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AP00050933

AIR PRODUCTS & CHEMICALS, INC.

CHEMICALS GROUP

CALVERT PLANT

RESPIRATORY PROTECTION PROGRAM

PURPOSE

This program is intended to provide guidance that will assist respirator users in safeguarding their health and lives through proper selection and use of respirators.

SCOPE

The scope of this program includes safe practice and requirements for using and maintaining respirators for protection of the respiratory system from inhalation of particulate matter, noxious gases and vapors, and oxygen deficiency. Exposure control shall be accomplished as far as feasible by accepted engineering methods before considering or instituting the use of respirators. Examples of such methods include enclosure or confinement of an operation, general and local ventilation, and substitution of less toxic materials.

RESPONSIBILITY

Plant Superintendent Responsibilities

1. Respirators shall be provided when such equipment is necessary to protect the health of the employees.
2. The Plant Superintendent shall provide the respirators which are applicable and suitable for the purpose intended.
3. The Plant Superintendent shall be responsible for the establishment and maintenance of a respiratory protective program.

Supervisory Responsibilities

1. The Production Supervisor is responsible for administering training and inspections.
2. Shift foremen are responsible for conducting inspections to ensure that employees are maintaining routinely used (assigned) respirators properly. These inspections will be conducted at least monthly.
3. Foremen and supervisors are responsible for insuring that employees are not exposed to excessive concentrations of toxic materials. This includes adherence to safe work practices, equipment preparation and maintenance, and wearing of respirators when toxic material concentrations are excessive.

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Employee Responsibilities

1. The employee shall use and maintain the provided respiratory protection in accordance with instructions and training received.
2. The employee shall use a suitable respirator either (a) when he has knowledge of excessive concentrations of toxic materials, or (b) he has reason to believe that concentrations may be excessive.
3. The employee shall guard against damage to the respirator.
4. The employee shall report any malfunction of the respirator to his foreman or supervisor.
5. The employee shall inspect and clean respirators as specified in the cleaning and maintenance section of this program.

Safety Department Responsibilities

1. Maintenance and annual inspections-cleaning shall be done by the safety officer on the midnight shift.
2. The safety engineer shall coordinate personnel monitoring and abatement programs on toxic material exposure.

REQUIREMENTS

Each plant program shall include:

1. Identification and monitoring of airborne contaminants.
2. Selection of proper respiratory protection.
3. Employee training.
4. Maintenance.
5. Inspection.
6. Storage.
7. Record Keeping.

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CONTAMINANT IDENTIFICATION AND MONITORING

Respiratory Hazards by Work Area

General

Subpart Z of OSHA (Part 1910.1000-0.1500) is incorporated by reference on establishing minimum requirements on permissible exposure, practices, etc.

The most recent TLV's established by ACGIH are also incorporated by reference. When TLV's of these two references differ, the more stringent TLV applies.

PVC

The following potential respiratory hazards have been identified in the PVC plant:

1. Vinyl Chloride Monomer (VCM). Area and personnel sampling show concentrations usually below the TLV of 1 ppm. Personnel sampling is done monthly on each shift.
2. Vinyl Acetate (VAc). Area sampling with fixed chromatograph samplers in 1975 show concentrations well below $\frac{1}{2}$ TLV. Employee exposures are intermittent and are associated with accidental release of materials from closed systems. No process changes have been made that would increase VAc exposure.
3. Propylene. Area sampling with fixed chromatograph samplers in 1975 show concentrations well below the asphyxiation level. Overexposure could result only from an infrequent massive release from a closed system.
4. Dimethylformamide (DMF). Exposure is expected to result only from occasional leaks, etc., from a closed system.
5. PVC Dust. Source (area) sampling in July 1974 at suspected high concentration locations showed that railcar loading and the product collector area may have moderately high dust concentrations. Bagging and general plant is lower than TLV.

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PVOH

The following potential respiratory hazards have been identified in the PVOH plant:

1. Methyl Alcohol. Area and personnel sampling in 1975 reveal some concentrations above the TLV, without regard to the use of respirators. Personnel sampling on baggers in May and June 1976 showed extremely low concentrations relative to TLV and no process changes have been made that are expected to increase exposure.
2. Methyl Acetate. Area and personnel sampling in 1975 reveal some concentrations above the TLV, without regard to the use of respirators. Personnel monitoring on baggers in May and June 1976 showed extremely low exposure and no changes have been made that are expected to increase methyl acetate levels.
3. Vinyl Acetate. Fixed point chromatograph sampling in 1975 indicates that vinyl acetate concentration is generally below $\frac{1}{2}$ TLV. No process changes have been made that are expected to increase the exposure.
4. ~~Vinyl Chloride Monomer~~ (VCM). Area sampling performed by the Lab in 1975 shows that VCM is substantially below the action level. Occasional brief excursions result from nonroutine conditions at the proximate PVC plant coupled with wind from generally southeasterly direction.

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Emulsion

The following materials have been identified as potential respiratory hazards:

1. Vinyl Acetate (VAc). Area sampling by fixed location chromatographs in 1975 show that VAc is typically substantially below the TLV. No process changes have occurred that are expected to increase the exposure.
2. VCM. Area sampling (October and November 1974) and personnel sampling (March and April 1975) establish that VCM is below the action level. No process changes have occurred that are expected to increase the exposure.
3. Ammonia. Will change to a closed system in 1976-77.
4. Formaldehyde. Tending tanks are open; otherwise a closed system is present.
5. Merbac 35. This material has a low volatility (viscous liquid in petroleum solvent). TLV is not established. Sampling procedure not established.
6. Maleic Anhydride. TLV not established. Analytical procedure received in June 1976; sampling procedure not established.
7. Ethylene in Emulsion Plant. Overexposure is expected to result only from leaks or releases from a closed system.
8. Ethylene in Storage Area. Overexposure is expected to result only from leaks or releases from a closed system.

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Acetylenics

The following potential respiratory hazards have been identified:

1. Acetone. Area sampling by the leak patrol using the Century Organic Vapor Analyzer in 1975 showed typical work area concentrations below $\frac{1}{2}$ TLV. No changes in the process have been made that are expected to increase the exposure.
2. Methyl Ethyl Ketone. Exposure is expected to be comparable to acetone mentioned above, that is, concentrations are expected to be below the TLV's.
3. Methyl Isobutyl Ketone. Exposure is expected to be comparable to acetone mentioned above, that is, concentrations are expected to be below the TLV's.
4. Isopropyl Ether.
5. Ethylene Glycol.
6. Polypropylene Glycol.
7. Dimethyl Formamide. Area (source) sampling in April and May of 1975 showed concentrations below $\frac{1}{2}$ TLV. No process changes have been made that are expected to increase DMF levels.
8. Renex 20.
9. Potassium Carbonate.
10. Potassium Hydroxide.
 - a. Recent Caustic Building process improvement. Sampling scheduled for midsummer.
 - b. Jackhammering to remove caustic pot--laborers. Concentration high enough to be irritating.
11. Propargol Alcohol.

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12. 2-Ethyl Hexanol.
13. 2-Ethyl Hexaldehyde.
14. Pluronic P-105.
15. n-Butyraldehyde. Exposure is expected to be comparable to acetone mentioned above, that is, concentrations are expected to be below the TLV's.
16. Acetylene. Area sampling by the leak patrol using the Century Organic Vapor Analyzer in 1975 showed typical work area concentrations below $\frac{1}{2}$ TLV. No changes in the process have been made that are expected to increase the exposure.
17. Igepal CO-730.
18. VCM from PVC Plant. Area sampling in October and November 1974 showed VCM less than action level. No process changes have been made that are expected to increase exposure.

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Catalyst Plant

The following potential respiratory hazards have been identified:

1. Platinum Salt Dust. Area measurements performed on 20 August 1975 indicate that exposure is administratively below the TLV. No process changes have been made that are expected to increase the exposure.
2. Nuisance Dust. Area and personnel sampling in 1975 show that the concentration is less than the TLV. No process changes have been made that are expected to increase nuisance dust exposure.
3. Hydrogen Chloride. Associated with open transfers. Concentration not measured but is occasionally objectionable.

AP00050941

Compounding Plant

The following potential respiratory hazards have been identified:

1. Lead. Area sampling and biological monitoring in July 1976 show that lead dust concentration is below the TLV, in all areas except the blending room and the weigh belt room. No process changes have been made that are expected to increase the concentration.
2. Nuisance Dust. Area sampling in 1975 shows that concentration is less than the TLV. No process changes have been made that are expected to increase the concentration of nuisance dust.
3. Chrominium. Chrominium is generally of concurrent exposure with lead. Sampling is scheduled for late fall. In the interim, respiratory protection is required wherever operating conditions and practices indicate a possible exposure.
4. Cleaning Solvent. Potential exposures are when the blenders are cleaned in changing compound formulations.
5. VCM. Personnel sampling in April and May 1975 showed VCM exposure below the action level. No process changes have been made that are expected to increase exposure.

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Laboratories

Possible respiratory hazards are:

1. Platinum in Catalyst Plant Laboratory. Area sampling during October 1975 did not indicate exposure above the TLV. However, the sampling-analysis technique was indirect and strains the extremely low TLV.
2. Lead in PVC Laboratory. An improved local ventilation system is being engineered.
3. Chromium in PVC Laboratory. An improved local ventilation system is being engineered.
4. Nuisance Dust in Catalyst Plant Laboratory. Area sampling during October 1975 showed exposure below $\frac{1}{2}$ TLV. No changes have been made that are expected to increase nuisance dust concentration.
5. VCM. Personnel sampling in January 1976 in the Main and PVC Labs showed VCM exposures well below the action level. No changes have been made that are expected to increase the concentration.

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Acetic Acid Loading

The only respiratory hazard is glacial acetic acid. This is primarily present during an accidental spill, and concentration is highly dependent upon atmospheric conditions, especially wind velocity.

Utilities

1. Boiler. Only in upset conditions due to loss of fans are respiratory hazards present--incomplete combustion: smoke, fumes, carbon monoxide and lack of oxygen.
2. Sulfur Dioxide. Levels are below the TLV as revealed by area sampling in May 1976. No process changes have been made that are expected to increase the exposure.
3. Chlorine at Cooling Towers. Only during releases from closed system.
4. Flyash at Loading Station. New abatement equipment being installed in midsummer 1976.
5. VCM from PVC. Area monitoring done in October and November 1974 showed VCM less than the action level. No process changes have been made that are expected to increase VCM exposure.

AP00050944

SO₂ Pilot Plant

Potential respiratory hazards are:

1. Sulfur Dioxide. Area sampling reveals that the level is less than the TLV. No process changes have been made that are expected to increase the exposure.
2. Ammonia. Ammonia's threshold odor is noticeably below the TLV, and the concentration is substantially below the TLV by smell. Pilot Plant is currently shut down.

AP00050945

Maintenance Shops

1. Potential respiratory hazards of mechanical, electrical, and instrument workers are cleaning solvents, and burning plastic fumes. Cleaning solvents are diesel fuels used mainly in dip tanks, and burning plastic fumes for which no TLV is established but which tend to be self-regulating because of its offensive odor, and welding fumes.
2. Painters have three potential respiratory hazards associated with their craft:
 - a. Organic Solvent Fumes. Concentrations of organic solvents have been approximated with the Century Organic Vapor Analyzer at a maximum in the neighborhood of 1000 ppm (0.1%).
 - b. Silica (from sandblasting). Silica from sandblasting has not been measured but by industrial hygiene practices is accepted to be excessive.
 - c. Paint Mists.
3. VCM. Area monitoring in October and November 1974 showed VCM less than action level in PVC, PVOH and Main Maintenance Shops. No process changes have been made that are expected to increase VCM levels.
4. Refrigeration Shop. Soldering and welding fumes, freon. Recently moved into new shop. Exhausting blower to be installed.
5. Grinding. Highly toxic materials are not knowingly ground at Calvert.
6. Welding Fumes. Highly toxic welding rods are not knowingly used. Area or local ventilation is present in maintenance shops.

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Warehouse, Main

1. Main exposure is from volatile organic vapors escaping from bagged solid plastics and dusts from broken or leaking bags being handled. Weighing is done in front of exhaust fan.
 - a. VCM. January 1975 personnel sampling showed levels below the action level. No changes have been made that are expected to increase exposure.
 - b. Vinyl Acetate.
 - c. Methanol. Area samples in October 1975 showed about $\frac{1}{2}$ TLV or much less. No process changes have been made that are expected to increase concentration.
 - d. Lead Pigment Dusts. Main exposure is from broken or leaking bags.
 - e. Chromium Pigment Dusts. Mainly associated with broken or leaking bags.
 - f. Carbon Black. Only associated with broken or leaking bags of carbon black pigment.
 - g. Nuisance Dusts. Primarily associated with broken or leaking bags of solids.
 - h. Carbon Monoxide. Area sampling in 1972 with Drager tubes in railroad cars, trailers, and in warehouse, all with forklifts operating, showed peak exposure less than TLV. No process changes have been made that are expected to increase exposure.
 - i. Methyl Acetate. Personnel sampling was done in June 1976 on PVCH baggers, who are expected to have maximum exposure of warehouse personnel. Levels were substantially below $\frac{1}{2}$ TLV.

AP00050947

Waste Treatment Plant

Possible respiratory hazards are as follows:

1. Ammonia. An occasional mild exposure might occur on unloading operations while hooking and unhooking transfer hoses.
2. Slaked Lime. Fine dust during air transfer is charged. A request has been submitted for an engineering improvement.

Vinyl Acetate Barge and River Storage Facility

1. Vinyl Acetate. Exposure is expected to be associated only with leaks and unusual occurrences in the outdoor barge and river tank storage facility.

Truck Drivers (Bulk PVC)

VCM has been identified as a potential respiratory hazard of truck drivers hauling bulk PVC made at the Calvert plant. Personnel monitoring of the driver while: (a) in the Calvert plant, (b) on the road, and (c) unloading at destination, all showed VCM substantially below the action level. No changes have been made that are expected to increase VCM exposure to truck drivers.

AP00050948

SELECTION OF PROPER RESPIRATORY PROTECTION

General

Where available, NIOSH-approved respirators must be obtained. Prior to the purchase of new respiratory protection, the person placing an order will route the purchase requisition to the safety engineer for approval to ensure that a proper respirator is ordered.

Summary of Types of Exposures and Respiratory Protection at Calvert

A full range of toxicity is present at Calvert for both dusts and vapors. Dust toxicity ranges from the "nuisance" classification of plastic dusts, to more toxic lead-containing dusts, to materials such as chrominium and platinum dusts where exposure should be very low. Filter respirators are specified for the extent of protection needed, ranging from ordinary efficiency filters to high efficiency.

The frequently used filters approved for use at Calvert are as follows:

<u>Filter Efficiency</u>	<u>Type Respirator</u>	<u>Description</u>	<u>Used With Typical Toxic Materials</u>
Ordinary	Filter	3M 8710	Plastic dusts, Nuisance dusts, Asbestos
Medium	Cartridge	Willson 1200 Series with R10 or R11	Lead
High	Cartridge	Willson 1200 Series with R12	Chrominium, Platinum

Vapor and gas toxicity likewise range from "low" toxicity of ethylene, and propylene, where asphyxiation due to oxygen displacement is the main hazard, to "medium" toxicity methanol and methyl acetate, to vinyl chloride monomer which should have very low exposures.

In general, cartridge or canister respirators are used for low concentrations of moderately toxic vapors or gases where sufficient oxygen to support life is present, airline respirators are used for higher concentrations or with materials that require lower exposures such as VCM. Scott Air Paks are used at even higher concentrations and for rescue.

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Respiratory Protection Associated With Specific Hazards and Work Areas

Respirators specified for possible respiratory hazards in the Calvert plant work areas are as follows:

PVC

<u>Hazard</u>	<u>Respirator Type</u>	<u>Respirator/Cartridges Filters, Canisters () Denotes Suitable But Not Used</u>	<u>Comments</u>
All	Airline	MSA	All concentrations organic <1000 ppm VCM
VCM	Canister	MSA/VCM	<25 ppm VCM
All	Self-Contained	Scott Air Pak/ Pressure Demand	All concentrations organic, VCM
PVC Dust	Filter	(3M No. 8710)	Not in Use

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PVOH

<u>Hazard</u>	<u>Respirator Type</u>	<u>Respirator/Cartridges Filters, Canisters</u>	<u>Comments</u>
All	Airline	MSA	All concentrations organic, ≤1000 ppm VCM
All but VCM	Canister	MSA/Type N	≤2% organic
PVOH Dusts	Cartridge	Willson 1200 Series/ R11 (R10)	Nuisance Dusts
PVOH Dusts, Organic Vapors	Cartridge	Amer. Opt. R-5051/ R-51	≤0.1% organic
Organic Vapors		Willson 1200 Series/ R21 or R25	
All but VCM	Self-Contained	Scott Air Pak/ Demand	
PVOH Dusts	Filter	3M No. 8710	

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Emulsion

<u>Hazard</u>	<u>Respirator Type</u>	<u>Respirator/Cartridges Filters, Canisters</u>	<u>Comments</u>
All	Airline	MSA/Type C	All concentrations organic, ≤1000 ppm VCM
VCM	Canister	MSA/VCM	≤25 ppm VCM
All but VCM	Canister	MSA/Type N	≤2% organic, ≤3% ammonia
All but VCM	Self-Contained	Scott Air Pak/ Demand	
Dusts	Filter	(3M No. 8710)	Not in Use
All	Self-Contained	Scott Air Pak/ Pressure Demand	

AP00050952

Acetylenics

<u>Hazards</u>	<u>Respirator Type</u>	<u>Respirator/Cartridges Filters, Canisters</u>	<u>Comments</u>
All	Self-Contained	Scott Air Paks/ Demand	
Caustic Dusts, Product Dusts	Filter	3M No. 8710	
Caustic Dusts	Airline Hood	Clemco	

AP00050953

Catalyst

<u>Hazards</u>	<u>Respirator Type</u>	<u>Respirator/Cartridges Filters, Canisters</u>	<u>Comments</u>
Hydrogen Chloride	Cartridge	Willson 1200 Series/ R25	
PT Dusts	Cartridge	Willson 1200 Series/ R12	
Nuisance Dusts	Filter	3M No. 8710	

AP00050954

Compounding

<u>Hazards</u>	<u>Respirator Type</u>	<u>Respirator/Cartridges Filters, Canisters</u>	<u>Comments</u>
Lead Dusts, Nuisance Dusts	Cartridge	Willson 1200 Series/ R10 (R11, R12)	
Chromium Dusts	Cartridge	Willson 1200 Series R12	
Nuisance Dusts	Filter	3M No. 8710	
Organic Vapors	Cartridge	Willson 1200 Series/ R21	

AP00050955

Laboratories

<u>Hazards</u>	<u>Respirator Type</u>	<u>Respirator/Cartridges Filters, Canisters</u>	<u>Comments</u>
Platinum	Cartridge	Willson 1200 Series/ R12	
Lead	Cartridge	Willson 1200 Series/ R10 (R11, R12)	
Chromium	Cartridge	Willson 1200 Series/ R12	

AP00050956

Utilities

<u>Hazards</u>	<u>Respirator Type</u>	<u>Respirator/Cartridges Filters, Canisters</u>	<u>Comments</u>
Smoke, Fumes, Carbon Monoxide Combined With Possible Lack of Oxygen (Indoors)	Self-Contained	Scott Air Pak/ Demand	
Smoke, Fumes (Outdoors)	Cartridge	Willson 1200 Series R25 (R21)	
Chlorine, SO ₂	Canister	MSA/Type GML	
Flyash	Filter	3M No. 8710	
SO ₂	Cartridge	Willson 1200 Series/ R25	

AP00050957

SO₂ Pilot Plant

<u>Hazards</u>	<u>Respirator Type</u>	<u>Respirator/Cartridges Filters, Canisters</u>	<u>Comments</u>
SO ₂	Cartridge	Willson 1200 Series/ R25	
SO ₂	Canister	MSA/Type GML	
Ammonia	Cartridge	Willson 1200 Series/ R24	
Ammonia	Canister	MSA/Type N	

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Acetic Acid Loading

<u>Hazards</u>	<u>Respirator Type</u>	<u>Respirator/Cartridges Filters, Canisters</u>	<u>Comments</u>
Acetic Acid	Cartridge	Willson 1200 Series/ R25 or R21	
Acetic Acid	Canister	MSA/Type N	

Barge Facility and Vinyl Acetate River Storage

<u>Hazards</u>	<u>Respirator Type</u>	<u>Respirator/Cartridges Filters, Canisters</u>	<u>Comments</u>
Vinyl Acetate	Self-Contained	Scott Air Pak/ Demand	

AP00050959

Maintenance

<u>Hazards</u>	<u>Respirator Type</u>	<u>Respirator/Cartridges Filters, Canisters</u>	<u>Comments</u>
Paint Mists, Solvents	Cartridge	Amer. Opt./R91P	
Paint Mists, Solvents	Cartridge	Willson 1200 Series/ (R14, R21)	
Silica	Airline Hood		
Cleaning Solvent, Burning Plastics	Cartridge	Willson 1200 Series/ (R21 or R25)	Use only when eye irritation is not present
Burning Plastics	Airline	MSA	Full face mask is needed where fumes can irritate eyes or facial skin

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Warehouse, Main

<u>Hazards</u>	<u>Respirator Type</u>	<u>Respirator/Cartridges Filters, Canisters</u>	<u>Comments</u>
Lead Dust	Cartridge	Willson 1200 Series/ R10	
Chrominium	Cartridge	Willson 1200 Series/ R12	
Carbon Black	Filter	3M No. 8710	
Nuisance Dusts	Filter	3M No. 8710 or Willson 1200 Series/ R10	

AP00050961

Waste Treatment

<u>Hazards</u>	<u>Respirator Type</u>	<u>Respirator/Cartridges Filters, Canisters</u>	<u>Comments</u>
Ammonia	Canister	MSA/Type C	43% ammonia
Slaked Lime	Filter	3M No. 8710	

AP00050962

EMPLOYEE TRAINING

For the safe use of any respirator, it is essential that the user be properly instructed in its selection, use and maintenance. Both supervisors and workers shall be so instructed by competent persons. All new employees are trained by their foremen. Retraining is done at least every two years for those employees who might have occasion to use a respirator. An acceptable basic training program is attached as Appendix I.

Training includes the following:

1. Instruction in the nature of the hazards associated with the employee's present work, whether acute, chronic, or both, and an honest appraisal of what may happen if the respirator is not used. A general summary of hazard types in the Calvert complex is also mentioned. Refer to "Contaminant Identification" section for hazards in a particular plant.
2. Explanation of why more positive control is not immediately feasible, including recognition that every reasonable effort is being made to reduce or eliminate the need for respiratory protective devices.
3. A discussion of why this is the proper type of respirator for the particular purpose.
4. A discussion of the respirator's capabilities and limitations.
5. Instruction and training in examination of respirators for defects, and on cleaning respirators.
6. Instruction and training in actual use of the respirator and close and frequent supervision to assure that it continues to be properly used. This includes a demonstration and practice session on how the respirator should be worn, how to adjust it, and how to determine if it fits properly (leak check).

It should also be pointed out to employees that certain conditions may prevent a good face seal. Such conditions may be a growth of beard, sideburns, a skull cap that projects under the facepiece, or temple pieces on eye glasses. Also, the absence of one or both dentures can seriously affect the fit of the facepiece.

7. Review of Safe Work Practices on using respirators.
8. Classroom and field training to recognize and cope with emergency situations.
9. Special situations, if any.

AP00050963

RESPIRATOR CLEANING, INSPECTIONS AND MAINTENANCE

Scope

The Calvert plant program for maintenance and care of respirators includes the following basic services:

1. Inspection for defects (including a leak check).
2. Cleaning and disinfecting.
3. Repair.
4. Storage.

Equipment shall be properly maintained to retain its original effectiveness. This cleaning and maintenance program applies to every respirator (except disposable) at the Calvert plant.

Responsibility and Frequency

1. Inplant (local) cleaning by respirator users or assignees. Every respirator is to be cleaned:
 - a. Whenever soiled.
 - b. After each use (at end of shift or day's work).
 - c. Monthly if not always kept in a sealed plastic bag or other sealed container.
2. Inplant (local) inspection.
 - a. Every respirator shall be inspected after each shift that it is used or carried.
 - b. Every respirator shall be inspected at least monthly regardless of use.
3. Annual inspection by safety department.
 - a. Every respirator is to be inspected and cleaned annually by the safety officer on the midnight shift.
4. Repairs.
 - a. Defective respirators will be repaired only by a qualified person, including replacing straps, valves, etc. Qualified people are those trained in the respirator maintenance program described in a later section.
 - b. Repairs can be made by the safety officer on the midnight shift. Respirators are to be picked up and delivered by the department using or assigned the respirators.

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Equipment and Supplies

1. MSA Cleaner-Sanitizer Catalog Number 34337. Local vendor is Calvert Industrial Supply.
2. Brushes
 - a. Tapered bottle brush.
 - b. Compact utility brush.
3. Toweling. Choose from terry cloth, lint-free cotton or linen, tablecloth, paper towels.
4. Rubber gloves are desirable when many respirators are washed at any one time.
5. Plastic Bags. Any "Baggie" or other plastic bag large enough to contain the cartridge or canister respirator.
6. Plastic or rubber apron for mass respirator cleaning.
7. Lab coat or coveralls for mass respirator cleaning.
8. Two deep sinks and/or pails for washing-rinsing respirators.
9. Tags or paper for respirator I.D.

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Cleaning, Sanitizing and Inspection Procedures

- A. After each use, for inplant periodic cleaning for lightly soiled respirators (excluding paint and polymer splattered parts), or for monthly inspections of respirators not kept in sealed plastic bags or cases.
1. Prepare cleaning-sanitizing solution by adding one package (1 oz.) of powdered MSA cleaner-sanitizer to each gallon of warm water (about 120° F).
 2. Leak check the respirators (the same way that tightness of face-piece fit is tested).
 3. a. For cartridge and canister respirators, remove all filters, cartridges or canisters and discard if used.
b. Remove all parts that are defective by visual inspection and discard these defective parts, including defective rubber (pliability, signs of deterioration), valves not seated properly, unclear lens.
 4. Immerse respirator (parts) in the cleaning-sanitizing solution and scrub gently with a soft brush until clean. Pick up valve edges and wash seating surfaces with fingers or brush (alternatively removing valves).
 5. Rinse in plain, warm water (about 120° F).
 6. Either air dry or blow dry (compressed air) the cleaned respirator parts.
 7. Remove and discard parts that remain uncleaned (generally check with your supervisor).
 8. Replace all valves (inhalation, exhalation), all filters, cartridges, canisters, and replacement parts.
 9. Check connections for tightness.
- B. Inspections for Respirators Not Requiring Cleaning
1. Do not leak check, as respirator would then need cleaning.
 2. Take respirator out of case, box, or bag.
 3. Visually and manually inspect for defective or missing parts, including defective rubber (pliability, signs of deterioration), valves not properly seated, canister expiration date, air tanks full, NIOSH approval on cartridges, unclear lens, warning devices and regulators on Scott Air Paks work, tightness of connections.

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4. Replace respirator in storage container (box, bag, or carrying case).

C. Annual Inspection and Cleaning

General. The same steps apply as in section A for lightly soiled respirators except that a complete respirator disassembly and more inspections are done. A respirator is thoroughly visually inspected both before breakdown, during breakdown, and after reassembly. The specific steps are as follows:

1. Prepare cleaning-sanitizing solution by adding one package (1 oz.) of powdered MSA cleaner-sanitizer to each gallon of warm water (about 120° F).
2. Leak check the respirators (the same way that tightness of face-piece fit is tested).
3. Thoroughly visually inspect each respirator for defects, including defective rubber (pliability, signs of deterioration), valves not seating properly, missing parts, unclear lens (glass or plastic), air tanks not fully charged, tightness of connections, canister expiration dates.
4. Completely break down the respirator, including removing all head-straps, lens, valves, and valve covers, breathing tubes, filters, cartridges, canisters, etc. Inspect each part.
5.
 - a. Discard filters, cartridges, canisters with seal missing or nearing expiration date, and defective parts.
 - b. Segregate paint splattered, polymer splattered, or rusty parts for special cleaning.
6. Immerse respirator parts in the warm (about 120° F) cleaning-sanitizing solution and scrub gently with a soft brush until clean.
7. Rinse in plain warm water (about 120° F).
8. Either air dry or blow dry (compressed air) the cleaned parts.
9. Remove and discard parts that could not be cleaned.
10. Reassemble, using new valves, filters, cartridges, and replacement parts.
11. Visually inspect.
12.
 - a. Place each cartridge or canister respirator in a plastic bag, seal, and label by department and respirator number.
 - b. Place each canister respirator (gas mask) and Scott Air Pak in its carrying case when the case is available.

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REPAIR OR MAINTENANCE

General

Replacement or repairs shall be done only by qualified persons with parts designed for the respirator. No attempt shall be made to replace components or to make adjustments or repairs beyond the manufacturers' recommendations. Reducing or admission valves or regulators shall be returned to the manufacturer for adjustment or repair.

Qualified People Requirements

Qualified people for repairs are those that meet the following requirements:

1. Have taken the basic course(s) on respirator theory and practice, including examining respirators for defects.
2. Have taken a respirator repair course administered by the safety department that includes:
 - a. Leak testing respirators by fitting to head and checking for fit (and leaks) per instructions for each respirator.
 - b. Visual, manual and flow testing of respirators as necessary to locate defective or missing parts, including defective rubber (pliability, signs of deterioration), valves not properly seated, canister expiration date, air tanks full, NIOSH approval on cartridges, unclear lens, warning devices and regulators work, tightness of connections.
 - c. Disassembly of respirator to basic components (straps, tanks including valves, regulators, carrying harness (Scott Air Pak), facepiece including attached lens, valves, valve covers, canisters, cartridges.
 - d. Cleaning all parts as directed.
 - e. Reassembly of respirator.
 - f. Visual and manual inspection for completeness.

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RECORD KEEPING

Every airline or cartridge respirator shall be numbered. The date of issuance, and the person or use assigned should be recorded.

A record shall be kept of inspection dates, findings, and cleaning for all respirators. A form for this purpose is attached (Appendix II). Other forms accomplishing the same purpose may be used.

A record shall be kept of respirator training. Each employee receiving training shall acknowledge the type of training he received by signing a form similar to that shown as Appendix III, or any written record may be used that accomplishes the same purpose.

A record shall be kept of Respirator Repair Training to train qualified people.

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RESPIRATOR INSPECTION FORM

- Fill in date and overall rating of either 1 or 2.
- For each category indicate (by number) the condition found and the services performed. For example, under "cleanliness" a dirty respirator would be indicated as 2-3.

DATE:

1. SATISFACTORY
2. UNSATISFACTORY
3. CLEANED

4. REPAIRED
5. REPLACED
6. REFILLED

[illegible]

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RESPIRATOR TRAINING

Mr. _____ was trained in the below-listed phases
of respirator use that are acknowledged:

TYPE OF TRAINING

INSTRUCTOR

DATE

SIGNATURE
OF INDIVIDUAL

Cartridge Respirator
familiarization, instruction,
and demonstrated use

Scott Air Pak
familiarization, instruction,
and demonstrated use

Safe Work Practice
review on cartridge respirator

Practice using
cartridge respirator

(Add others as needed)

(EXHIBIT II)

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FRESH AIR MASK INSPECTION

DATE _____ SHIFT _____

<u>OPERATOR</u>	<u>MASK AVAILABLE</u>	<u>CLEANED AND DISINFECTED</u>	<u>IN OPERATING CONDITION</u>	<u>CARTRIDGES ISSUED</u>	<u>OPERATOR'S INITIALS</u>
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

COMMENTS _____

SHIFT FOREMAN'S SIGNATURE _____

DAY SUPERVISOR'S SIGNATURE _____

AREA FOREMAN'S SIGNATURE _____

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APPENDIX I

TRAINING AIDS

- A. All items in Section B below plus the white filter mask by 3M.
(Gr. 9710).
- B. Defect examination of respirators

Respirator No. 1. Airline respirator with missing regulator components (diaphragm and regulator cover plate with control knob) (hose is also presently missing).

Respirator No. 2. Cartridge respirator with missing valve.

Respirator No. 3. Cartridge respirator with "dirt" on exhalation valve (Scotch tape used to hold a piece of matter on the sealing surface). Comment that the dirt, piece of plastic, etc. can either be wiped off with a finger, etc. or washed off.

Respirator No. 4. Airline respirator with a missing strap.

- C. Practice wearing of Respirators

1. Cartridge Respirator (Use defective respirator No. 2 with the missing valve).
2. Canister Respirator (In red storage box).
3. Airline full face respirator (MSA) with two 25 foot hoses and the Acme filter and regulator station.
4. Lysol Spray Disinfectant and towels.

- D. Safe Work Practices

1. On cartridge and canister respirators
2. On airline respirators

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-APPENDIX 2-

SUGGESTED TRAINING FORMAT

- A. Briefly state why respirators are worn and when each type is worn.
1. Why - they are worn to protect a person from toxic (harmful) materials from entering the lungs.
 2. When - usually foreman will tell their men about the particular hazards in their plant and about what respirators to wear. The basic ideas are (hold up a sample of each respirator as you mention it):
 - a. Cartridge respirator - low (0.1% or less) concentrations of vapor or gas for the cartridge portion and for high concentrations of dust or other solids for the filter. Must have enough oxygen in the air.
 - b. The 3M dust-type filter (white mask) is good for low toxicity dusts - most of our materials except lead fall into this category. It offers no protection against harmful gases or vapors. Must have enough oxygen in the air for breathing.
 - c. Canister masks (chest type is usually stocked) - offers protection for higher concentrations of toxic materials (usually up to 2%), and for longer times. The all-purpose canister, which is generally stocked, offers protection against carbon monoxide. Must have enough oxygen in the air for breathing.
 - d. Airline respirators - furnishes complete protection against any atmosphere not immediately dangerous to life (you can take off the respirator and walk or run to safety without being killed or seriously injured).
- B. Practice on locating respirator defects. All but one are defective respirators as they were taken from the PVC and Compounding Plants - the one respirator with trash under the valve is gimmicked to give an easy example of an obvious defect and one that has been found in the plants. Point out this part of the SWP and quickly read it.
- C. Putting on a full face mask. Best to use the canister mask to show them. Remember the easier way to show is to let all straps full out, grasp top straps with both hands, stick chin in face piece, pull straps over head, and then tighten straps, etc. (remember about taking off bottom canister seal).

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- D. Quick references to cleaning respirators near back of both SWP's. Show with cartridge respirator about unscrewing cartridges before washing. Mention that OSHA says that the foreman must inspect respirators to be sure that no defects exist and that they are clean.
- E. Practice on using respirators. Each man puts on a cartridge respirator, a canister respirator, and an airline respirator. For the airline respirator, he hooks up all connections on the two hoses and unhooks them (this is important!).

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