VISTA Technologies, Inc.
Radiation Safety Program

PROCEDURE - 1

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VISTA Technologies, Inc.
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PROCEDURE - 2

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PROCEDURE - 3

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VISTA Technologies, Inc.
Radiation Safety Program

PROCEDURE - 4

RESPIRATORY PROTECTION

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TABLE OF CONTENTS

ABBREVIATIONS AND ACRONYMS

α	-	Alpha
ß	-	Beta
γ	-	Gamma
μ	-	Micro
^{241}Am	-	Americium-241
^{137}Ce	-	Cesium-137
^{234}Pa	-	Protactinium-234
^{210}Pb	-	Lead-210
^{210}Po	-	Polonium-210
^{214}Po	-	Polonium-214
^{218}Po	-	Polonium-218
^{232}Pu	-	Plutonium-232
^{226}Ra	-	Radium-226
^{228}Ra	-	Radium-228
^{219}Rn	-	Radon-219 (Actinium Series)
^{220}Rn	-	Radon-220 (Thorium Series)
^{222}Rn	-	Radon-222 (Uranium Series)
^{89}Sr	-	Strontium-89
^{90}Sr	-	Strontium-90
^{230}Th	-	Thorium-230
^{232}Th	-	Natural Thorium
^{238}U	-	Uranium-238
µCi	-	MicroCurie
µCi/hr	-	MicroCuries per hour
µCi/ml	-	MicroCuries per milliliter
µM	-	Micrometer
µR/hr	-	MicroRoentgen per hour
µg/mg	-	Microgram per milligram
ALARA	-	As low as reasonably achievable
ALI	-	Annual limit on intake
ANSI	-	American National Standards Institute
APR	-	Air-purifying respirator
Bq	-	Becquerel
Bq/m^3	-	Becquerels per cubic meter of air
BZ	-	Breathing Zone
C	-	Coulomb
C/kg	-	Coulombs per kilogram
CDE	-	Committed Dose Equivalent
CEDE	-	Committed Effective Dose Equivalent

CFR	-	Code of Federal Regulations
Ci	-	Curie
CIH	-	Certified Industrial Hygienist
CFM	-	Cubic feet per minute
CLIA	-	Clinical Laboratories Improvement Act
CLP	-	Contract Laboratory Program
cm	-	Centimeter
cm/sec	-	Centimeters per second
cpm	-	Counts per minute
CPR	-	Cardiopulmonary resuscitation
CSE	-	Certified Safety Executive
(D)	-	Duplicate count
DAC	-	Derived air concentration
DAC-h	-	DAC hours
DCA	-	Double Contingency Analysis
DDE	-	Deep Dose Equivalent
DI	-	De-ionized water
DOT	-	U.S. Department of Transportation
dm^2	-	Square Decimeter; one square decimeter equals 100 square centimeters
dpm	-	Disintegrations per minute
dpm/cm^2	-	Disintegrations per minute per square centimeter
dpm/dm^2	-	Disintegrations per minute per square decimeter
dps	-	Disintegrations per second
DRD	-	Direct reading dosimeter
DU	-	Depleted uranium
EPA	-	U.S. Environmental Protection Agency
eV	-	Electronvolt
FE	-	Feces sample
FIDLER	-	Field instrument for detection of low energy radiation
FR	-	Filter ratio
FSP	-	Field Sampling Plan
ft^2	-	Square foot
γ	-	Gamma ray
GA	-	General area
GeLi	-	Germanium - Lithium
G-M	-	Geiger-Mueller
GMC-H	-	Mine Safety Appliances Company, full-facepiece, dual ..combination filter cartridges for an APR
GPD	-	Gaseous Diffusion Plang
h	-	hours
He-3	-	Helium Three (3)

HEPA	-	High efficiency particulate air
HNO_3	-	Nitric acid
HP	-	Health Physics
hr	-	Hour
HS	-	Hot spot (radiation)
HSP	-	Site-specific Health and Safety Plan
HWP	-	Hazardous Work Permit
ICRP	-	International Commission on Radiological Protection
ID	-	Identification
IDLH	-	Immediately dangerous to life or health
IDW	-	Investigation derived waste
IP	-	Ionization potential
IVC	-	Independent verification contractor
keV	-	Kiloelectronvolt
kg	-	Kilogram
LANL	-	Los Alamos National Laboratory
lpm	-	Liters Per Minute
MCA	-	Multi-channel analyzer
MDA	-	Minimum detectable activity
meV	-	Millielectronvolt
m	-	Meter
m^2	-	Squared Meters
m^3	-	Cubic meters
mCi	-	MilliCurie
MSHP	-	Manager, Vista Safety and Health Program
mil	-	1/1000 inch
ml	-	Milliliter
mm	-	Millimeter
mR	-	MilliRoentgen
mR/hr	-	MilliRoentgens per hour
mrem	-	Millirem
mrem/hr	-	Millirems per hour
MSA	-	Mine Safety Appliances Company
MSDS	-	Material Safety Data Sheet
MSHA	-	Mine Safety and Health Administration
NaI	-	Sodium iodide
NCA	-	Nuclear Criticality Analysis
NCS	-	Nuclear Criticality Safety
NCRP	-	National Council on Radiation Protection and Measurements
NEA	-	Nuclear Energy Agency
NIST	-	National Institute of Science and Technology

U^{nat}	-	Natural uranium
UR	-	Urine sample
U.S.	-	United States
VISTA	-	Vista Technologies, Inc.
VSHP	-	VISTA Safety and Health Program
VRSP	-	VISTA Radiation Safety Program
WL	-	Working Level
WP	-	Work Plan

1 PURPOSE AND SCOPE

This procedure describes the requirements and Vista policies associated with respiratory protection at Vista job sites and during any work requiring their use. Adherence to this procedure helps assure that personnel exposures to airborne radioactive material will be below specified limits, personnel will remain free of contamination and contamination will not be spread beyond the designated contaminated area.

1.1 Vista Respiratory Protection Policy

Engineering and process controls shall be used to the extent practicable to limit the concentrations of airborne radioactive materials to levels less than 10% of Derived Air Concentration (DAC) values listed in 1O CFR 2O, Appendix B, Table 1, Column 1. When it is impractical to use engineering and process controls, or while they are being implemented, other precautionary procedures such as limiting stay times, increased surveillance and/or the use of respiratory protective equipment will be used to limit the intake of airborne radioactive materials as far below 40 DAC hours, in seven (7) consecutive days, as possible. The 40 DAC-hour control measure of 1O CFR 2O.1204(h)(1) will be the internal exposure limit. Respirators should not normally be used for routine repetitive tasks but may be used for non-routine tasks. Emergency situations involving potential respiratory hazards may arise under any program. Periods of respirator use and overall duration of use should be kept to a minimum. Respirator users shall be allowed adequate relief from use (breaks) at reasonable intervals. The variations in job assignments and in the physical and psychological capacities and attitudes of the user shall be considered. The user may leave the area at anytime for the relief from respirator use in the event of equipment malfunction, physical or psychological distress, or any other condition which requires relief.

1.2 Procedures

The attached procedures of the Respiratory Protection Program shall be followed as applicable for any work involving actual or potential exposure to airborne hazardous materials.

1.3 Vista Air Sampling Program

The air-sampling program is established to provide adequate identification of all respiratory hazards present including radiological, oxygen deficient, and toxic materials.

- Air sample data will be used to select the proper respirator and provide estimates of worker exposure.
- Air samples will be representative of the air being breathed by the worker(s).

1.4 Vista Bioassay Program

Measurements of radioactive materials in the body and/or excreted from the body will be performed as necessary for timely detection and assessment of individual intakes of radioactive materials according to procedure. The techniques used (e.g., whole body counts, urine samples, etc.) will be appropriate with respect to the material exposed.

- Baseline bioassay data shall be obtained. See section 2 of this procedure.
- Periodic bioassay samples will be taken to determine the adequacy of the respiratory protection program and will be used to determine actual exposures, if any.

1.5 Effectiveness of the Respiratory Protection Program

Workers shall be periodically observed working in respirators to ensure proper equipment functioning and to monitor worker stress while working.

NOTE: Personnel shall not be allowed to wear a respirator without a current medical (OSHA-type) exam. This is required in order to protect workers from the physical harm which may be caused to a respiratory system which cannot handle the strain of breathing through a respirator.

1.6 Responsibilities

1.6.1 Radiation Safety Officer

The Vista Radiation Safety Officer (RSO) is overall responsible for training of personnel using respirators. The On-site Radiation Protection Officer (ORPO) or Health Physicist (HP) in the absence of RSO assumes the responsibility. The Vista ORPO and HP shall be qualified by training and experience, and approved by the RSO, to perform the requirements of this procedure.

1.6.2 Personnel

It is the responsibility of each employee to ensure all respiratory protection equipment under their control is checked in accordance with the provisions of this procedure, they are currently qualified by medical examination and training before putting on a respirator, and that all provisions of this procedure are complied with at all times.

2 PHYSICAL EXAM & FIT TESTING REQUIREMENTS

Personnel will complete a baseline bioassay, physical examination, and fit test prior to initial use of respirators and at least every twelve (12) months thereafter (except fit test). Requalification/testing must occur within the twelve (12) month period.

2.1 Physical Examinations

Personnel will be certified by a licensed physician that the individual is physically able to use respiratory protection equipment. For radioactive materials and hazardous materials (except asbestos), this qualification is annual.

NOTE: For asbestos, this qualification is every six months (29 CFR 1920)

2.2 Training

Personnel who wear respirators and personnel who direct the work shall be trained in respiratory protection. The training will be based on the types of respirators to be worn and depends on the hazards to be encountered. The training will include the review of radiation and contamination hazards, including the use of other protective equipment that may be used with the respirator, and the following:

a. Discussion of the airborne contaminants (physical properties, DAC's, physiological actions, toxicity and means of detection)

b. Discussion of the construction, operating principles, and the limitations of the respirator and application of available cartridges and canisters;

c. Instruction on the proper use of the device, including performance of a pre-use inspection and negative pressure test;

d. Instruction on how to perform a qualitative fit test;

e. Instruction in the proper maintenance of the respirator;

f. Instruction in emergency actions to be taken in the event of malfunction of the respirator;

g. Any other special training as needed.

h. The trainee will be required to properly perform a pre-use inspection, don, wear and remove the respirator. He/she will be given ample time to wear the device in an uncontaminated atmosphere to become familiar with its operation.

i. The training shall be given by personnel who have practical experience in the selection, use and maintenance of respiratory protection equipment.

2.3 Fit Test

A qualitative or quantitative respirator fitting test will be performed to determine the ability of each individual wearer to obtain a satisfactory fit with a negative pressure respirator. The results of the fit test will be used to select types, models and sizes of respirators for each individual user.

- A quantitative fit test is preferred and, if performed, an overall fit factor of at least 100 shall be obtained with a full face negative pressure respirator.

- A qualitative fit test in a challenge atmosphere is acceptable and should be performed according to Section 3 of this procedure "Qualitative Fit Testing". If the wearer is unable to detect penetration of the challenge agent, the fit test is satisfactory.

2.4 Respirator – Fitting Test Records

Records of the respirator-fitting tests shall be kept for at least the duration of employment. These records shall include the following information:

1) Type of respirator-fitting test used
2) Specific make and model of respirator tested
3) Name of person tested
4) Name of test operator
5) Date of test
6) Results of respirator-fitting tests
   (a) Success or failure of person to obtain satisfactory fit if a qualitative respirator-fitting test was carried out
   (b) Respirator protection factor based upon test results if a quantitative respirator-fitting test was carried out

2.5 Respirator Fitting Tests

A qualitative or quantitative respirator-fitting test shall be used to determine the ability of each individual respirator wearer to obtain a satisfactory fit with a negative-pressure respirator. (The National Institute for Occupational Safety and Health recommends that only a program of quantitative fit testing can provide adequate worker protection). The results of qualitative or quantitative respirator-fitting tests shall be used to select specific types, makes, and models of negative-pressure respirators for use by individual respirator wearers. A respirator-fitting test shall be carried out for each wearer of a negative-pressure respirator at least annually. Respirator-fitting tests shall not be required for positive-pressure respirators.

2.6 Qualitative Respirator-Fitting Test

A person wearing a respirator is exposed to an irritant smoke, an odorous vapor, or other suitable test agent. An air-purifying respirator must be equipped with an air-purifying element(s) which effectively removes the test agent from inspired air. If the respirator wearer is unable to detect penetration of the test agent into the respirator, the respirator wearer has achieved a satisfactory fit with the respirator.

2.7 Quantitative Respirator-Fitting Test

A person wears a respirator in a test atmosphere containing a test agent in the form of an aerosol, vapor, or gas. Instrumentation which samples the test atmosphere and the air inside the respiratory-inlet covering of the respirator, is used to measure quantitatively the penetration of the test agent into the respirator-inlet covering. When carrying out a qualitative or quantitative respirator-fitting test, the respirator wearer shall carry out a series of exercises which simulate work movements.

2.8 Acceptance Test Procedures

When carrying out respirator-fitting tests, it shall be acceptable procedure to make the following modifications to respirators provided that such modifications do not affect the seal of the respirators to wearers.

(1) When carrying out a qualitative or quantitative respirator fitting test which uses an aerosol as the test agent, it shall be acceptable procedure to equip an air-purifying respirator with a high-efficiency filter.
(2) When carrying out a qualitative or quantitative respirator-fitting test which uses a vapor or gas as the test agent, it shall be acceptable procedure to equip an air-purifying respirator with an appropriate cartridge or canister which removes the vapor or gas from air.
(3) When carrying out a quantitative respirator-fitting test, it shall be acceptable procedure to attach a sampling probe to the respirator which is connected by flexible tubing to an instrument which measures the penetration of the test agent into the respirator.

When carrying out quantitative respirator-fitting tests, it shall be an acceptable procedure to carry out a single test for each available make and model of respirator in order to select a respirator for use by a person. However, three additional quantitative respirator-fitting tests involving the wearing of the selected make and model of respirator by the person shall be carried out to determine a protection factor for that particular respirator and person. The lowest protection factor determined by these three tests shall be assigned to a particular person wearing a specific make and model of respirator.

If a qualitative respirator-fitting test has been used in respirator selection, a person shall be allowed to use only the specific make(s) and model(s) of respirator(s) for which the person obtained a satisfactory fit. Under no circumstances shall a person be allowed to use any respirator if the results of the qualitative respirator-fitting test indicates that the person is unable to obtain a satisfactory fit. If a quantitative respirator-fitting test has been used in selecting a respirator, the test results shall be used to assign a respirator protection factor to each person for each specific make and model of respirator tested. The assigned respirator protection factor shall be applied when the person wears the specific respirator in a hazardous atmosphere.

2.9 Respirator Protection Factor Assignment

When a group of persons wear respirators in a given work area, a single respirator protection factor shall be assigned to all respirator wearers in the group. When negative-pressure respirators are being used, this respirator protection factor shall correspond to the lowest value established by qualitative or quantitative respirator-fitting tests for any person of the group with the specific make and model of respirator which that person will wear in the given work area.

2.10 Face Dimensions and Facepiece Sizes

The wide range of face dimensions requires more than a single size of respirator facepiece to provide a proper fit to all respirator users. Therefore, respirator facepieces of more than one size shall be available in any respirator-selection program involving respirators equipped with facepieces.

2.11 Employee Acceptance

Employee acceptance of a particular respirator model within a class shall be considered in selecting a respirator since this may determine whether or not the person wears the respirator properly. Acceptance factors to be considered include discomfort, breathing resistance, weight, and interference with vision or the work to be performed. If the results of respirator-fitting tests show that the person can obtain an acceptable fit with two or more respirator models of the selected class of respirator, then the person should be permitted to use the respirator model which he or she prefers.

3 QUALITATIVE FIT TESTING

3.1 Purpose

This procedure provides instructions for performing qualitative fit testing of respirators.

3.2 Equipment

3.2.1 Qualitative Fit Test Materials

a) Irritant Smoke Test

- Ventilation smoke tubes,Stannic Chloride ($SnCl_4$ – or tin tetrachloride) (MSA Part # 5645 or equivalent)
- Aspirator bulb
- Tubing

b) Isoamyl Acetate Test

- Isoamyl acetate ($C_7H_{14}O_2$)-also known as banana oil.
- Tissue, cloth, swab, or brush

"The irritant smoke test (using Stannic Chloride) will be phased out, by Vista, as soon as the Bitrex (Denatonium Benzoate) bitter taste kits become commercially available."

3.2.2 Respirator, full face piece, cartridge type, negative pressure, air purifying.

3.3 Precautions and Limitations

3.3.1 Verify that the person has met the physical and training requirements and that the

individual has no facial hair that may interfere with the proper operation of the respirator.

3.3.2 The person administering the test should avoid breathing the test agent.

3.3.3 Exercise caution when handling irritant smoke tubes. Observe the precautions listed on the box and do not allow the crystals inside the tube to contact skin.

3.3.4 Verify that the respirator used for the fit test is in good working condition.

3.3.5 Disinfect each fit test respirator by wiping with a disinfectant cloth between each fit test.

3.3.6 Isoamyl acetate shall not be used when only High Efficiency Particulate Air (HEPA) cartridges are worn.

3.3.7 DO NOT direct the test material directly at filters or combination cartridges.

3.4 Procedure

3.4.1 Test method (perform one of the tests below)

3.4.1.1 Irritant smoke and/or Bitrex bitter taste test may be used when either HEPA or combination vapor and HEPA cartridges are worn.

3.4.1.2 Isoamyl acetate shall not be used when HEPA only cartridges are worn.

3.4.2 Irritant Smoke Test and/or Bitrex

3.4.2.1 The test subject will perform a pre-use inspection, don the respirator and perform a negative pressure test.

3.4.2.2 If NOT already done, break off the ends of the smoke tube so that a small hole results on each end.

3.4.2.3 Attach the smoke tube to the respirator bulb and a piece of tubing to the end of the smoke tube to be directed at the respirator.

3.4.2.4 Aspirate a small amount of smoke to check that the assembly works.

3.4.2.5 Position test subject down wind of the tester.

3.4.2.6 Instruct the test subject to close their eyes.

3.4.2.7 Aspirate the smoke around the respirator sealing area slowly.

3.4.2.8 Instruct the test subject to perform the following exercises (each approximately 30 seconds) while continuing to aspirate smoke around the sealing surfaces:

a. Normal breathing

b. Deep breathing
c. Move head from side to side
d. Move head up and down
e. Talk
f. Frown
g. Normal breathing

3.4.2.9 If no odor or irritation is detected, the test is satisfactory.

3.4.2.10 If leakage is detected (odor or irritation), stop the test. The individual may adjust the fit or obtain another device and repeat the test.

3.4.3 Isoamyl Acetate

3.4.3.1 Perform step 3.4.2.1

3.4.3.2 The test should be conducted in an area with a minimum of air movement.

3.4.3.3 Saturate a tissue, brush or piece of cloth with isoamyl acetate.

3.4.3.4 Pass the material around the respirator sealing area slowly.

3.4.3.5 Have the individual perform the actions of 3.4.2.8 above while continuing to pass the material around the respirator sealing areas.

3.4.3.6 If a banana odor is not detected, the test is satisfactorily completed.

3.4.3.7 If leakage is detected (banana odor) then go to step 3.4.2.10.

4 USE OF THE MSA ULTRA-VUE RESPIRATOR

4.1 Purpose

This procedure provides guidelines for the proper use of the MSA ULTRAVUE air purifying respirator (or equivalent).

4.2 Equipment

a) MSA ULTRA-VUE RESPIRATOR (or equivalent)
b) Cartridges
c) Ultra-Vue HEPA filter cartridge (or equivalent) or
d) Approved combination cartridge

4.3 Precautions and Limitations

4.3.1 When wearing this device, personnel are required, as soon as practical, to leave areas (removing the respirator, if necessary) in case of equipment malfunction, undue physical or psychological stress, procedural or communication failure, significant deterioration of operational conditions, or any other conditions that might require relief. Should such a condition occur, the individual will inform their supervisor

immediately.

4.3.2 Follow good work practices when using this device.

4.3.3 An individual may re-wear their assigned respirator during a shift provided that the interior of the face piece has no loose surface contamination above clean limits (i.e., is less than 0.1 mr/hr) and completes an additional pre-use inspection each time the device is donned.

NOTE: Do not use this device in oxygen deficient or immediately dangerous to life or health (idlh) atmospheres. This device does not provide oxygen.

4.3.4 Observe any limitations on the cartridge used.

4.4 Prerequisites

4.4.1 Use of the respirator is required.

4.4.2 Documentation of issue has been performed.

4.5 Procedure

4.5.1 Obtain the respirator.

4.5.2 Ensure the respirator has a current inspection.

4.5.3 Visually inspect the device.

4.5.3.1 Check that the filter cartridge is correctly installed.

4.5.3.2 Check the tightness of connections and the condition of the face piece and head harness. Special attention is to be given to rubber or elastomer parts to ensure that they are pliable and flexible and not deteriorating.

4.5.4 Don the respirator.

4.5.4.1 Check that all headband straps are extended.

NOTE: If a surgeons cap or hood is used, ensure it does not protrude into any face piece sealing area.

4.5.4.2 Insert chin into face piece and pull head harness back over the head. This may be accomplished by either pulling the harness over the head while inserting the face or initially placing the straps over the lens, inserting the face, then pulling the harness over the head.

4.5.5 Adjust the straps as follows:

4.5.5.1 Pull the two chinstraps straight back.

4.5.5.2 Pull the two temple straps straight back.

4.5.5.3 Push the headband down on the back of the head, being careful not to place it on the neck.

4.5.5.4 Re-tighten the chinstraps as necessary.

4.5.5.5 Re-tighten the temple straps as necessary.

4.5.5.6 Tighten the forehead strap if necessary.

4.5.6 Conduct a negative pressure test:

4.5.6.1 Place fingers over the filter inlet ports. If a combination cartridge is used, place palm over the inlet port.

4.5.6.2 Inhale gently so the mask collapses.

4.5.6.3 Hold breath for 5-10 seconds.

4.5.6.4 If any leakage is detected, readjust the head harness and face piece.

4.5.6.5 Repeat until no leakage is detected.

4.5.6.6 If a satisfactory seal cannot be obtained, the individual shall not wear the device and will notify their supervisor of the condition.

4.5.7 Note the time of work area entry and exit.

4.6 Removal

NOTE:	Do not grasp the respirator by the filter cartridge when removing it.

4.6.1 Remove the respirator by bending forward, grasping the snout area, and pulling the face piece out and away from the face.

4.6.2 Place the respirator into an appropriate container (bag), and document.

5 RESPIRATOR ISSUE AND DAC-HOUR TRACKING

5.1 Purpose

This procedure provides instruction for issuing respirators and tracking Derived Air Concentration-hours (DAC-HRS).

5.2 Equipment

a) MSA Ultra-Vue full-face piece air purifying respirators equipped with the proper purifying filter (or equivalent).

5.3 Precautions and Limitations

5.3.1 Use of a respirator is required when airborne radio-activity concentrations cannot be maintained at less than 25% of DAC values (lO CFR 2O Appendix B, Table 1, Column 3).

5.3.2 Personnel shall not exceed 40 DAC-hrs in any seven consecutive days.

5.3.3 Calculated DAC-hrs greater than or equal to two (2) in one day or ten (10) in any seven consecutive days shall be recorded. Exposures exceeding these guidelines will be evaluated by bioassay. If the bioassay results indicate a higher value, then the higher value shall be recorded; a lower value, then the lower value MAY be recorded.

5.3.4 Periodic surveillance of individuals working in respirators will be performed to evaluate actual exposures and monitor workers stress and equipment performance. Any problems shall be reported to the job supervisor.

5.3.5 Contact lenses shall not be worn while wearing a respirator.

5.4 Prerequisites

5.4.1 The individual has met the physical, training and fit test wearer requirements.

5.4.2 The individual has no facial hair which could interfere with the proper operation of the respirator.

5.5 Procedure

5.5.1 Verify that the individual meets the prerequisites.

5.5.2 Verify that the respirator is required for the work the individual is to perform.

5.5.3 Remind the individual to perform a pre-use inspection, negative pressure test, and to keep track of the actual time the respirator was worn.

5.5.4 As soon as air sample data is available, calculate the DAC-hrs of exposure.

5.5.4.1 If the DAC-hrs meet the record requirement, then record the calculated DAC-hrs. If not, then put in N/A in the DAC-hrs block.

5.5.5 DAC-hrs = (hrs. in the area X total DAC fraction) /respirator protection factor

a. Respirator protection factor for particulate filters (HEPA or combination. Reference 1O CFR 2O, Appendix A for additional information.

6 RESPIRATOR MAINTENANCE

Respirator Selection: Only respiratory protection equipment approved by NIOSH/MSHA shall be used. The respiratory protection equipment shall be selected for use based on the airborne hazard identified and DAC-hr limitations.

Respirator Maintenance: Respirators shall be maintained to retain their original shape, effectiveness and be in the same configuration as required by NIOSH/MSHA approval. Respirators shall be cleaned, sanitized, and surveyed to ensure each worker is provided a clean respirator at all times. Respirators shall be inspected immediately prior to each use, after cleaning, and at least monthly when available for use. Replacement of parts or repairs shall be performed only by persons trained/experienced in proper respirator assembly. Replacement parts will be those designed for the particular respirator and designated by the manufacturer. Respirators shall be stored to protect them against dust, sunlight, heat, extreme cold, damaging chemicals or excessive moisture. Respirators shall be stored to prevent distortion of rubber or elastomer parts. All new respirators shall be cleaned, sanitized, inspected and tagged with an identification number prior to use.

6.1 Purpose

This procedure provides instruction for the inspection and maintenance of MSA Ultra-Vue (or equivalent) negative pressure air purifying respirators.

6.2 Equipment

a. disinfecting wipes
b. plastic bags
c. tape
d. rags or sponges
e. warm (approximately 120°F) water
f. spare parts as required by the manufacturers instructions
g. Clorox (or equivalent)
h. MSA cleaner/sanitizer (or equivalent)
i. soft bristle brush

6.3 Precautions and Limitations

6.3.1 Replace any questionable or faulty parts including rubber components that show wear or distortion. Replacement parts shall be those specified by the manufacturer.

6.3.2 Respirators will be assigned and tagged with a unique identification number. DO NOT tag the device in such a manner as to interfere with the proper operation.

6.3.3 Records will be maintained of all maintenance activities including cleaning/sanitizing, inspections and parts replacement.

6.3.4 HEPA cartridges shall not be re-used except by the same individual in the same shift after survey.

6.3.5 All respirators shall be cleaned and inspected when new, prior to initial issue and monthly at a minimum thereafter.

6.3.6 Respirators assigned to specific individuals shall be cleaned, surveyed and inspected at least at the end of each shift, prior to re-use, or more often as necessary.

6.4 Prerequisites

Personnel performing respirator inspections shall be trained in the use of this procedure. No attempt shall be made to conduct repairs beyond the scope of the manufacturer's instructions.

6.5 Procedure

6.5.1 Cleaning

a. Survey the respirator and cartridge to determine extent of contamination. Respirators with > 50,000 DPM/100 cm^2 shall be soaked prior to cleaning.

b. Remove the HEPA cartridge and properly dispose of as radioactive waste (if required).

c. Fill a container with warm water. Add one package of MSA cleaner/sanitizer, or 2 fluid ounces of chlorine bleach per gallon of water used.

d. Gently scrub the respirator with a soft bristle brush, sponge, or cloth for at least two (2) minutes.

e. Thoroughly rinse the respirator in warm water and allow it to air dry.

f. Survey the respirator after it is completely dry for loose and fixed contamination. Respirators which indicate >1000 DPM/100 cm^2 beta-gamma, 100 DPM/100 cm^2 alpha or >0.1 mr/hr fixed beta-gamma shall not be used. Repeat washing as above.

g. Document the survey results for each respirator.

6.5.2 After-use or New Inspections

6.5.2.1 Examine the face piece for dirt, cracks, tears or distortion.

6.5.2.2 Examine the head harness for breaks, tears, loss of elasticity or excessively worn serrations which might permit slippage. Check that the buckles are operational and free of defects.

6.5.2.3 Remove the exhalation valve cover and examine the valve for foreign material (dust, hair, dirt). Inspect the valve seat for cracks, tears, or distortion of the valve material. Check that the valve and seat are properly mounted and replace the valve covers.

6.5.2.4 Inspect the inhalation valve and seat for damage and foreign material. Inspect valve for cracks, tears or distortion. Check that the valve and seat are properly mounted and connection is tight. Check that the filter mounting coupling is not cracked and threads are in good working condition.

6.5.2.5 Examine clamps and connections and ensure they are tight and secure.

6.5.2.6 Check that there is a gasket in the inlet mounting assembly (coupling) and that it is not worn or deteriorated and is properly installed.

6.5.2.7 Inspect the speaking diaphragm for damage or deterioration.

6.5.2.8 Check that the lens is not cracked or badly scratched so as to impair visibility. Check that the lens position and frame are securely mounted and in good condition.

6.5.2.9 Install a NEW HEPA filter cartridge or other cartridge as directed by supervision. Be sure to check for gasket on the cartridge when it is installed (if required).

6.5.2.10 Check that the face piece is tagged with an identification number.

6.5.2.11 Lightly disinfect the interior of the face piece with a disinfectant wipe.

6.5.2.12 Place the respirator in a plastic bag and tape the bag closed.

6.5.2.13 Record on the bag the date the respirator was cleaned, inspected and surveyed and the signature of the person performing the above.

6.6 Monthly Inspections

6.6.1 Check that all connections are tight including that the filter cartridge is securely attached and the mounting assembly is secure.

6.6.2 Check that the filter cartridge is in good condition, no cracks and that the label is legible.

6.6.3 Check that the respirator is not taking a set (hardening) and that rubber and elastomer parts are pliable by massaging the respirator.

6.6.4 Check that the bag is securely closed and labeled including dates.

6.6.5 Record the inspection on the respirator bag and on the Respirator Equipment History Record.

6.7 Storage

6.7.1 Respirators will be stored with the head harness straps fully extended and on the inside of the face piece.

6.7.2 Respirators are to be stored so that they are not damaged by adjacent equipment, heat, cold or chemicals or twisted out of normal configurations.

6.7.3 Devices ready for use will be segregated from those not ready for use and clearly marked as such.