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SOUTH CHARLESTON PLANT

February 22, 1974

Technical Task Group on Vinyl Chloride
Manufacturing Chemists Association

Gentlemen:

Attached is a draft of the work practice prepared at our Chicago meeting on February 20, 1974.

We plan to discuss this with Mr. Vernon Rose and others of NIOSH on Wednesday, February 27, 1974.

Very truly yours,

R. N. Wheeler, Jr.

R. N. Wheeler, Jr.
Chairman
Subcommittee on Work Practices

RNWJr/ra

Attachment

D R A F T

TABLE OF CONTENTS

XI. Monitoring

a) Workplace Areas
b) Personal Monitoring

XII. Tank Car Unloading

D R A F T

OCCUPATIONAL SAFETY AND HEALTH WORK PRACTICE STANDARD FOR THE MANUFACTURE OF SYNTHETIC POLYMER CONTAINING VINYL CHLORIDE

I. Scope and Application

This standard applies to the process of manufacturing synthetic polymer containing vinyl chloride (chlorethene, Chemical Abstracts Registry No 75015).

II. Purpose

The purpose of this work practice standard is to limit exposure of workers to vinyl chloride monomer in synthetic polymer manufacturing. This work practice standard shall not apply to synthetic polymer containing 0.1% or less of vinyl chloride monomer.

III. Definitions

a) "Regulated areas" means an area where entry and exit is restricted and controlled

b) "Waste resin" means any resin or other reaction products removed from vessels which contain freely emanating vinyl chloride monomer.

c) "Closed container" is any container which is used to prevent the physical contact of waste material containing freely emanating vinyl chloride monomer from contact with the individual.

d) "Contaminated" refers to the presence of freely emanating vinyl chloride monomer which would not normally be found or expected and where it could contribute to employee exposure.

e) "Saturated" refers to clothing contaminated with materials containing freely emanating vinyl chloride monomer so that the clothing may become a source of exposure.

f) "Immediate" means without delay, at once.

g) "Prompt" means within a reasonable time. This refers to situations less urgent.

h) "Working level" refers to the atmospheric concentration of a contaminant or material which, in the light of current knowledge and technology, may be achieved.

IV. Environmental (Workplace Air)

a) Concentrations

Vinyl chloride monomer concentrations in the breathing zone of employees shall not exceed a working level of 50 ppm determined as a time-weighted average (TWA) exposure for an eight-hour work day.

b) Sampling, Calibration, and Analysis

Procedures for the collection of environmental samples shall be as provided for in Appendix I* of this work practices standard or by an equivalent method. Analysis of samples shall be as provided in Appendix II* or by any method shown to be equivalent in precision, sensitivity, and accuracy to the specified method.

V. Medical

a) Medical surveillance as specified in this section of the work practices standard for manufacturing of polyvinyl chloride resins shall apply to all employees engaged in this operation.

b) Medical surveillance shall be required or made available to workers covered by this work practices standard no less frequently than every twelve (12) months. This medical program shall be considered the practical minimum and these examinations should be reviewed every three (3) years for revisions and supplemental testing where indicated.

c) The preplacement and annual examinations shall consist of:

1) History

A. Medical history
B. Comprehensive work history
C. Specific past exposures to VCM-PVC
D. Cancer background history

2) Physical

Complete physical examination by a physician

3) Radiological Examination

A. 14 x 17 chest x-ray
B. Hands

4) Pulmonary Function

A. FVC
B. FEV_1

*To Be Supplied Later

5) Blood Work

A. Complete blood count

(1) red blood count
(2) white blood count and differential
(3) hemoglobin
(4) hematocrit

B. Platelet count

C. Blood chemistry

(1) bilirubin
(2) SGO-T
(3) SGP-T
(4) alkaline phosphatase
(5) LDH
(6) BUN
(7) total protein
(8) albumin

6) Urinalysis

A. Routine urine chemistries
B. Microscopic

7) Other

Other tests as may be indicated based on medical findings, history, or state of the art.

d) If an employee shows an abnormal test or finding, more frequent examinations shall be performed.

VI. Labeling and Posting

a) Signs

1) Entrances to the regulated areas shall be prominently posted with legible signs bearing the following:

DANGER!
CANCER SUSPECT AGENT AREA
AUTHORIZED PERSONNEL ONLY

b) Labels for Monomer Containers

Vinyl chloride monomer in containers or vessels located outside the regulated area shall be labeled as follows:

Inactive

VINYL CHLORIDE

DANGER! EXTREMELY FLAMMABLE LIQUID AND GAS UNDER PRESSURE

→ Contact Supervisor Agent.

HARMFUL IF INHALED

MAY POLYMERIZE VIOLENTLY UNDER FIRE CONDITIONS OR LOSS OR REMOVAL OF INHIBITOR

Keep away from heat, sparks, and open flame.

Keep container closed.

Use with adequate ventilation.

Avoid breathing vapor.

Avoid contact with skin.

Keep cylinder out of sun and away from heat.

Container should be grounded when being emptied.

Never drop cylinder.

FIRST AID: If inhaled, remove to fresh air. If not breathing give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. Call a physician.

In case of:

Fire -- Use water spray, dry chemical, or CO_2.

Spill or Leak -- For small spills, evacuate area and permit to evaporate. For large spills or leaks, evacuate area. Dike or flush to ground and let evaporate. Do not flush to sewer because of explosion hazard.

c) Waste Resins

Waste resins shall be removed from the regulated area for disposal and shall be placed in closed containers having the following label:

WASTE VINYL CHLORIDE RESIN
DANGER! MAY CONTAIN VINYL CHLORIDE MONOMER
EXTREMELY FLAMMABLE
VINYL CHLORIDE IS A CANCER SUSPECT AGENT

d) Equipment

Equipment, material and clothing contaminated with vinyl chloride monomer shall not be removed from the regulated area unless it has been decontaminated or placed in closed containers bearing the following legend:

DANGER! CONTAMINATED WITH VINYL CHLORIDE MONOMER
CANCER SUSPECT AGENT

VII. Personal Protective Equipment and Clothing

a) Clothing

Protective gloves, footwear or foot coverings, and protective head covering shall be worn as appropriate. This provision shall also apply to reactor cleaning operations where levels of vinyl chloride monomer are below 50 ppm within the reactor environment.

For reactor cleaning operations where levels within the reactor environment are in excess of 50 ppm, impervious clothing shall be worn to prevent skin contact of vinyl chloride monomer or other materials containing vinyl chloride monomer.

b) Respiratory Protection

1) General

When the limits of exposure prescribed in Section $\frac{IV}{4}$ (a) cannot be met by limiting the concentration of vinyl chloride monomer in the work environment through feasible engineering means, an employer must establish and enforce a program of respiratory protection detailing the required protection of each worker exposed.

Respiratory protection as defined below shall be provided and used when a variance which allows the use of respirators as a means of controlling exposure for routine operations has been granted or while action on an application for a variance is pending.

2) Non-Routine Operations

The requirements set forth in this section shall apply for non-routine operations such as brief exposure to concentrations in excess of the working level as a result of maintenance or repair activities, emergency situations, or other short-time non-standard work routines. A respiratory protection program meeting the general requirements outlined in Section 3.5 of the American National Standard Practices for Respiratory Protection Z88.2-1969 shall be established and enforced by the employer. This program shall include instructions on the selection, fitting, use, testing for leakage, cleaning, and maintenance of the respiratory protective devices.

3) Reactor Cleaning and Maintenance

Where employees are engaged in cleaning and maintenance operations inside polymerization reactors at a concentration maintained below 50 ppm, respiratory protection shall be made available in case of excursion above this limit or as may be needed for escape from the reactor. Where employees are engaged in cleaning and maintenance operations inside polymerization reactors at concentrations in excess of 50 ppm, they shall be provided with and wear an air-supplied respirator. The type of respiratory protection to be used shall be of an air-supplied type, self-contained, or by air lines. Sources of air for the respiratory protection shall be free of contaminants.

VIII. Appraisal of Employees

Each employee exposed to vinyl chloride monomer shall be apprised of all hazards, the consequences of overexposure, appropriate emergency procedures, proper conditions for safe use, and precautions to minimize exposure.

IX. Work Practices

a) Emergency Procedures

Specific emergency procedures shall be prescribed. The procedures shall be readily available, in writing, to the employees. The employees shall be familiarized with these procedures, and trained and rehearsed in their application.

b) Engineering Procedures

Engineering procedures shall be established to reduce exposure of employees to vinyl chloride monomer vapors in polymer manufacturing. Where local exhaust ventilation is used, it shall be designed and maintained to prevent the accumulation of or recirculation of vinyl chloride monomer vapor into the work area.

c) General Housekeeping

1) Emphasis shall be placed upon immediate clean up of spills, periodic inspection, prompt repair of equipment and leaks, and proper storage and disposal of materials to prevent airborne contamination and accidental skin contact with vinyl chloride monomer.

2) There shall be periodic tests for leaks and for emission of vinyl chloride monomer which may result from work practices. The frequency of these tests shall be such as to insure the integrity of equipment and adherence to proper work practices. Tests shall be performed at least daily or more frequently if ambient work atmospheric concentrations of vinyl chloride monomer are in excess of the working level.

3) For waste material and contaminated equipment handling, see Section VI (c) and VI (d) on Labeling and Posting.

d) Special Precautions

Vinyl chloride monomer is a gas at ambient temperatures. Therefore, waste materials, equipment, and other sources of the monomer in closed containers shall not be placed in areas of excessive temperature or sunlight since build up of internal pressure may result in rupture of the container, fire or explosion.

e) Reactor and Vessel Entry

A reactor and vessel entry procedure shall be developed. Employees shall be familiarized with the procedure in writing, and shall be trained and rehearsed in the techniques provided for in the procedure.

Atmospheres within the vessel shall be purged to where vinyl chloride monomer contained therein is below 50 ppm and the oxygen content contained therein is sufficient for supporting life. Where either the vinyl chloride monomer concentration cannot be reduced below 50 ppm or where there is insufficient oxygen or where other toxic materials may be present in concentrations dangerous to life, an air-supplied respirator system and protective clothing, as stated in Section VII(e), of this work practice standard shall be provided by the employer and used by the employee.

All piping to and from the vessel shall be blanked or otherwise isolated prior to entry.

X. Sanitation

a) General

Storage or consumption of food, storage or use of containers of beverages, storage or application of cosmetics, smoking, storage of smoking materials, tobacco products or other products for chewing, or the chewing of such products, are prohibited in regulated areas.

b) Showers and Hand Washing Facilities

Showers, hand washing facilities, and soap and water shall be available to all VCM-PVC workers. Employees engaged in reactor cleaning or other operations requiring vessel entry shall shower at the end of the work shift.

c) Clothing

Clothing saturated with vinyl chloride monomer or with other process streams containing vinyl chloride monomer shall be promptly removed and replaced with uncontaminated clothing.

XI. Monitoring and Record-Keeping Requirements

a) Workplace Areas

1) Concentrations of vinyl chloride monomer in the work room area shall be monitored at strategic sampling points. Adequate records of these concentrations shall be maintained and held available for inspection for a period of twenty (20) years.

2) Sampling frequency and patterns shall be adequate to represent the work room area environment and to demonstrate the integrity of the equipment and work practices.

b) Personnel Monitoring

After the initial determination, sampling shall be of such frequency and pattern as to represent with accuracy the levels of exposure of employees. In no case shall the sampling be done at intervals greater than six (6) months. Records shall be maintained for twenty (20) years for all sample schedules to include the sampling data, analytical methods, type of respiratory protection in use (if applicable), and the concentrations of vinyl chloride monomer. Records shall be maintained so that they may be classified by employee.

Each worker shall have access to his sample results as they pertain to occupational exposure.

Reactor or other vessel environments shall be periodically monitored at frequent intervals for vinyl chloride monomer concentrations during the times they are occupied by an employee. Records of these measurements shall be maintained as hereinbefore provided.

XII. Tank Car Unloading

Each unloading line and each vapor equalizing line shall be equipped with vent connections permitting, at the completion of unloading, pressure to be vented, and the hose purged with an inert gas to a point remote from employees' workplace.