

I. Introduction

The Delaware City plastics plant uses vinyl chloride monomer (VCM) as a raw material in the manufacture of various types of polyvinyl chloride (PVC) resins. The plant also uses lead in the compounding facility as a stabilizer. It is believed that exposure to VCM may cause angiosarcoma of the liver which is a type of cancer. VCM is also a highly flammable and explosive material. Lead, which can be absorbed into your body by breathing or eating, is a toxic material.

The Occupational Safety and Health Administration (OSHA) and the Environmental Protection Agency (EPA) have enacted rules which regulate plants which use or manufacture PVC and/or lead. Some of those rules mandate the use of respiratory protection. Consequently, the plastics plant must adhere to those rules.

The material in this binder sets forth the plant's respiratory protection program with respect to VCM and lead and is required by OSHA regulations. It covers personnel training; respirator selection, use, care, and maintenance; worker and supervisor responsibilities; the respirator inspection program; and the medical examination program.

It is the plant's goal to eliminate the use of respirators by implementing feasible engineering and work practice controls to reduce airborne levels of VCM and lead. Until that goal can be fully accomplished, plant employees will have to wear respirators at various times and adhere to this program.

It is very important that all personnel who work at the plant follow the program described in this manual. By doing so all workers will be protecting their own health and safety and will reduce the occurrence of illnesses and lost time. Failure to adhere to this program may lead to disciplinary action. Violations may also lead to fines and penalties imposed by OSHA.

Each employee should be furnished with a copy of this manual and is expected to be familiar with its contents. Employees of contractors who work in plant areas in which

they may potentially be exposed to VCM and/or lead must also be briefed in this program and are expected to follow it.

II. Responsibility

A. Plant Manager

Everyone that works in the plant is responsible for some phase of the respiratory protection program. Since all employees report either directly or through the line organization to the plant manager, the plant manager has the ultimate responsibility to be sure that they have performed their duties under this program.

B. Plant Safety Supervisor

The plant safety supervisor is responsible for administering the respiratory protection program. This includes:

1. Training new employees in the selection, use, care and maintenance of respirators;
2. Conducting periodic inspections of respirators and the respiratory protection program;
3. Assuring that all respirators are properly cleaned, maintained and stored;
4. Assuring that each employee is afforded appropriate medical surveillance; and
5. Updating this manual as changes in the respiratory protection program occur.

C. Department Heads

Plant personnel are assigned to one of three departments: operations, technical or maintenance. Each department has a department head who is responsible to assure that each employee within his department has received adequate training in the selection and use of respiratory equipment before that employee begins work in his department.

D. First Line Supervisors

There are a number of first line supervisors assigned to each shift. They report either directly or through the line organization to the department heads. Consequently, the department heads are responsible for assuring that the first line supervisors enforce the proper use of respirators. It is the first line supervisor's responsibility to be sure each employee, including contractor employees reporting to him, are wearing the proper respiratory equipment while performing a job on which such equipment is required, or if plant conditions necessitate the use of such equipment. Each first line supervisor is also required to conduct an annual respirator fit test on each employee under his supervision.

E. Employees

Each employee and supervisor is responsible for knowing the contents of this manual and for adhering to the plant's respiratory protection program.

III. Disciplinary Action

The failure of any employee to adhere to the plant's respiratory protection program may lead to disciplinary action. The action taken for such a violation will be based upon its seriousness and flagrancy. For those violations that are not of sufficient seriousness to warrant formal action, the plant safety supervisor, department heads or shift supervisors are expected at least to point out the violation to the employee.

IV. Training

A. Initial Training

Before a new employee will be allowed to work in the PVC plant, he must successfully complete the respiratory protection training program. This program is conducted by the plant safety supervisor or his designee and includes the following:

1. A discussion of the hazards of VCM that is specific to the Delaware City plant.
2. The employee will be required to review and study this manual.
3. The employee will be examined by a licensed physician retained by the plant to determine his fitness to wear a respirator and to work in the plant. The scope of this examination is discussed elsewhere in this manual.
4. The employee's facial structure will be analyzed by the plant safety supervisor to determine if any special problems may exist in the employee's use of respiratory protection. This includes an analysis of dentures, facial hair and eyeglasses that may preclude a good fit.
5. The safety supervisor will review the contents of this manual with the employee.
6. The safety supervisor will demonstrate the function and use of each respirator for the employee and require him to try on each.
7. The safety supervisor will demonstrate the fit testing procedures for each respirator and require the employee to demonstrate his ability to conduct such a test. The fit test referred to here is the one to be conducted by each employee prior to each use of a respirator.
8. At the conclusion of the training program, the employee will be given an examination on the various aspects of the program. The employee must pass the examination and adequately demonstrate his ability to use respiratory equipment before he will be allowed to begin work.

B. On-the-Job Training

When a new employee has successfully completed the respiratory training program, he will then be given on-the-job training in the plant. Before a new employee begins this phase of his training, his first line or area supervisor should review with him the job functions that require the use of respirators, the location of the Arcas system warning lights, the location of the breathing air outlets, and the location of respirators. The new employee will then be assigned to an experienced employee. In addition to teaching the new employee how to perform his job, the experienced employee will be required to ascertain that the new employee is wearing a respirator when required by this respiratory protection program and that the new employee conducts the appropriate fit testing procedures and properly uses the respiratory equipment.

C. Refresher Courses

At least once each year, each employee must take a refresher course in the respiratory protection program. The refresher courses are conducted by the first line supervisors or the plant safety supervisor and include the following:

1. The employees will review the hazards of VCM that is specific to the Delaware City PVC plant.
2. The first line supervisors will review the contents of this manual with their employees.
3. The first line supervisors will demonstrate the fit testing procedures for ~~and~~ function and use of each respirator.
4. The first line supervisors will conduct a fit test on each of their employees.
5. At the conclusion of the training program, the employees will be given an examination on the various aspects of the program. If an employee fails to pass this test, he will be required to take the initial training course described in paragraph A of this section before he will be allowed to resume his job duties.

D. New Procedures and Equipment

If new procedures with respect to the selection, use, care or maintenance of respirators are adopted or different respiratory protection equipment is purchased, those employees affected by such changes shall be immediately notified and if appropriate, additional training shall be provided. All such changes shall be promptly reflected by amending or supplementing the contents of this manual for each employee.

E. Retraining

If an employee is formally disciplined for violating the respiratory protection program during the year preceding his refresher course, his refresher course will consist of the initial training course described in paragraph A of this section including successful completion of the examination and demonstration described in paragraph A(8).

F. Acknowledgement

After an employee successfully finishes his initial training or refresher course, he should sign the appropriate acknowledgement form set forth in Exhibit I of this manual.

V. Equipment

A. Respirators Available

There are currently four types of respirators used in the plant for protection against exposure to VCM gas. They are all approved by the National Institute of Occupational Safety and Health (NIOSH) and the Mine Safety and Health Administration (MSHA).

1. 3M brand No. 8716 VCM respirator, No. TC-23C-200 (3M respirator).
2. MSA airline constant flow respirator with comfo face piece, No. TC-19C-78 (MSA constant flow respirator).
3. Scott constant flow with Scottoramic full face piece, No. TC-19C-73 (Scott constant flow respirator).
4. Scott Presur-Pak 11A, No. TC-13F-40 (Scott Presur-Pak respirator).

A 3M brand No. 09910 respirator No. TC-21C-190, (3M dust respirator) is provided for employees who work in areas where workers may be exposed to lead.

B. Respirator Fit

Respirators will not be effective when conditions 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 eyeglasses. Also, the absence of one or both dentures can seriously affect the fit of a facepiece. Your diligence in observing these factors is extremely important. To assure proper protection, a fit test should be done each time you put on the respirator. This may be done by following the fitting instructions set forth in this manual.

If prescription glasses are worn, the employee should get an eyeglass kit from the Safety Department if he will be using the Scott constant flow or Scott Presur-Pak respirators. This kit enables an employee to mount his eyeglasses into the facepiece.

As mentioned above, the presence of facial hair will adversely affect the respirators' fit. Therefore, Diamond Shamrock has a beard policy which requires all

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employees who may use a respirator to remove all facial hair that could come into contact with any one of the five respirator facepieces. Failure to abide by this policy will result in disciplinary action.

C. 3M Respirator

1. Description

The 3M respirator is approved for employee respiratory protection up to 10 ppm of VCM. This respirator has a half facepiece with an absorbent air filter to remove VCM from the air entering the mask. The air filter has purple colored granules in the respirator cartridge that filter out the VCM. See diagram no. 1 for a picture of this respirator.

2. Use

These respirators are available in the control rooms of the plant. Your first line supervisor will issue one to you. The respirators should remain packaged in the hermetically sealed shipping packages until needed. Prior to entering a contaminated atmosphere, the fit test set forth in the next paragraph should be completed. When the purple colored granules in the respirator cartridge have turned to brown or if the respirator was used during a shift, the user should dispose of the 3M respirator as described in this manual.

3. Fit Test

The bottom loop of the elastic strap of the head harness should be placed around the head just below the ears and then the top loop should be placed around the head above the ears. The straps should not be twisted. The facepiece should be positioned over the nose and mouth. Both hands should be used to tighten the straps by grasping the loose ends of the lower elastic strap and pulling to the rear and then repeating the same procedure for the upper strap. The tension in the head harness may be decreased without removing the respirator from the head by pushing out on the flat surface of the buckles on each side of the respirator. After putting on the respirator and

adjusting it, the seal of the facepiece must be tested as follows before entering an atmosphere containing VCM:

(a) The front of the respirator should be covered with the hand, a piece of cardboard, or something similar. The position of the facepiece should not be disturbed.

(b) The worker should then exhale sharply through his nose and mouth. A positive pressure should be felt inside the facepiece. If air leakage is detected, the position of the facepiece on the face and/or the tension in the straps should be adjusted and then the seal retested. This procedure should be repeated until the facepiece is properly sealed.

(c) If a proper fit cannot be obtained, the worker should not enter an atmosphere that contains VCM. He should alert his immediate supervisor of the problem as soon as possible.

4. Storage and Disposal

These masks are stored in the control rooms and should remain in their sealed containers until needed for use. If this respirator is used during the shift, it should be disposed of at the end of the shift. If the purple colored granules have changed to brown, the 3M respirator should be immediately disposed of and a new one obtained. These masks are to be disposed of in the mask disposal receptacle.

D. MSA Constant Flow Respirator

1. Description

The MSA respirator is approved for use in atmospheres not immediately dangerous to life or health. This respirator must be connected to the plant breathing air system which supplies uncontaminated air at 30 to 40 psig. The respirator delivers a continuous flow of air to the facepiece.

The facepiece is a half mask unit with a single valve. Its chin cup and soft rolled edge provides a good seal for the face. It is equipped with a double

headband and floating yoke suspension to provide a uniform seal pressure at the facepiece rim. See diagram no. 2 for a picture of this respirator.

2. Use

This respirator will be used in atmospheres containing 1,000 ppm of VCM or less. When a worker is performing one of the job functions described in Exhibit II that requires that this respirator be worn, he should use it. Every employee who normally works in a regulated area and performs job functions that require the use of this respirator should pick up a clean and sanitized MSA respirator at the clean respirator storage locker each day before beginning work. At that time, he should make sure that the mask seal area, straps, and hose are pliable and void of cracks. He should check the tightness of the connections and perform the fit test set forth in the next paragraph to assure mask tightness.

3. Fit Test

The facepiece is easily adjusted. For best results the chin cup of the facepiece should be placed on the chin. The nose section should be swung into position along the bridge of the nose and the floating yoke suspension adjusted around the nose for the most comfortable fit. The headbands should be placed in the most comfortable position over the head and back of the neck, and their tightness should be adjusted by moving the buckles in the appropriate direction. The flow control valve should be attached over the belt on the left hip.

The facepiece should be tested for tightness before each use by squeezing the corrugated breathing tube tightly. The user should inhale so that the facepiece collapses slightly for 10 seconds. If the facepiece remains collapsed, it is sufficiently tight. If any leakage is detected around the facial seal, the head harness straps should be readjusted. If other than facial seal leakage is detected, the condition should be investigated and corrected. If a proper seal cannot be obtained, the worker

should not enter an atmosphere containing VCM. He should report such problems to his immediate supervisor.

4. Storage

At the end of his work shift, the worker should return used MSA respirators to the used respirator storage cabinet for cleaning and necessary maintenance. The Safety Department will recondition it, if necessary, and then wash, sanitize and package it. They will then be delivered to the clean respirator storage cabinets.

E. Scott Constant Flow Respirator

1. Description

This respirator is a full facepiece continuous flow respirator. It is used for respiratory protection in atmospheres where eye and face protection is required. When a worker is performing one of the job functions described in Exhibit II that requires that this respirator be worn, he should use it. This respirator includes the wide vision facepiece, a chin mounted stainless steel regulator, hose and harness assemblies, and an air supply hose. The mask mounted regulator provides air on demand or with a constant flow. This respirator must always be used in the constant flow mode. This is achieved by manually adjusting the continuous flow regulator knob located under the chin portion of the facepiece. Air from the plant breathing air system is supplied through a small diameter, flexible, neoprene hose secured over the shoulder, held snugly across the back and clipped to the belt at the right hip. The ends of the hose are pinch proofed with steel spring windings. See diagram no. 3 for a picture of this respirator.

2. Use

This respirator will be used in atmospheres containing 1,000 ppm of VCM or less. Every employee who normally works in a regulated area and performs job functions that require the use of this respirator should pick up a clean and sanitized one at the clean respirator storage cabinet each day before beginning work. At that time, he should make sure that the mask seal area, straps, and hose are pliable and void of cracks.

He should check the tightness of the connections and perform the fit test described in the following paragraph.

3. Fit Test

The head straps should be adjusted to full outward position. The head harness should be held out of the way with one hand or back over the lens. The facepiece should be placed over the face with the chin properly located in the chin pocket. The head harness should be pulled over the head and the neck straps tightened by pulling on the two buckles. The head harness should be stroked down to the back with one or both hands. The two temple straps should be tightened and the neck straps retightened if necessary. In most cases the top head strap will be tight when in the full outward position. The seal should be checked by closing off the breathing tube with the hand and slowing inhaling. No leakage should be detected, and the face piece should be drawn onto the face.

4. Storage

At the end of the work shift, the Scott constant flow respirators should be returned to the used respirator storage cabinets for cleaning and necessary maintenance. The Safety Department will recondition it, if necessary, and then wash, sanitize, and package it. They will then be delivered to the clean respirator storage cabinets.

F. Scott Presur-Pak Respirator

1. Description

This unit is a self-contained breathing apparatus. The parts include a full face mask of black rubber with adjustable headbands, a breathing tube of black rubber attached to an air regulator, and a 30-minute air bottle on a back harness. This respirator has a selector switch with on-off positions. With this switch in the up (on) position known as the pressure demand mode, it provides air on demand and maintains a positive, comfortable, gentle pressure within the mask well above that of the outside atmosphere.

This positive pressure is maintained by the exhalation valve under all breathing conditions and totally excludes toxic external atmospheres from the mask for the duration of the air supply.

2. Use

This respirator can be used for atmospheres containing VCM concentrations above 1,000 ppm. They are mainly used in emergency situations for purposes of life rescue, firefighting, or securing equipment to prevent a greater hazard from the release of VCM.

Before a worker puts this unit on, he should check the pressure gauge on the bottom of the air bottle. He should also check the air pressure on the regulator frequently while using this unit. When the worker puts the Scott Presur-Pak on, he should set the selector switch to the off position to prevent the diaphragm in the regulator from rupturing. He should then perform the fit test set forth in the following paragraph.

3. Fit Test

The head straps should be adjusted to the full outward position. The head harness should be held out of the way with one hand or back over the lens. The facepiece should be placed on the face with the chin properly located in the chin pocket. The head harness should be pulled over the head and the neck straps tightened by pulling on the two buckles. The head harness should be stroked down to the back using one or both hands. The two temple straps should be tightened and the neck straps retightened, if necessary. In most cases, the top head strap will be tight when in the full outward position. The seal should be checked by closing off the breathing tube with the hand and inhaling slowly. No leakage should be detected, and the face piece should be drawn onto the face.

4. Storage

The Scott Presur-Pak respirators are stored in 15 locations throughout the plant. These locations are indicated on Exhibit III. The units are stored in their black plastic equipment shipping containers.

G. 3M Dust Respirator

1. Description

This respirator is a yellow cloth cup-shaped mask that fits over the mouth and nose. It is secured by tightening the elastic bands around the head.

2. Use

These respirators are to be used in the compound blender floor area during the production of lead based stabilizer compounds. This respirator removes dust and mists from the air, but gives no protection against fumes, gases, vapors, or oxygen deficiency.

3. Fit Test

The following procedure must be performed each time the mask is worn. The respirator should be cupped in the right hand with the nose piece at the fingertips. The top strap should be held between the thumb and the index finger of the left hand. The respirator should be cupped under the chin with the nose piece up. The top strap should be pulled over the head and positioned at the top back part of the head. The bottom strap should be pulled over the head and positioned around the neck below the ears. To tighten the straps, the buckle should be grasped with the left hand. The straps should be held away from the hair and pulled through the buckle with the right hand. To loosen the straps without removing the mask, the buckle should be grasped with the left hand. The teeth of the buckle should then be pulled outward and the strap pulled through the buckle with the right hand. Using both hands, the metal nose piece should be molded to the shape of the nose.

4. Storage and Disposal

The masks are stored 10 to a bag in the compound storage shed and are distributed by the first line supervisor during the production of lead compounds.

The masks are disposed of at the end of a shift along with the other lead contaminated operating wear (suits, gloves, etc.) in the appropriate disposal receptacles.

VI. Respirator Selection Guide

A. Introduction

The following information should be followed in selecting the proper respiratory protection equipment. This section describes when a respirator must be worn and which respirator should be selected, except for emergency situations which are covered elsewhere in this manual. It is the first line supervisor's responsibility to assure that each employee is using the proper equipment when required.

B. Protection Against VCM Exposure

Respiratory protection is to be worn when a job function requiring such protection is performed, or the area VCM monitoring system indicates VCM concentrations which require respiratory protection.

1. Job Functions

Respiratory protection may be required for the particular job duties performed. All job duties have been studied by the plant Operating Department to determine when respirators must be worn to avoid exposure to VCM. Exhibit II is a listing of the job duties requiring respiratory protection and the respirator that must be used. If a worker is near another worker whose job requires him to use a respirator and the former is not performing that job, the former should wear the 3M respirator. A person is deemed to be near another worker if he is working:

a) Within a distance of 10 feet of a reactor that is being charged or dropped. The duration of time a mask must be worn will be the same as for the operator who is doing the charging or dropping.

b) Working within 10 feet of an operator who is required to wear a mask because of the job function he is performing.

2. Arcas Warning System

The Arcas system is a gas chromatograph analyzer system capable of analyzing low concentrations of VCM in ambient air. There are 48 sampling locations

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throughout the plastics plant. A more complete description of this system can be found in Exhibit IV. The Arcas system will activate a series of warning lights located throughout the operating areas when the following VCM levels are reached:

<u>Light Color</u>	<u>VCM Level</u>	<u>Available Respiratory Protection</u>
Green	Less than 5 ppm	No respiratory protection is required unless the job being performed is one in which the employee must wear a respirator.
Yellow	5-10 ppm	3M Respirator
Red	Greater than 10 ppm	1. MSA Respirator 2. Scott Constant Flow Respirator 3. Scott Presur-Pak Respirator

When the green light is on, workers should use the respiratory equipment required for the job they are performing. When the yellow light is on, workers must wear one of the VCM respirators specified in the above chart or immediately evacuate the area. If the red light is on, workers should evacuate to a safe area. If one of the Arcas display panel lights indicates a concentration in excess of 1000 ppm, the number one operator should notify plant personnel to evacuate. In that case the emergency procedures set forth in this manual should be followed.

Before removing a respirator or reentering an area, the Arcas display panel in the control room should be checked. The display panel indicates VCM concentrations in the specified operating areas which exceed the following levels: 1, 5, 10, 25, 1000 and 3600 ppm. This information determines the respiratory protection to be used for reentry.

<u>VCM Level</u>	<u>Available Respiratory Protection</u>
1. Greater than 1000 ppm	1. Scott Presur-Pak Respirator
2. 25-1000 ppm	2. A) Scott Constant Flow Respirator B) MSA Constant Flow Respirator C) Scott Presur-Pak Respirator*

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VCM Level

Available Respiratory Protection

3. 10-25 ppm

- 3. A) Scott Constant Flow Respirator
- B) MSA Constant Flow Respirator
- C) Scott Presur-Pak Respirator*

4. 5-10 ppm

- 4. A) 3M Respirator
- B) Scott Constant Flow Respirator*
- C) MSA Constant Flow Respirator*
- D) Scott Presur-Pak Respirator*

5. 1-5 ppm

5. According to job function.

*The indicated respirator is not normally worn at this concentration unless no other respirators are available or the job function the worker is performing requires it.

C. Protection Against Lead Exposure

If a worker enters the blender floor area when lead containing compounds are being produced, he must wear the 3M dust respirator. Signs will be posted at the entrance to this area to alert plant personnel that lead containing compounds are being produced.

This respirator is acceptable for concentrations up to 500 micrograms of lead per cubic meter. Job function study results confirm that the concentrations of lead in the blender floor area are below this level.

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VII. Plant Breathing Air System

The MSA and Scott constant flow respirators are airline supplied respirators. The breathing air for these respirators is supplied by the number four and number five air compressors located in the utilities building. There is a carbon absorption unit located after the air compressor that purifies the breathing air.

To use the breathing air system, the air hose should be hooked up to one of the breathing air stations located throughout the plant, the respirator should be put on, and the required fit test conducted. First line supervisors are required to point out the breathing air station locations to their new employees as a part of the on-the-job training.

There is a backup bottled air system which can be used if the air compressors are inoperable. The backup system will provide 20 to 30 minutes of air depending on the number of respirators being used. It consists of two bottle banks containing 12 bottles each located in the emergency power station next to the utilities building.

The backup system will be activated automatically if there is a power failure, the carbon monoxide concentration in the breathing air system exceeds 20 ppm or the air pressure in the breathing air system falls below 60 PSIG. The backup air system can also be brought on-line manually by depressing the trip button on the system relay panel in the utility building. When the backup system comes on-line, an alarm will sound in the poly control room, and a red indicator light on the relay panel will come on. The operator number one in the poly control room should immediately notify the utilities number one operator who should then contact his first line supervisor. The latter should notify the other first line supervisors who should check all personnel under their supervision and discontinue as safely and efficiently as possible all nonessential use of the breathing air system.

As mentioned above, the backup system will be activated automatically if the carbon monoxide concentration exceeds 20 ppm. An alarm on the utility building relay panel will sound, and a red light will come on. The horn can be silenced after it sounds by

switching on a horn silence switch on the relay panel. When the horn has been silenced, the power light on the relay panel will flash until it has been reactivated. When the carbon monoxide concentration falls below 20 ppm, the utilities number one operator should depress the carbon monoxide monitor reset button on the control panel and turn the horn switch back on.

The utilities number one operator should monitor the gauges on the air bottles when the backup system is on. If the system's pressure falls below 60 PSIG, he should notify the first line supervisors immediately. All personnel using the MSA or Scott constant flow respirators should then don the Scott Presur-Pak respirator.

When the conditions that caused the backup system to come on-line have been corrected, the utilities number one operator should depress the reset button on the relay panel to activate the compressed air breathing system. If the backup breathing air system has become exhausted, the utilities number one operator should open the manual ball valve located directly below the backup system relay panel once the condition causing the backup system to activate has been corrected. This will allow the breathing air system pressure to increase above 60 PSIG. The reset button should be pressed and then the manual ball valve should be closed.

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VIII. Emergencies

A. Definition of Emergency

An emergency condition exists anytime there is a VCM spill regardless of its seriousness.

B. Emergency Equipment

Emergency equipment such as additional respiratory equipment, body harnesses, wrist straps and rope can be found in the emergency equipment cabinets located throughout the plant. These cabinets are painted red and marked as containing emergency equipment.

The appropriate respiratory equipment for emergency situations is the Scott Presur-Pak. The locations for these respirators are specified in Exhibit III.

Before his shift begins, the operator number ones should check the emergency equipment cabinets and Scott Presur-Pak locations in their area. The contents should be compared to a check list on the cabinet door. If any item is missing, the operator number one should immediately obtain it from the plant Safety Department.

C. Training

An employee's initial training by the plant safety supervisor shall include a discussion of the plant's emergency procedures. His on-the-job training shall include a review by his first line supervisor of evacuation procedures, evacuation areas, the location of emergency equipment cabinets and the location of personnel protective equipment used in emergencies.

At least once a year the plant should conduct a VCM emergency drill. The plant personnel's response should be observed and evaluated by the plant Safety Department. Records and further training sessions may be necessary to correct any deficiencies in the plant's response.

D. Vapor Detection System

The plant has a VCM vapor detection system located in the polymerization and reclaim areas. The lower detection limit for this system is 20% of the lower explosive level of VCM. When this level is reached, an automatic VCM spill alarm is sounded, and the water deluge system sprays the affected area with water.

E. Personnel Responsibilities and Procedures

If a VCM spill occurs, all nonessential personnel shall evacuate to the predesignated safe areas. Each safe area shall have an evacuation leader who is responsible for assuring that all nonessential personnel that should be there are accounted for. He is responsible for the reentry and further evacuation of his group. Essential operating personnel who remain behind should communicate with the evacuation leaders regarding the status of the spill.

One of the operator number twos should get the emergency equipment from the nearest emergency equipment cabinet. Essential operating personnel (first line supervisors, operator number one and two operator number twos in the affected area) should immediately put on the Scott Presur-Pak and, if necessary, protective clothing and gloves. The only situation in which this equipment need not be donned immediately is to give prompt attention to a situation that may result in a catastrophe (e.g., fire, explosion). In that event it should be obtained and worn as soon as reasonably possible.

Before entering into a spill area, some attempt should be made to determine the VCM concentration in the atmosphere. If the concentration is unknown or greater than 36,000 ppm, no one should enter the area unless someone is in there and his life is endangered. If the concentration is between 3,600 and 36,000 ppm, entry may be made only for life rescue, firefighting or securing equipment to prevent a greater hazard from a release of VCM. No one should enter the spill area unless one or more persons remains behind with the emergency equipment. If a person enters an area where the concentration is unknown or greater than 3,600 ppm, one of the lifelines or safety harnesses should be

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secured to him. The first line supervisor and operator number one in the area and/or the environmental operator should assess the nature of the spill, advise the medical security technician and make an appropriate announcement to the evacuation leaders. The essential operating personnel should then enter the spill area, identify the cause of the spill, and take appropriate action.

F. Fire Brigade

A VCM spill may cause or threaten to cause a fire. The essential operating personnel shall notify the head of the first brigade with respect to each spill as to the existence or threat of a fire. If there is a fire or a threat of a fire, the fire brigade shall respond in accordance with its established procedures.

G. Medical Treatment

The essential operating personnel, evacuation group leaders and plant Safety Department should determine as soon as possible if anyone has been exposed to VCM. All exposed employees should be given the appropriate medical attention as described in the Medical Surveillance section of this manual.

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IX. Cleaning and Maintenance

A. For the 3M Respirator and the 3M Dust Respirator

These respirators are disposable and should not be reused. They are to be disposed of in the proper disposal receptacle by each user at the end of the shift in which it is used or at the end of its useful life, whichever occurs first. Therefore, no cleaning or maintenance of these respirators is necessary.

B. For the MSA and the Scott Constant Flow Respirators

Each employee who picks up one of these respirators at the beginning of his shift should return it to the used respirator storage cabinet at the end of his shift. A representative from the Safety Department will pick up these used respirators every morning (except on Saturdays and Sundays) and take them to the cleaning area located in the trailer adjacent to the Safety Department office. There will always be a sufficient number of clean respirators available for each shift and weekends.

These respirators are then examined for damage by the Safety Department. All hoses are to be stretched and checked for cracks, the assembly is to be examined for tightness and the headstraps and facepiece are to be checked for wear and deterioration. Spare parts such as hoses and headstraps are available in the cleaning area. All repairs will be made by Safety Department personnel who have been certified by the manufacturer to perform such maintenance. If the Safety Department determines that a respirator cannot be repaired in-house, it will be discarded.

After the respirators are checked for damage and, if necessary, repaired, they are to be cleaned and sanitized in the Wave Energy Systems Model 512 automatic cleaning system. This system is a three foot high and four foot long steel cabinet with a recessed ultrasonic chamber. To clean and sanitize, the lid on the rotating drum should be removed and the drum loaded with respirators. Detergent should be put into the chamber, followed by the drum, and the cover closed. The cycle switch should be set on full cycle, the cycle time should be selected (15 minutes to one hour) and the start button pressed.

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When the respirators have been cleaned, sterilized and disinfected, the cycle and light will come on. The respirator should then be removed, placed in the PVC bags provided in the cleaning area, and sealed. The bags should be signed by the person who inspected the respirators for damage to indicate the date inspected and by whom. They should then be placed in the clean respiratory storage cabinet.

C. For the Scott Presur-Pak

The Safety Department will inspect and clean these respirators after each use but at least monthly, whichever comes first. After this respirator has been used, it should be placed in the used respirator storage cabinet. If this respirator is used during a shift, the first line supervisor in the area in which it was used is responsible for assuring that a clean Scott Presur-Pak respirator is obtained from the clean storage cabinet immediately after the used respirator is placed in the used respirator storage cabinet.

The Safety Department will inspect these respirators for damage. The hose should be stretched and examined for tightness of assembly and cracks. The facepiece and straps should be examined for deterioration. Next, the unit should be assembled and the diaphragm's functions checked. The yellow main line valve located on the regulator and the cylinder valve located at the base of the air bottle should be opened thereby allowing air to flow into the regulator and hose. The cylinder valve should then be closed, and the regulator gauge compared to the cylinder gauge. They should have identical readings, plus or minus 100 PSI. The regulator gauge should remain steady. If there is a drop in its reading, that indicates there is a leak in the hose or connections. If such a drop occurs, the leak should be located and repaired. With the cylinder valve still closed, the air in the hose should be reduced. The alarm should ring when the regulator gauge reads about one-quarter full. The unit should then be tested in both the pressure and the demand modes by setting the selector switch in the appropriate position. In the pressure mode the flow of air should be continuous, and in the demand mode air will enter the facepiece when breathing action draws it in. The red bypass valve located on the

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regulator should then be opened and tested. If it is functioning correctly, air should flow into the facepiece at a more forceful rate than when in the pressure mode. Finally, the cylinder gauge should be checked. If it does not register full, the cylinder should be filled with breathing air supplied by the air cylinders in the cleaning area.

The person who inspected the respirator should then complete the inspection report form set forth in Exhibit III. A record of the inspection date, findings and corrective measures, if any, should be noted.

After the Scott Presur-Pak has been inspected, the facepiece and head harness should be cleaned, sterilized and disinfected in the same manner as the MSA and Scott constant flow respirators.

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X. Inspection and Evaluation of Respiratory Protection Program

The entire respiratory protection program is to be inspected and evaluated on a regular basis. All plant personnel are expected to participate in this process. The mechanisms to accomplish this objective are set forth below.

A. Department Safety Meetings

First line supervisors are to hold monthly safety meetings, and all departmental personnel must attend. A number of safety related topics may be covered in a single meeting. This session should include a discussion of at least some facet of the respiratory protection program described in this manual.

First line supervisors should encourage those in attendance to participate in all topics discussed. With respect to the respiratory protection program this will include the workers' comments and recommendations on the program's effectiveness. Those comments and recommendations should be noted in the minutes of the meeting. Those minutes should include a general report on the subjects discussed and a record of attendance. Copies of those minutes should be submitted to the first line supervisor's immediate supervisor and to the plant safety supervisor.

B. Safety Contacts and Observations

First line supervisors are required to conduct a safety contact and observation session with each worker that he supervises at least once a month. To perform this function first line supervisors will observe the workers on-the-job performance paying particular attention to job safety and health. The first line supervisor should include as a part of the session questions concerning the worker's ability to select, use and handle respiratory equipment and should encourage the employee to discuss his views and recommendations regarding the respiratory protection program. He should note those views and recommendations in a written report of the session. The report should also include a summary of the supervisor's observations and the topics discussed. A copy of

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that report should be sent to the first line supervisor's immediate supervisor and the plant safety supervisor.

C. Loss Prevention Committee

This committee is comprised of all plant supervisory personnel and meets monthly. This committee discusses all aspects of the plant's health and safety programs. This session should include a discussion of the effectiveness of the respiratory protection program and should include observations, comments and recommendations. The committee shall keep minutes of its meetings which should include a summary of the topics discussed, recommendations, proposed action and schedules. Subsequent meetings should review the progress made with respect to the loss prevention committee's recommendations.

D. Sampling Program

The plant's environmental group conducts personnel and area wide sampling on a predetermined basis (continuous or periodic). A monthly report summarizing the sampling results is prepared and submitted to the Health and Environmental Affairs Department (HEAD). HEAD evaluates those reports and provides the plant with assistance if it is needed. This may include recommendations for improving the respiratory protection program.

E. Safety Department Spot Checks and Audits

The plant Safety Department will conduct regular and frequent spot checks on the plant's safety and health programs. This will include an inspection of the various aspects of the respiratory protection program as described in this manual. These inspections should pay particular attention to whether workers and supervisors are adhering to the procedures set forth in this manual, evaluations of the effectiveness of these procedures, and recommendations on improvements. Those points should be covered by a written report to the plant safety supervisor.

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The unit Safety Department performs an annual audit of the plant's entire safety and loss prevention program. This includes a written evaluation of the effectiveness of the respiratory protection program and recommendations for improvement.

The plant Safety Department should review and analyze the report submitted to it pertaining to the respiratory protection program and investigate ways to improve it. As changes in the respiratory protection program are made, the plant Safety Department should update this manual and furnish all plant employees with current versions.

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XI. Medical Surveillance

A. For VCM

All new employees who will be working in the PVC plant must submit to a physical examination by a licensed physician retained by Diamond Shamrock before they will be allowed to begin work. Each employee who has worked in a VCM or PVC manufacturing facility for 10 years or more is expected to submit to a re-examination every 6 months. All other employees must be examined every year. Diamond Shamrock will pay the cost of these examinations.

If an employee refuses to submit to such an examination, he is expected to submit to one by a physician of his choice. The employee will be given a form that his doctor will have to complete. He will also be required to sign the acknowledgement set forth in Exhibit V. Diamond Shamrock will reimburse the employee for the cost of such an exam as long as it is conducted in accordance with this section, and the cost is reasonable. If an employee decides to be examined by his own physician, both the employee and the physician are expected to comply with this section including the submission to Diamond Shamrock of the certificates regarding the employee's fitness and use of alternative medical exams.

The OSHA VCM standard in 29 CFR Section 1910.1017(k) specifies the contents of this medical exam. The physician who conducts the physical examination must give the tests and obtain the medical history required by that standard. The physician may give the employees an alternative examination to the one specified in the standard if such an examination is at least as competent in detecting medical conditions that may be caused by VCM exposure. If the physician gives such an alternative examination, he must give Diamond Shamrock a written statement which sets forth the alternate exams used and the rationale for their substitution.

The purpose of the physician's exam is to determine if the employee's health would be impaired by exposure to VCM in his work and whether he is capable of using

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respiratory equipment. After each examination of each employee, the examining physician must furnish a written statement to Diamond Shamrock indicating whether the employee is fit to be exposed to VCM and whether he is capable of using respiratory equipment. The plant safety supervisor must promptly forward a copy of that statement to the employee.

If an employee is exposed to a massive quantity of VCM, he should be immediately examined by a licensed physician. The physician shall conduct an examination that is appropriate considering the facts surrounding the employee's exposure, the employee's symptoms and the test required annually or semiannually, as the case may be, by the OSHA VCM standard. The statement of fitness and capability described above must also be furnished to Diamond Shamrock and the exposed employee.

If the physician's statement indicates that the employee's health would not be impaired by exposure to VCM and is capable of wearing respiratory equipment, he will be allowed to work in the plant. If the statement indicates that the employee's health may be impaired by exposure to VCM or is not capable of wearing respiratory equipment, he will not be allowed to work in the plant.

B. For Lead

Those employees who work with lead in the compound plant and who are or may be exposed to more than 30 micrograms of airborne lead per cubic meter averaged over 8 hours for more than 30 days per year will be required to participate in a lead medical surveillance program. Before a new employee who may be so exposed will be allowed to work in the compound plant, he must submit to a medical examination. Each employee whose blood level during the prior 12 months was at or above 40 micrograms of lead per 100 grams of whole blood must submit to an annual medical examination. The medical examination to be conducted for these employees shall be the one required by the OSHA lead standard found at 29 CFR 1910.1025.

Diamond Shamrock will provide a medical examination to an employee as soon as possible if the employee has notified the plant safety supervisor of symptoms of lead poisoning, the employee makes a request to the plant safety supervisor for medical advice concerning the effects of his lead exposure on his ability to procreate healthy children, or the employee has demonstrated difficulty in breathing during a respiratory fit test or during use. If an employee has been removed from further exposure to lead or has otherwise been limited in the performance of his job as required by the OSHA lead standard, Diamond Shamrock shall provide him with a medical examination as often as is deemed appropriate by a licensed physician retained by Diamond Shamrock. The examining physician shall determine the content of the medical exams for these employees. If the employee asks the examining doctor for a pregnancy test or an evaluation of male fertility, that shall also be provided.

In addition to the medical exams discussed above, Diamond Shamrock will provide blood sampling and analysis for lead every 6 months to employees who are or may be exposed to more than 30 micrograms of airborne lead per cubic meter averaged over 8 hours for more than 30 days per year. If any such employee has a blood lead level of at or above 40 micrograms per 100 grams of whole blood, he shall be given this sampling test and analysis every 2 months until 2 consecutive blood level analyses indicate a blood lead level below 40 micrograms per 100 grams of whole blood. If an employee has been removed from the compound plant as required by the OSHA lead standard, the testing and analysis will be done monthly until the employee no longer needs to be so removed.

All medical examinations and procedures conducted for employees exposed to lead will be performed by or under the direction of a licensed physician and will be paid for by Diamond Shamrock.

Diamond Shamrock will give the examining physician a copy of OSHA's lead standard and require him to conduct the examinations required by that standard. Diamond Shamrock will also provide the doctor with a description of the employee's duties as they

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relate to his lead exposure, the employee's exposure level to lead and any other toxic substance, a description of the personal protection equipment worn by the employee, the employee's prior blood level determinations, and all prior written medical opinions regarding the employee in Diamond Shamrock's possession.

The purpose of these medical examinations is to determine if the employee is fit to continue working in the compound plant. If the employee's blood lead level exceeds those set forth in the OSHA lead standard, Diamond Shamrock may be required, temporarily or permanently, to remove him from working in the compound plant. Any such removal shall be done in accordance with OSHA regulations and Diamond Shamrock policy. If an employee's blood lead level requires Diamond Shamrock to remove him from further exposure to lead, the employee will be asked to submit to another blood sampling test within 2 weeks after Diamond Shamrock receives the results of the first test.

If an employee's blood lead level exceeds 40 micrograms per 100 grams, Diamond Shamrock will notify the employee of his blood lead level within 5 days after receiving those results, and if he must be removed from continued exposure to lead as required by the OSHA standard, Diamond Shamrock will in that notice inform the employee that he must be so removed with the medical removal protection benefits required by the OSHA lead standard.

Diamond Shamrock will obtain the following information in writing from the examining doctor and furnish a copy of it to the employee: the physician's opinion as to whether the employee has a medical condition which increases his risk of material health impairment from lead exposure; any recommended special protective measures to be provided to the employee, or limitations to be placed on his exposure to lead; any recommended limitation on the employee's use of respirators; and the results of the blood level determinations.

The examining doctor will not reveal to Diamond Shamrock or anyone else any other findings or diagnoses unrelated to the employee's occupational exposure to lead.

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The doctor will advise the employee of any medical condition discovered during the examination that requires further examination or treatment.

EXHIBIT I

The following acknowledgement shall be signed by each employee after he takes and successfully completes the initial training course described in this manual:

ACKNOWLEDGEMENT

The undersigned employee has participated in the respiratory protection program at the Delaware City plastics plant and has done the following:

1. Reviewed the information on the hazards of VCM;
2. Been given a copy of the Delaware City respiratory protection manual and has studied its contents;
3. Received a demonstration on fit testing procedures to be used for the 3M, MSA constant flow, Scott constant flow, Scott Presur-Pak, and 3M dust respirators and given a fit test for each;
4. Received a demonstration on the function and use of the 3M, MSA constant flow, Scott constant flow, Scott Presur-Pak, and 3M dust respirators;
5. Been given an opportunity to wear the 3M, MSA constant flow, Scott constant flow, Scott Presur-Pak, and 3M dust respirators during the training session;
6. Been tested on the contents of the Delaware City respiratory protection manual;
7. Been required to demonstrate his ability to use the 3M, MSA constant flow, Scott constant flow, Scott Presur-Pak, and 3M dust respirators.

Date:

Employee Name

The following acknowledgement shall be signed by each employee after he takes and successfully completes the annual refresher course described in this manual:

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ACKNOWLEDGEMENT

The undersigned employee has participated in the annual refresher course in the respiratory protection program at the Delaware City plastics plant and has done the following:

1. Reviewed the information on the hazards of VCM;
2. Reviewed the contents of the Delaware City respiratory protection manual during the review session;
3. Received a demonstration on fit testing procedures to be used for the 3M, MSA constant flow, Scott constant flow, Scott Presur-Pak, and 3M dust respirators and given a fit test for each;
4. Received a demonstration on the function and use of the 3M, MSA constant flow, Scott constant flow, Scott Presur-Pak, and 3M dust respirators;
5. Been tested on the contents of the Delaware City respiratory protection manual.

Date:

Employee Name

EXHIBIT II

Job Functions Requiring Respiratory Protection

A. The 3M respirator should be worn while performing the following job functions:

1. When latex is on the floor,
2. Cleaning condensers,
3. Removing grits dumpsters,
4. Charging a reactor or within 10 feet, and
5. Dropping a reactor or within 10 feet.

B. The MSA constant flow respirator should be worn while performing the following job functions:

1. Scrubbing reactors,
2. Rinsing reactors,
3. Cleaning drop screens,
4. Washing blend tanks, strippers, and blowdown tank,
5. Opening and washing bowsers and filter,
6. Cleaning seal water system filter screens,
7. Work around sweeco screens, in the paste poly areas,
8. Dropping seed polys,
9. Any task requiring vessel entry,
10. Unhooking VCM rail cars,
11. Sampling waste water stripping effluent,
12. Sampling stripped slurry,
13. Cleaning paste poly drop values, and
14. Cleaning suction basket of paste poly vacuum pump.

C. The Scott constant flow respirator should be worn while performing the following job functions:

1. Changing VCM filters,
2. Sampling reactors,

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3. Sampling VCM from storage spheres,
4. Sampling blowdown tanks,
5. Unloading VCM trucks,
6. Emptying influent sump baskets at the bio plant,
7. Draining gas holder knock out pots,
8. Changing suction filters - Fuller reclaim comp,
9. Cleaning VCM unloading basket at the rail car unloading station,
10. Opening and cleaning foam traps,
11. Sampling strippers, blowdown and blend tank,
12. Dropping BB polys to dump truck or dumpsters,
13. Cleaning influent sumps at bio plant,
14. CRC make up, and
15. Sampling used polys.

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EXHIBIT III

Equipment Inspection Report

<u>Emergency Equipment (List)</u>	<u>Location</u>	<u>Clear Access</u>	<u>Operates Properly</u>	<u>Clean Defects and or Ready Remarks</u>
Pak No. 1	Pace Dryer Control Room			
Pak No. 2	Poly Control Room			
Pak No. 3	PCB Maintenance Shop			
Pak No. 4	Poly Control Room			
Pak No. 5	Environmental Operator's Office			
Pak No. 6	Shift Supervisor's Office			
Pak No. 7	Reclaim Control Room			
Pak No. 8	Poly Control Room			
Pak No. 9	Poly Control Room			
Pak No. 10	New Poly Paced Control Room			
Pak No. 11	Poly Control Room			
Pak No. 12	Compound Plant Office in Hallway			
Pak No. 13	VCM Truck Unloading Control Room			
Pak No. 14	Poly Control Room			
Pak No. 15	New Poly Paced Control Room			

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EXHIBIT IV

Arcas System at Delaware City

The Arcas monitoring system at Delaware City is comprised of three individual gas chromatograph units. Each unit samples 16 points located throughout the plant for total organics. All organics in the PVC plant are assumed to be VCM. Sampling is done sequentially and each point is analyzed once every sixteen minutes. Each unit is calibrated once per shift.

Individual analyses are shown several ways, and every analysis is stored on a computer system and can be retrieved. Each analysis over 1.2 ppm is printed out on a Decwriter in the shift supervisors' office. Every analysis over 1 ppm activates a light on a display panel in the poly control room which indicates sampling point and concentration range. An audible alarm must be acknowledged by poly control room personnel. Any reading over 5 ppm activates a flashing warning light in the appropriate location of the plant.

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EXHIBIT V

Acknowledgement

Diamond Shamrock offered me a physical examination on _____,
19__ to evaluate my fitness for working in VCM regulated areas and to wear respiratory
equipment. I have of my own free will chosen not to take this examination.

Date:

Name _____