

OSHA - ENGINEERING AND WORK PRACTICECONTROL PLANAUGUST 9, 1983TABLE OF CONTENTS

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ENGINEERING AND WORK PRACTICE CONTROLS
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I. WORK PRACTICE CONTROLS

A. Respiratory Protection Guidelines

Although most of the planned engineering and work practice control programs for the plant have been implemented, some of the routine operational jobs require the use of respiratory protection. The OSHA Vinyl Chloride Standard states "Employees engaged in any operation, procedure or activity where a release of vinyl chloride liquid or gas might be expected as a consequence of the operation, which would result in an employee exposure in excess of the permissible limit, shall be provided and required to wear respiratory protection." Employees must use fresh air respirators, Scott air packs or Scott sling packs for the following operations, because the possibility of exposure to greater than the permissible limit exists. VCM cannister masks may be worn under some conditions, as noted in (h). It is anticipated that VCM cannister masks will be phased out by November 15, 1983.

1. General Plant

- a. When entering a vessel or any confined area that contains more than 1 ppm vinyl chloride.
- b. When opening any piece of equipment that has been in vinyl chloride service.
- c. When performing work on any open piece of equipment that has been in vinyl chloride service, unless the equipment is blinded and a Supervisor verifies that the VCM concentration in the work area is less than 1 ppm.
- d. When repairing a VCM leak on any equipment that contains VCM, and the VCM concentration in the work area exceeds or is expected to exceed 1 ppm.
- e. When using the portable vinyl chloride detector to pinpoint a vinyl chloride leak detected by the continuous monitoring system, and the VCM concentration in the work area exceeds or is expected to exceed 1 ppm.
- f. When working in an area where the local VCM warning beacon is flashing, or the fixed point monitor indicates a VCM concentration of 3 ppm or more in the area.
- g. When performing any other operation which has the possibility of resulting in exposure greater than the permissible exposure limit. The permissible exposure limit is defined as:
 - i. No employee may be exposed to vinyl chloride at concentrations greater than 1 ppm averaged over any 8-hour period.

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- ii. No employee may be exposed to vinyl chloride at concentrations greater than 5 ppm averaged over any period not exceeding 15 minutes.
 - iii. No employee may be exposed to vinyl chloride by direct contact with liquid vinyl chloride.
- h. VCM cannister masks may be used under the following conditions:
 - i. Working in a contaminated area of less than 10 ppm for up to 10 hours.
 - ii. Performing leak detection operations while Honeywell units are indicating between 1 and 10 ppm VCM.
 - iii. Escape from an area of high VCM concentration to obtain a Scott Air Pak.
- 2. VCM Tank Farm Area
 - a. When checking the sphere vapor space oxygen content.
 - b. When working at the compressor station.
 - c. When opening domes on railcars prior to connecting hoses.
 - d. When connecting and disconnecting hoses to the railcar.
 - e. When sampling VCM railcars or storage vessels.
- 3. Reactor Area
 - a. When opening a Lenape manway on a reactor without using steam jet evacuation on the reactor.
 - b. When changing filters which have been contaminated by VCM. This includes but is not limited to fresh and recovered VCM filters, recovery seal water filters, recovery knockout tank scrubber water filters, etc.
 - c. When on top of any blend tanks which are regulated areas.
 - d. When working on a plugged reactor with a closed valve.
 - e. When working near the reactor with a closed valve.
 - f. When working near the reactor with a closed valve.

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- g. When sampling reactors or VCM storage vessels.
- h. When on top of a blend tank that is being filled with water or slurry from the resin reclaim system.

4. Bioponds Area

- a. When working near the biodisc operation and the biodisc shaft covers are not being ventilated.
- b. When using compressed air to fluidize resin in Pond 1.

B. Exposure Protection Guidelines

This section covers work practices which help to minimize employee exposure to VCM, regardless of whether or not respiratory protection is used. In general, this includes VCM exposure caused by performance of certain jobs, and VCM exposure caused by unknowingly being in an area which has a high VCM concentration.

1. Hazardous Job Posting

Whenever any job is performed in which VCM will potentially be dispersed around the workplace, hazardous job signs must be posted around the site in order to warn passerbys. These signs read "DANGER - POTENTIAL VCM EXPOSURE AREA - RESPIRATOR REQUIRED." Personnel are not to enter marked off areas unless they are wearing respiratory protection, or they have obtained verification from a calibrated HNU that the area is safe to enter without a respirator. The following jobs are hazardous, and must be posted as such.

- a. VCM or VCM-contaminated filter changes.
- b. Vessel opening and cleanout.
- c. Flushout of VCM-contaminated material to grade or sewer.
- d. VCM leak repair.

2. Filter Cleaning, Removal and Replacement

The following procedure must be used when changing filters which have been in contact with VCM.

- a. Steam purge and recover the filter to the process until a vacuum is reached.
- b. The operator must put on a fresh air mask, impervious gloves and impervious suit.

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- c. Post hazardous job signs around the area of the filter.
- d. Change the filters.
- e. Dispose of the used filters in accordance with Section (I)(B)(7) of this manual.

3. Pump, Condenser, Subcooler, Line and Vessel Maintenance

The following procedure must be used when performing maintenance on lines, vessels, subcoolers and condensers which have contained VCM.

- a. The equipment must be evacuated or flushed out until free of VCM as detected by the HNU portable hydrocarbon detector.
- b. Post hazardous job signs around the area of the equipment to be opened, if VCM is still present in the equipment.
- c. Open the equipment.
- d. Dispose of any VCM-contaminated waste material in accordance with Section (I)(B)(7) of this manual, where applicable.
- e. When drilling a reactor condenser, perform work using an air mover on the Lenape manway for ventilation of the condenser.

4. Opening Manhead on Empty Reactor

The following procedure must be used when opening the manhead on a reactor.

- a. Check the external pressure gauge to insure that the reactor is not under pressure.
- b. Unlatch the manhead roll bar, and crack the manway.
- c. Radio the panel operator to open the evacuation jet to the reactor. This will move air inward and disperse VCM vapors.
- d. Open manhead completely, after verifying that the evacuation jets are on.
- e. Inspect reactor.

NOTE: The manhead is not opened after every reaction but only periodically to check the internal condition.

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5. Manual Reactor Entry

The following procedure must be used when entering a reactor.

- a. Open manhead using the procedure described in Section (B)(4).
- b. Follow equipment entry procedure as described in Attachment "A" of Safety and Health Manual.
- c. Perform work using a Lenape-mounted air mover for ventilation of the reactor. Entry without a respirator can be permitted if the supervisor has verified that the VCM concentration inside the reactor is less than 1 ppm.
- d. Close the top manhead.
- e. Hydrostatically test reactor for leakage.

6. VCM Leak Detection And Elimination

VCM leaks which are detected by any of the following means, or by any other means, must be expeditiously isolated and repaired within a reasonable period of time.

- a. The continuous monitoring system data logging computer notifies the panel operator with a panel alarm whenever the monitor picks up three consecutive readings above 5 ppm on an individual stream. Following awareness of a leak condition, a reasonable effort must be made by the operating department to locate the leak and isolate it.
- b. A weekly VCM Leak Survey is conducted with an HNU. This survey checks a substantial number of potential VCM Leak sources in the plant.
- c. A more thorough VCM Leak Survey than required in Section (I)(B)(6)(b) is conducted at least once per year, in which every flange, gasket and fitting on equipment in VCM service is checked with an HNU.

7. Isolation Of VCM - Contaminated Wastes

Any waste material which is contaminated with a significant quantity of VCM, as determined with a calibrated HNU, must be moved away from plant operations and personnel before being dumped in the plant's waste disposal bins. Such wastes may be moved to the plant's waste disposal bins after they have aerated long enough to strip out VCM, as verified by a calibrated HNU. Examples of candidate wastes are filters, vessel clean-out debris, coarse resin, etc.

ENGINEERING AND WORK PRACTICE CONTROLSOSHA VCM STANDARDC. PVC And VCM Sample Handling Guidelines1. PVC Resin Analysis

PVC resin, in small individual samples, is brought to the Laboratory for the performance of certain physical tests. The following work practices apply to handling of dry PVC resin.

- a. Samples fresh from the dryer department should not exceed 3 pounds. This will limit exposure to residuals of VCM in resin.
- b. Upon completion of testing, sample to be retained is stored on sample shelves. Any spillage is immediately swept up and along with samples not to be retained, discarded in a waste can and removed from the area to be placed in a waste box outside the Laboratory.

2. VCM Analysis

From time to time it will be necessary to perform chemical analysis on samples of VCM. These samples are taken from various points in the process stream in stainless steel pressure vessels. The following work practices apply to the handling and testing of VCM in the Laboratory.

- a. When pressure vessels are brought to the lab for analysis, they must be placed in a fume hood for storage.
- b. Any transfer and testing of VCM shall take place in an exhaust vent hood. Technician will wear impervious gloves when transferring liquid VCM.

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II. ENGINEERING CONTROLS

A. Exposure Reduction Projects To Be Installed

1. Recovery System Improvements

This project will improve operation of the large recovery systems by installing additional recovery system instrumentation. Problems with the recovery systems that are caused by reactor foaming will also be reduced by this project. Currently, employees are exposed to VCM when the recovery systems are opened in order to clear resin out of the equipment.

Target Completion Date: 4/85

2. Elevation Of Reactor Evacuation Stacks

This project will elevate the reactor evacuation stacks in order to improve atmospheric dispersion of the plumes. Currently, the plumes from the reactor evacuation stacks impinge on the tops of the reactors when certain wind conditions prevail.

Target Completion Date: 7/84

3. Recovery System Drain And Flush Revisions

This project will install additional and improved high pressure service water connections and drains on several pieces of equipment in the recovery areas. Installation of this project will result in better recovery of VCM that must be removed from the recovery systems when they are opened for maintenance.

Target Completion Date: 10/84

4. Biodisc Exhausters

This project will install fans on the biodisc shaft covers in order to ventilate the biodisc unit. Currently, VCM is stripped out of the wastewater in the biodisc unit, and the contaminated air disperses around the biodisc unit.

Target Completion Date: 12/83

5. Improved Compliance With EPA VCM Standard

This project will install additional high temperature pressure alarms on reactors, and will collect the from six small relief valves in the old module.

Target Completion Date: 7/84

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- a. Continuous Flow Fresh Air System
- b. Fixed Point Monitor, Data Logging Computer and Warning Lights
- c. Emission Recovery System
- d. Process Vent Containment (sphere, bullets and reactors)
- e. Relief Valve Leakage Reduction (rupture discs)
- f. Improved Rupture Disc Holders

2. VCM Tank Farm Area

- a. VCM Unloading Compressor Seals
- b. VCM Transfer Pump Seals
- c. Railcar Unloading Arm Revisions
- d. General Compressor Revisions (process piping simplifications)
- e. VCM Unloading Revisions (unloading line K.O. pot. sphere alarms)

3. Reactor Area

- a. Emergency AMS Kill System
- b. Steam Stripping
- c. Vent Gas Incineration System And Spare
- d. VCM Pump Seals
- e. Compressor-Vacuum Pump Seals
- f. Batch Water Stripping System
- g. Process Waste Water Containment (receivers and recovery systems)
- h. Reactor Double Rupture Disc Replacement

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- i. Emergency Cooling For Reactors
- j. Receiver High Level Alarms
- 4. Laboratory
 - a. Laboratory Analysis Hood Revisions