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HEALTH AND SAFETY PLAN

HEALTH AND SAFETY PLAN

Rocky Flats Plant Operable Unit 1 Groundwater Treatment Facility Health and Safety Plan prepared by Resource Technologies Group, Inc

The site-specific health and safety plan has been written for the use of Resource Technologies Group, Inc , their employees, and subcontractors All EG&G personnel associated with this Project shall comply with all aspects of this plan as related to health, safety, and emergency response

REVIEW AND APPROVAL

M C Burnette
EG&G Project Manager — Date: 9-30-93

H.W. Kost
Health and Safety Liaison Officer — Date: 9/29/93

A E D C
Environmental Restoration Health and Safety Officer — Date: 9/29/93

ROCKY FLATS PLANT
OPERABLE UNIT 1 GROUNDWATER TREATMENT FACILITY
HEALTH AND SAFETY PLAN

Plan Approvals

Resource Technologies Group, Inc

Bartley W Conroy — 7/30/93
Bartley W. Conroy — Date
Corporate Health and Safety Officer

EG&G Rocky Flats

Mark Burmeister — 8-6-93
Mark Burmeister — Date
Contractor s Technical Representative

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INTRODUCTION

This Appendix describes the RTG Respiratory Protection Program as established in the RTG Health and Safety Program Manual It describes responsibilities and basic requirements for RTG personnel who are required to work in situations where respiratory hazards may be present This Program was developed in accordance with the Federal OSHA Respiratory Protection Standard (29 CFR 1910 134) the American National Standards Institute (ANSI) Practices for Respiratory Protection (Z88 2) and the NIOSH Guide to Respiratory Protection

This Respiratory Protection Program addresses both field and fixed facility (laboratory) operations As a result some portions of the Program will have two different procedures for the same task such as in the Hazard Evaluation/Respirator Selection section

RTG will provide approved and certified respirators and component parts to employees at no cost to the individual Employees will use this respiratory protective equipment in accordance with this Procedure and the instructions and training that are provided

TYPES OF APPROVED RESPIRATORS

Only respirators approved and certified by the National Institute for Occupational Safety and Health (NIOSH) or the Mine Safety and Health Administration (MSHA) under 30 CFR Part 11 shall be used by RTG personnel Such respirators are listed in the NIOSH Certified Equipment List which is issued in December of each year

Respirators can be divided into two categories negative pressure and positive pressure Within these categories the following types of respirators are approved for use by RTG personnel

Negative pressure

half face air purifying respirators

full face air purifying respirators and

Positive pressure

powered air purifying respirators

pressure demand self contained breathing apparatus (2215 psi only)

air line/supplied air respirator with escape bottle

RTG will provide employees with an opportunity to fit test negative pressure air purifying respirators from several manufacturers in order that an employee will get the appropriate fit

RESPIRATOR SELECTION

The Health and Safety Manager will determine the appropriate type of respirator for a specific hazard The selection of respiratory protective equipment will be based upon these five steps

Identification of the hazard

Evaluation of the hazard level

Consideration of the user's personal characteristics

Consideration of the conditions of use and

Use of an approved respirator

Each step is described in detail in the following sections

IDENTIFICATION OF THE HAZARD

Identification of the type of hazard is the first step in the selection of a respirator Although the number of hazardous conditions which might require a respirator are virtually limitless they will generally fall into one of the following five categories

Gas or Vapor Contaminant

Gases are substances which normally exist as such at ordinary temperature and pressure (e g carbon monoxide or sulfur dioxide) where as vapors are the gaseous state of substances that would be solid or liquid at ordinary temperature and pressure (e g acetone or benzene vapors)

Most gases and vapors are colorless but may have a distinctive odor which helps in hazard identification The odor threshold of many gases and vapors is below the Permissible Exposure Limit (PEL) or Threshold Limit Value (TLV) and odor can therefore be used as an indication of a hazard A few gases and vapors however have odor thresholds above their respective PEL s and the perception of their odor indicates that a hazardous concentration has already been exceeded The Health and Safety Manager can provide information regarding odor thresholds for specific chemicals

Regardless of the relationship between the odor threshold and PEL the perception of contaminant odor is an indication of respirator leakage or cartridge breakthrough and the respirator wearer should exit the area immediately

Particulate Contaminants

Particulate contaminants are made up of tiny particulates or droplets of a substance Many of these particles are so small (less than 50 microns in diameter) they cannot be seen and those less than 10 microns in diameter can easily be inhaled Particles less than 5 microns in diameter are small enough to reach deep into the lungs or into the alveoli

Particulates are produced by mechanical means through the disintegration processes such as grinding crushing drilling blasting or spraying or by physicochemical reactions such as combustion vaporization distillation sublimation calcination or condensation

Combination of Contaminants

Gaseous and particulate contaminants frequently occur together Paint spraying for example produces both paint mist (particulate) and solvent vapors (gaseous) Smoke also contains particulates and gases

Oxygen Deficient Atmospheres

In an oxygen deficient atmosphere the problem is not the presence of something harmful but the absence of something essential Such atmospheres are most commonly found in confined and usually poorly ventilated spaces such as silos petrochemical tanks and the holds of ships Oxygen deficient atmospheres are classified as immediately dangerous to life or health (IDLH)

An accurate description of an oxygen deficient atmosphere is important for proper respirator selection but one definition has not been universally accepted For RTG and OSHA compliance purposes an oxygen deficient atmosphere contains less than 19 5 percent oxygen

IDLH Atmospheres

This is an atmosphere where employee exposure can

Cause serious injury or death within a short period of time (e g high concentrations of carbon monoxide or hydrogen sulfide)

Cause serious delayed effects (e g airborne radioactive materials or cancer causing agents) or

Prevent exposed personnel from escaping the environment within 30 minutes

Once a hazardous situation has been categorized as one of the hazards above (i e gas, vapor particulate oxygen deficient IDLH) an initial decision can be made concerning the general type of respirator that may be selected

EVALUATION OF THE HAZARD LEVEL

The second consideration in selecting a respirator is the level or concentration of the hazard requiring the respirator The concentration of the air contaminant and how it compares to the TLV of PEL for that substance must be known in order to determine the protection factor" which the respirator must provide The protection factor is the ratio of the concentration of the contaminant outside the respirator to that inside the respirator under conditions of use Respirators should be selected so that the concentration inside the respirator will not exceed the TLV or PEL

$$MUC = PF \times TLV$$
$$PF = MUC/TLV$$

where MUC = maximum use concentration
PF = protection factor
TLV = threshold limit
(or use PEL permissible exposure limit)

Respirator protection factors tend to vary depending upon the specific standard cited The list below presents protection factors that are generally accepted in the absence of standards that indicate otherwise

	Protection Factor
Half face filter or chemical cartridge respirator	10
Full face filter or chemical cartridge respirator	50
Powered air purifying respirator	100
Self contained breathing apparatus pressure demand	10 000 +

CONSIDERATION OF THE USER S PERSONAL CHARACTERISTICS

Medical Condition

The use of any type of respirator will impose some physiological stress on the user For example

Air purifying respirators make breathing more difficult because the filter or cartridge impedes the flow of air

The special exhalation valve on an open circuit pressure demand respirator requires the wearer to exhale against some resistance

The bulk and weight of an SCBA can be a burden and

If the wearer is using an airline respirator they might have to drag up to 300 feet of hose around

All these factors can significantly increase the employee s workload and wearers shall have medical examinations to determine if they are medically able to wear respiratory protective equipment without aggravating preexisting medical problems

In order for the Health and Safety Manager to render a qualified opinion on employee respirator usage the physician should be provided with the following information

The type of respiratory protection equipment to be used and its modes of operation

The tasks an employee will perform while wearing the respirator

The length of time that the employee might wear the equipment and

Any substance to which the employee could be exposed and its related toxicity

Emotional and Mental Factors

Emotional and mental factors must also be considered when employees wear respirators Some individuals feel claustrophobic when wearing them especially with protective clothing If there are indications that an individual suffers from chronic claustrophobia such individuals should not be placed in such a situation

Physical Characteristics

Scars hollow temples very prominent cheekbones deep skin creases and lack of teeth or dentures may cause respirator facepiece sealing problems Full dentures should be retained when wearing a respirator but partial dentures may or may not have to be removed depending upon the possibility of swallowing them under duress

Corrective Lenses

If glasses or goggles are required they shall be worn so as not to affect the respirator

If a full face respirator is worn a proper seal cannot be established due to eyeglasses temple bars extending through the sealing edge of the facepiece Wearing contact lenses with any type of respirator is not permitted unless essential for therapeutic reasons and with the concurrence of the Health and Safety Manager

Systems have been developed for mounting corrective lenses inside full facepieces and when a person must wear corrective lenses the proper facepiece and lenses must be obtained to provide good vision comfort and a gas tight seal

CONSIDERATION OF THE CONDITIONS OF USE

Eye Irritation

If the air contaminant can cause eye irritation a full facepiece respirator should be used

Skin Irritation or Absorption Through the Skin

Some airborne contaminants are extremely irritating to the skin (ammonia or hydrochloric acid) while others are capable of being absorbed through the skin and into the blood stream with serious and possible fatal results (hydrocyanic acid or organophosphate pesticides such as parathion malathion or tetraethyl phosphate)

Rubber facepiece material can cause skin irritation dermatitis for some individuals The use of non allergenic silicone facepieces can help alleviate this condition

Communication

Speech communication may be necessary in jobs where a respirator is required Conventional respirators however distort the human voice to some extent and shouting can cause facepiece or component leakage

Mechanical speech transmission devices called speaking diaphragms are available as an integral part of some respirators These consist of a resonant cavity and diaphragm which amplify sound in the frequency range most important to intelligible speech The diaphragm acts as a barrier to entry of ambient atmospheres and should be carefully handled and protected by a cover to prevent puncture or breakage

Methods of electronically transmitting speech from the respirator utilize microphones connected to a telephone facepiece or earlobe while the amplifier power pack and loudspeaker or transmitter are attached to the exterior of the mask are carried on the body or are remotely located

Respirators with electric or electronic speech transmission devices having an integral or body attached battery power supply should be used with caution in explosive atmospheres and connecting cables from microphones inside the facepiece must have gas tight seals where they emerge from the facepiece When the loudspeaker diaphragm is part of the

barrier between the respirator wearer and the ambient atmosphere it should be inspected frequently for leakage and protected from puncture or breakage

Location of Hazardous Work Area

The location of the contaminated area with respect to a possible source of respirable air requires special consideration When using an airline respirator the distance that the wearer can go into a contaminated atmosphere is limited by the length of hose connected to the source of respirable air The hose also requires that the user must enter and leave the area by the same route unless the device is equipped with an auxiliary filter cylinder appropriate for use in withdrawal While wearing an SCBA or filter respirator a person may leave the contaminated area by any approved exit but one must make certain that the device will afford protection until reaching respirable air taking into account possible delays

Duration of Task

Work time usually determines the period for which respiratory protection is needed including time necessary to enter and leave a contaminated area A self contained breathing apparatus or chemical cartridge respirator provides protection for as long as the facepiece is supplied with adequate respirable air Particulate filter respirators can provide protection for long periods without need for filter replacement but only if the atmospheric particulate loading is low Therefore for protracted periods of use an airline respirator offers definite advantages over a filter respirator

Some respirators have a means for indicating remaining service life Some type of warning is available for all self contained breathing apparatus This may be a pressure gauge timer or an audible or physical alarm The user should understand the operation and limitations of each type of warning device Most chemical cartridge respirators have no indicator of remaining service life Canisters and cartridges should be changed according to the manufacturer s directions

Activity Required

The work area to be covered work rate and mobility of the wearer in carrying out the work should be considered in respirator selection Air purifying respirators present minimal interference with the wearer s movement Supplied air respirators with trailing hoses severely restrict the area the wearer can cover and present a potential hazard if the hose comes in contact with machinery or other objects SCBA presents a size and weight penalty which may restrict climbing and movement in tight places

The wearer s work rate determines his respiratory volume maximum inspiratory flow rate and inhalation and exhalation breathing resistance The respiratory minute volume is of

great significance in self contained and airline respirators operated from cylinders since it determines their operating life It is also a factor in cartridge service life on air purifying respirators Useful life under moderate work conditions may be one third of that under rest conditions

Peak flow rate is important in the use of constant flow airline equipment The air supply rate should always be greater than the peak inspiratory flow rate to maintain the respiratory enclosure under positive pressure

The high breathing resistance of air purifying respirators under conditions of heavy work can result in distressed breathing

Work In Low Temperatures

The major problem in the use of respirators at low temperatures is freezing of exhalation valves and for full facepieces poor visibility

Full facepieces are designed so that the incoming fresh air sweeps over the inside of the lens to reduce fogging Otherwise it would be impossible to wear a full facepiece even at ordinary room temperature without severe fogging Anti fog compounds may be used to coat the inside of the lens to prevent fogging at room temperatures and down to temperatures approaching 32 degrees Fahrenheit (°F) However below 0°F anti fog compounds will not prevent severe fogging

Full facepieces are available with nose cups that direct moist exhaled air through the exhalation valve A properly fitted nose cup should in theory allow adequate visibility at temperatures down to 30° F

At very low temperatures the exhalation valve may collect moisture and freeze open allowing the wearer to breathe contaminated air or freeze closed which prevents normal exhalation

High pressure connections on SCBA may leak because of metal contracting at low temperatures The connections should not be overtightened since they may break when the temperature returns to normal

Work In High Temperatures

A person working in areas of high ambient or radiant temperature is already under stress and any additional stress resulting from use of respirators should be minimized This can be done by selecting and using respirators having minimum weight and breathing resistance Supplied air respirators and hoods and suits having an adequate supply of cool breathing air are recommended Also a simple Venturi valve operated by compressed breathing air is available for that purpose

USE OF AN APPROVED RESPIRATOR

Having considered the type of hazard the level of the hazard user charactenstics and the conditions of use a decision may be made concerning the appropriate type of respirator As important as selecting the right type of respirator is the selection of an approved respirator The National Institute for Occupation Safety and Health (NIOSH) provides a testing approval and certification program for respiratory protective devices Approved devices are listed in the NIOSH Publication NIOSH Certified Equipment List This publication is updated periodically with the addition of newly approved equipment and deletion of equipment which has lost its approval

All approved devices have a "TC (Tested and Certified) number permanently printed on the item and this number is referenced in the NIOSH Certified Equipment list described above

Only NIOSH/MSHA approved respiratory protective equipment will be issued to and worn by RTG employees

RESPIRATOR FIT TESTING

GENERAL REQUIREMENTS

Fit testing is required by OSHA and ANSI RTG provides each respirator user a fit test in order to select the specific type make and model of negative pressure respirator for use by the wearer

The following policies are observed in the fitting and use of the respirator

Fit testing for positive pressure respirators is not required

Personnel shall be allowed to use only the specific make(s) and model(s) of air purifying respirators for which the person has obtained a satisfactory fit verified through fit testing procedures

An employee is not permitted to use any respirator not previously fit tested or if the results of the fit test indicated that the person was unable to obtain a satisfactory fit

No facial hair or glasses are allowed that will interfere with the attainment of a good seal Facial hair (e g some moustaches) that does not interfere with a good facepiece to face seal is permissible

RTG will provide persons requiring glasses with specially mounted glasses inside the full face mask Under no circumstances will contact lenses be worn while using any type of respirator unless essential for therapeutic reasons and with the concurrence of the Health and Safety Manager

If it is found that an employee cannot obtain a good facepiece to face seal because of facial features or medical factors that equipment shall not be used and they shall not enter an atmosphere requiring the use of that equipment

The Health and Safety Manager will keep records of the make model size and type of respirator that has been satisfactorily fit tested for each employee The record will include the date and signature of the person performing the test and

Fit tests will be repeated at least annually

FIT TEST PROCEDURE

An employee shall be allowed to use only the specific make(s) and model(s) of air purifying respirators for which the person has obtained a satisfactory fit verified through fit testing

procedures An employee is not permitted to use any respirator not previously fit tested or if the results of the fit test indicated that the person was unable to obtain a satisfactory fit

RTG s qualitative fit test procedures involve two stages of testing Stage I involves a simple respirator negative and positive pressure sealing check for facepiece fit Stage II involves the exposure of the respirator wearer to a test atmosphere This will include two separate atmosphere tests to double check the adequate fit of the respirator to the wearer

NOTE During any fit test respiratory head straps must be as comfortable as possible Over tightening the straps can reduce facepiece leakage but the wearer may not be able to tolerate the mask for any period of time

Stage I

Negative Pressure Sealing Checks For Tightly Fitting Air Purifying Respirators

The wearer performs this test after donning an air purifying respirator The test consists of closing off the inlets of the cartridge(s) canister or filters by covering them with the palm(s) of the hand(s) so that air cannot pass inhaling gently and holding one s breath for at least ten seconds If the facepiece collapses slightly and no inward leakage of air into the facepiece is detected it can be reasonably assumed that the fit of the respirator is satisfactory This is only as a gross determination of fit none the less this test shall be used each time prior to entering a toxic atmosphere

Positive Pressure Seal Check for Air Purifying Respirators with Inhalation and Exhalation Valves

This test is very much like the negative pressure sealing check and is conducted by closing off the exhalation valve and exhaling gently The fit is considered satisfactory if a slight positive pressure can be built up inside the facepiece for at least 10 seconds without detecting any outward leakage of air between the sealing surface of the facepiece and the wearer s face This test is also used only as a gross determination of fit This test shall be used each time prior to entering a toxic atmosphere

NOTE The positive and negative pressure sealing checks can also be used on SCBA facepieces to determine gross fit characteristics

Stage II

A person wearing an air purifying respirator will be exposed to two test agents isoamyl acetate an odorous vapor and stannic chloride an irritant smoke The respirator will be equipped with a cartridge which effectively removes the test agents from respired air If the

wearer is unable to detect penetration of the test agent into the respirator the wearer has achieved a satisfactory fit

Health and Safety Managers should note that there are specific fit testing protocols mandated by Federal regulations for respirator use in atmospheres containing the following substances

Asbestos	29 CFR 1910 1001 and 1926 58
Benzene	29 CFR 1910 1028
Lead	29 CFR 1910 1025
Formaldehyde	20 CFR 1910 1048

Procedures for the Isoamyl Acetate Vapor (Banana Oil) Test

The isoamyl acetate fit test may be conducted by using a plastic bag as a test hood The bag may be hung from the ceiling over a coat hanger suspended by twine Inside the plastic bag a piece of cloth saturated with isoamyl acetate is attached to the hanger at the top of the bag This produces a concentration of approximately 100 ppm in the test atmosphere inside the plastic bag Most people can detect isoamyl acetate at 1 to 10 ppm The permissible exposure is 100 ppm

The wearer dons the respirator in a normal manner The respirator will be fitted with organic vapor cartridges

The wearer enters the test enclosure so that the head and shoulders are well inside the bag

If the wearer smells banana oil he returns to clean air and readjusts the facepiece and/or adjusts the headstraps without unduly tightening them

The wearer repeats the second step If he does not smell banana oil he is assumed to have obtained a satisfactory fit If he smells the vapor an attempt should be made to find the leakage point If the leak cannot be located another brand of respirator with a facepiece of the same type should be tried

After a fit is obtained if the respirator is an air purifying device it must be equipped with the correct filter(s) cartridge(s) or canister for the anticipated hazard

During the test the subject should make movements that approximate a normal working situation These may include but not necessarily be limited to the following

Normal breathing

Deep breathing as during heavy exertion This should not be done long enough to cause hyperventilation

Site-to side and up-and down head movements These movements should be exaggerated but should approximate those that take place on the job

Talking This is most easily accomplished by reading a prepared test loudly enough to be understood by someone standing nearby

Other exercises may be added depending upon the situation For example if the wearer is going to spend a significant part of his time bent over at some task it may be desirable to include an exercise simulating this motion

The major drawback of the isoamyl acetate test is that the odor threshold varies widely among individuals Furthermore the sense of smell is easily dulled and may detenorate during the test so that the wearer can detect only high vapor concentrations Consequently a wearer may say that the respirator fits when there is in fact a large leak Therefore check these test results out carefully and move on to the next test atmosphere

Procedures for the Irritant Smoke (Stannic Chlonde) Test

This test is similar in concept to the isoamyl acetate test It usually involves exposing the respirator wearer to an irritating aerosol produced by commercially available smoke tubes normally used to check the quality of ventilation systems When the tube ends are broken and air is passed through it the material inside reacts with the moisture in the air to produce a dense highly irritating smoke consisting of hydrochloric acid absorbed on small solid particles As a qualitative means of determining respirator fit this test has a distinct advantage in that the wearer usually reacts involuntarily to leakage by coughing or sneezing The likelihood of this test giving a false indication of proper fit is reduced On the other hand the aerosol is very irritating and must be used carefully to avoid injury Also it is advisable to have exhaust ventilation behind the subject to protect the person doing the testing

This test can be used for both air purifying and atmosphere supplying respirators but air purifying respirators must have a high efficiency filter(s) After the test it may be necessary to replace the high efficiency filter(s) on the air purifying respirator with another type of air purifying element(s) depending upon the hazard to which the respirator wearer is to be exposed This test can be used for worker training or respirator selection

The irritant smoke test will be conducted by using a plastic bag as a test hood The bag shall be hung from the ceiling over a coat hanger suspended by twine A small hole should

be made in the top portion of the bag so that the irritant smoke can be dispensed into the bag after the test subject has entered the bag

The air purifying respirator to be used in this test must be equipped with a high efficiency filter

The irritant smoke fit test will be performed as follows

The wearer puts on the respirator tightening the headstraps to obtain a good fit but not overtightened and uncomfortable Once the respirator is properly on the subject should enter the suspended bag so that his head and shoulders are well inside the bag

The tester shall begin to add the irritant smoke in small quantities at first pausing between puffs from the applicator

The subject should breathe normally

After confirming that the respirator functions properly during norma breathing the subject should breathe deeply as during heavy exertion This should not be done long enough to cause hyperventilation

Side to side and up and down head movements should also be tested while the head and shoulders remain in the bag These movements should be exaggerated but should approximate those that take place on the job

Talking is most easily tested by reading a prepared test loudly enough to be understood by someone standing nearby

Other exercises may be added depending upon the situation For example if the wearer is going to spend a significant part of his time bent over at some task it may be desirable to include an exercise simulating this motion

If the wearer detects no leakage the tester may increase the smoke density still remaining alert to his reaction

NOTE When fit testing half face respirators with irritant smoke the test subject must keep his eyes tightly closed to avoid irritation Also the wearer should be well clear of the test area before removing the respirator (or opening his eyes if testing a half face respirator)

INSPECTION, CLEANING, MAINTENANCE, AND STORAGE

Respirator maintenance is an integral part of RTG s Respiratory Protection Program Wearing a poorly maintained or malfunctioning respirator is in one sense more dangerous than not wearing a respirator at all Workers wearing defective devices think they are protected when in reality they are not It is the responsibility of the Project Manager and/or Site Health and Safety Officer to ensure compliance with inspection cleaning maintenance and storage requirements The program requires at a minimum

Inspection for defects including a leak check
Repair as required
Cleaning and disinfecting and
Proper and sanitary storage of equipment

The maintenance program should ensure that each worker s respirator remains as effective as when it was new

INSPECTION FOR DEFECTS AND MAINTENANCE

If properly performed inspections will identify damaged or malfunctioning respirators before they can be used The OSHA standard outlines two types of inspections

Before and after use and
During cleaning

All respiratory equipment will be inspected thoroughly during the cleaning process Before the apparatus is used any defects will be repaired or the defective part replaced Proper inspection maintenance and cleaning of respiratory equipment is the responsibility of the user

The following procedure shall be used to inspect half and full face air purifying respirators and SCBAs

Air Purifying Respirators

Air purifying respirators should be checked as follows before and after each use
Examine the facepiece for

Excessive dirt

Cracks tears holes or physical distortion of shape from improper storage

Inflexibility of rubber facepiece (stretch and knead to restore flexibility)

Cracked or badly scratched lenses in full facepieces

Incorrectly mounted full facepiece lenses or broken or missing mounting clips and

Cracked or broken air purifying element holder(s) badly worn threads or missing gasket(s) if required

Examine the straps of the head harness for

Breaks

Loss of elasticity

Broken or malfunctioning buckles and attachments and

Excessively worn serrations on head harness which might permit slippage (full facepieces only)

After removing the cover examine the inhalation and exhalation valves for the following

Foreign material such as detergent residue dust particles or human hair under the valve seat

Cracks tears or distortion in the valve material

Missing or defective valve cover and

Improper installation of the valve in the valve body

Examine the air purifying element for

Incorrect cartridge canister or filter for the hazard

Incorrect installation loose connections missing or worn gasket or cross threading in the holder

Expired shelf life date on the cartridge or canister and

Cracks or dents in the outside case of the filter cartridge or canister indicated by the absence of sealing material tape foil etc over the inlet

If the device has a corrugated breathing tube examine it for

Broken or missing end connectors

Missing or loose hose clamps and

Deterioration determined by stretching the tube and looking for cracks

SCBA Inspection Procedures

Before a self contained breathing apparatus can be used it must be properly inspected to help prevent malfunction during use The checklist that follows can help ensure proper inspection

Prior to starting checklist make sure that

High pressure hose connector is tight on cylinder fitting

Bypass valve is closed

Mainline valve is closed and

Regulator outlet is not covered or obstructed

Back Pack and Harness Assembly Straps

Visually inspect for complete set and

Visually inspect for frayed or damaged straps

Regulator and High Pressure Hose High Pressure Hose and Connector

Listen or feel for leakage in hose or at hose to cylinder connector (Bubble in outer hose covering may be caused by seepage of air through hose when stored under pressure This does not necessarily indicate a faulty hose)

Regulator and Low Pressure Alarm

Place mouth onto or over regulator outlet and blow A positive pressure should be created and maintained for 5 to 10 seconds without loss of air Next inhale to create a slight negative pressure on regulator hold for 5 to 10 seconds The vacuum should remain constant This tests the integrity of the diaphragm Any loss of pressure or vacuum during this test indicates a leak in the apparatus

With the regulator outlet uncovered and unobstructed open and close bypass valve momentarily to assure flow of air through bypass system

Cover regulator outlet with palm of hand Open mainline valve and read regulator gauge (must read at lease 1 800 psi and not more than rated cylinder pressure)

Remove and replace hand from outlet in rapid movement Repeat this motion twice more Air should escape when hand is removed each time indicating a positive pressure in chamber and

Close cylinder valve leaving the mainline valve open and slowly move hand from regulatory outlet to allow air to flow slowly Gauge should begin to show immediate loss of pressure as air flows Low pressure alarm should sound between 520 and 480 psi Remove hand completely from outlet and close mainline valve

Storage of Units

Cylinder refilled as necessary and unit cleaned and inspected

Cylinder valve closed

High pressure hose connector tight on cylinder

Pressure bled from high pressure hose and regulator

Bypass valve closed

Mainline valve closed

All straps completely loosened and laid straight and

Facepiece properly stored to protect against dust direct sunlight extreme temperatures excessive moisture and damaging chemicals

CLEANING

Cleaning and sanitizing the units is accomplished in the following manner

The apparatus is disassembled into its components as described in the manufacturer s schematic display that accompanies the unit This step also affords the opportunity to thoroughly inspect each of the components for

any defects excessive wear and tear etc Discard any previously used cartridges

Thoroughly wash the facepiece and mask components in a cleaning and sanitizing solution such as one ounce of powdered MSA Cleaner-Sanitizer to 1 gallon of warm water (120°F) The components should be scrubbed with a sponge or soft brush to remove dust dirt or other contaminants

Thoroughly rinse all component pieces in warm water This step is important because residuals of cleaning solutions can cause irritation and/or dermatitis for some individuals

Air dry all components thoroughly inspect them again for any defects reassemble the unit and store properly until the next use

STORAGE

Respirators will be stored in a convenient clean and sanitary location to protect them against dust sunlight excessive heat or cold excessive moisture damaging chemicals and mechanical damage They will be stored individually (e g not stacked one upon the other or in cramped spaces) to prevent distortion of rubber or other elastomeric parts Respirators should be stored in plastic bags preferably in the cartons in which they came and be readily identifiable as to the individuals to whom they have been assigned