

JJH: JCL: TGG: RF

XF: OKC

TO: Harry Garrison

FROM: Tom Grumbles
DATE: March 12, 1985

Interoffice
Communication

SUBJ: CHEMICAL EXPOSURE ABATEMENT PROGRAM

VIST/

There are several suggestions noted in the text. Other comments are below.

I.A.2 Modification of PEL's for Prolonged Exposure Periods: I'm not sure why you've included this attachment. For your information, VCM is a category IC (Figure XIII-1) contaminant and is not adjusted for prolonged work schedules.

I.L.3 Signs/Labels: McClain and I are still looking at the waste container question given us by Warner. I think the answer will be that the waste containers in-plant must be labeled. OSHA doesn't care about NESHAPS and hazardous waste definition. Also, if we used the same rationale with the waste material as for product (RVCM below 8.5ppm) then this material could create exposure exceeding 0.5ppm.

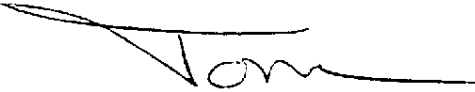
I hope to respond to Warner this week.

I.L.4 I'd suggest the following words:

It has been determined that if RVCM levels in resin are less than 8.5ppm, airborne concentrations of VCM from processing this product will not produce exposures exceeding 0.5ppm. Therefore, products meeting these conditions are exempt from the labeling requirements of the standard. Resin produced by the OKC plant is typically below 1.0ppm RVCM, therefore containers of PVC product are not labeled.

I.L.5 VCM Containers: Processing and storage vessels will have to be labeled to comply with OSHA 1910.1200, HAZARD COMMUNICATION STANDARD.

Please call if you have questions on any of these comments. I'm sure we'll be discussing the waste container labeling issue in the near future.


Thomas G. Grumbles

Attachment

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VISTA POLYMERS INC.
OKLAHOMA CITY PVC PLANT
CHEMICAL EXPOSURE ABATEMENT PROGRAM

I. VCM EXPOSURE ABATEMENT

A. REFERENCES:

1. OSHA 1910.1017 - Vinyl Chloride (Attachment I)
- ② OSHA Instruction CPL-2-2.20, Modification of PEL's for Prolonged Exposure Periods (Attachment II)

B. PURPOSE: To establish and administer a program that will minimize employee exposure to vinyl chloride monomer.

C. OBJECTIVE: To achieve the purpose stated above by carrying out the basic elements listed below:

1. Conduct a personnel monitoring program that will provide dosimetry data for individuals and/or job positions. Maintain records of this program. Report exposures exceeding the permissible exposure limit to affected employees in writing.
- OK
② Maintain a fixed point continuous monitoring system of areas of the plant where VCM concentrations may occasionally exceed the permissible exposure limit.
3. Establish regulated areas if necessary and restrict access to these areas which are determined to have vinyl chloride concentrations in excess of the permissible exposure limit.
4. Control employee exposures to vinyl chloride monomer at or below the permissible exposure limit by engineering, work practice and personal protective controls.
5. Provide respiratory protective equipment (and other protective garments as necessary) and training in the use of this equipment to employees who might be required to work in areas where VCM concentrations would (or might) require such protection.
6. Establish and maintain an emergency manual that details procedures to be taken by employees to control and/or correct emergency situations or to evacuate if they are not equipped/trained to handle such situations.

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CHEMICAL EXPOSURE ABATEMENT PROGRAM

I. VCM EXPOSURE ABATEMENT

C. OBJECTIVE (Continued)

7. Provide training for each employee relating to the hazards of vinyl chloride monomer and precautions for its safe use.
8. Provide a program of medical surveillance for all plant employees and maintain records of this program.
9. Provide appropriate warning signs and labels for areas in which employees or other personnel may encounter a potential for exposure to VCM above the permissible exposure limit.

D. PERSONNEL MONITORING PROGRAM

Personnel monitoring data collected during 1983 and 1984 indicate that there were no exposures in excess of the permissible exposure limit (PEL) and that only 7 sampling results (1 in 1983 and 6 in 1984) were in excess of the action level. Based on this data, the plant could discontinue personnel monitoring as provided by OSHA 1910.1017(d)(2)(iii). We will continue, however, to pursue a personnel monitoring program to serve as an audit of our abatement program's effectiveness.

The strategy for this personnel monitoring program will be based on job position as indicated below:

<u>Monthly</u>	<u>Quarterly</u>	<u>Semi-Annually</u>	<u>Annually</u>
1 - Shift Supervisor	Lab Technicians/Loaders	Mechanical Engineer	Office Manager
1 - Panel Operator	Lab/Loading Supervisor	Mechanical Supt.	Maint. Clerk
3 - Outside Operators	Maintenance Supervisor	Process Engineers	Materials Coord.
2-3 Mechanics	Safety Director	Senior Process Engr.	Recep/Secretary
1 - Utility Helper		Process Superintendent	Warehouseman
		Plant Superintendent	Yield Analyst
		Plant Manager	

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CHEMICAL EXPOSURE ABATEMENT PROGRAM

I. VCM EXPOSURE ABATEMENT

D. PERSONNEL MONITORING PROGRAM (Continued)

Personnel monitoring will be repeated at least monthly for any employee whose dosimetry results indicate an exposure greater than the action level (0.5 ppm). This repeat sampling will continue until two consecutive samples (not less than 5 days apart) indicate exposure at or below the action level (0.5 ppm). When this is achieved, the employee will return to the routine sampling schedule. This repeat sampling will be conducted in addition to the routine sampling indicated above.

All employees in job positions in the monthly sampling category will be sampled at least once every four (4) months by rotating persons selected in the various job categories. See Attachments III-A and III-B for an example of the sampling control log.

Employees whose dosimetry results indicate exposure above the PEL (1.0 ppm) will be notified in writing by the Plant Manager. An example of this notification is appended as Attachment IV.

Records of the dosimetry results are maintained per OSHA 1910.1017(m). A summary of these results are presented in Attachment V for 1983 and 1984.

Personnel exposure monitoring is conducted using passive dosimeters (3M Organic Vapor Monitors) and a Perkin Elmer F-42 Gas Chromatograph (See Attachment VI).

E. FIXED POINT MONITORING SYSTEM

The Fixed Point Monitoring (FPM) System consists of two Honeywell gas chromatograph analyzers, 19 remote monitoring heads, and a Perkin Elmer computer which monitors the analyzer output, computes and signals an alarm in the event a leak is detected and summarizes the daily results. If concentrations of VCM are detected that would result in exposures above the PEL, persons in the area are instructed to leave the area. Only authorized persons with the appropriate protective equipment are allowed in the area until the situation is remedied.

These monitoring heads are located strategically throughout the plant in areas which based on past experience were susceptible to vinyl chloride leaks. The location of these monitoring heads are listed in Attachment VII.

* computes what?
(concentration, vcm,
air levels, etc.)

* should specify
How (Radio,
PA system, etc.)

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CHEMICAL EXPOSURE ABATEMENT PROGRAM

I. VCM EXPOSURE ABATEMENT

F. REGULATED AREAS

There are no longer any regulated areas as defined by OSHA 1910.1017(e) since no area of the plant has vinyl chloride concentrations in excess of the permissible exposure limit. Several of the areas formerly designated as regulated areas are treated as areas that due to the nature of the equipment/operations have a higher than normal potential to expose an employee to VCM concentrations in excess of the PEL (1.0 ppm) if an error, equipment malfunction, etc. was to occur. Unauthorized persons are advised to stay out of the areas. In addition, employees may be required to wear respiratory protection as a precautionary measure while performing certain tasks in these areas (example: VCM unloading platforms while connecting/disconnecting VCM unloading hoses to/from railcars).

G. ENGINEERING AND WORK PRACTICE CONTROLS

A written plan to reduce exposures to, at or below the permissible exposure limit, or to the greatest extent feasible, solely by means of engineering and work practice controls has been prepared and is updated every six months. A copy of the last such update is presented in Attachment VIII.

H. RESPIRATORY PROTECTION

Respiratory protective equipment, as well as other necessary protective garments are provided to employees. Training is also provided to employees in the proper use, maintenance, storage, etc. of this equipment. The plant has a separate, comprehensive, written respiratory protection program; however, it is not included as an attachment in the exposure abatement program.

I. EMERGENCY PROCEDURES MANUAL

The plant maintains a separate, comprehensive, written Emergency/Disaster Plan; however, it is not included as an attachment in the exposure abatement program. Specific operational procedures to prevent, control and/or correct hazardous releases of vinyl chloride are found in the Operating and Maintenance Procedures Manual.

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CHEMICAL EXPOSURE ABATEMENT PROGRAM

I. VCM EXPOSURE ABATEMENT

J. TRAINING

All employees are provided training relating to the hazards of vinyl chloride and precautions for its safe use. This training program covers all of the key points addressed by OSHA 1910.1017(j). Employees are provided this training in their initial plant orientation/indoctrination and once per year thereafter.

K. MEDICAL SURVEILLANCE

A comprehensive, medical surveillance and health screening program is provided for all employees. The program meets, and in some cases exceeds, the minimum requirements of OSHA 1910.1017(k).

Examinations are provided every six months for each employee who has been employed in vinyl chloride or polyvinyl chloride manufacturing for ten years or longer and annually for all other employees.

Each employee exposed to an emergency is afforded appropriate medical surveillance.

Medical records are maintained by the Vista Medical Department in accordance with OSHA 1910.1017(m). No medical records are maintained at the plant.

L. SIGNS/LABELS

Warning signs and labels are posted in areas and affixed to containers, respectively, as required by OSHA 1910.1017(1).

1. Regulated Areas - Since the plant has no regulated areas in which the concentration of VCM is above the permissible exposure limit, posting strictly per OSHA 1910.1017(1)(i) is not required. We have, however, retained warning signs in and around most of these areas as a matter of good practice.
2. Hazardous Operations - Areas containing hazardous operations (i.e., areas where a release of vinyl chloride might be expected as a consequence of the operation or because of an accident in the operation which would result in an employee exposure in excess of the permissible exposure limit) are posted with the appropriate warning.

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I. VCM EXPOSURE ABATEMENT

L. SIGNS/LABELS (Continued)

3. Containers of PVC Waste - The OSHA regulations were promulgated prior to the NESHAPS regulations which require steam stripping of reactor slurry before dumping. Personnel dosimetry, fixed point monitoring and a special study (see Attachment IX) conducted in 1984 all document evidence that PVC resin waste from the reactors (referred to as reactor culls) and PVC trapped in the water effluent system (referred to as pond resin) present no exposures above the permissible exposure limit or the action level to personnel handling these materials. These containers, therefore, are not labeled.

④. PVC Containers - Containers of PVC product are not labeled since it has been determined that there is not exposure to downstream processors provided the residual VCM concentration is less than 8 ppm. Resin produced by the Oklahoma City Plant typically runs nil to 1.0 ppm.

⑤. VCM Containers - VCM container (gas cylinders) and railcars are labeled as required by OSHA 1910.1017(1)(5). Processing and storage vessels, however, are not labeled.

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CHAPTER XIII

MODIFICATION OF PELs FOR PROLONGED EXPOSURE PERIODS

- A. Purpose and Scope. The 1968 ACGIH Threshold Limit Values (TLVs) adopted by OSHA as permissible exposure limits (PELs) are directly related to assumed conventional exposure periods of no more than 8 hours/day, 40 hours/week.
1. The 8-hour exposure limits for some substances may not provide appropriate protection from health hazards when novel work schedules are utilized; e.g., exposures longer than 8 hours/day, four 10-hour days/week, six 7-hour days/week, etc. This chapter identifies those PELs which may inadequately protect workers for prolonged exposure periods and describes how an "adjusted PEL" may be calculated.
 2. Instructions on sampling and citation procedures shall be sought from the Assistant Regional Administrator (ARA) for Technical Support who shall in turn contact the Directorate of Technical Support.
- B. Procedure.
1. Each substance listed in the Substance Toxicity Table in Chapter II has been assigned to one of the six "Work Schedule" categories described in Figure XIII-1 on the basis of the 1968 Documentation of TLVs published by ACGIH.
 2. During a health inspection, the Industrial Hygienist has the responsibility of documenting any work schedules resulting in excessive exposures to a hazardous substance caused by exposure periods longer than 8 hours/day or 40 hours/week. This would include routine overtime shifts.
 3. The Industrial Hygienist should determine an "adjusted PEL" as necessary for each hazardous substance sampled, according to the specifications given for the category to which it is assigned.

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FIGURE XIII-1

Summary of Work Schedule Categories

Work Schedule Category	Principle Group Characteristic	Conditions Resulting In Adjustment	Adjustment Formula
1A	Ceiling limit standards	None	None
1B	Irritants	None	None
1C	Technologic limitations	None	None
2	Acute toxicity only	Exposed greater than 8 hours/day	Adj. PEL = PEL X 8 hours/ hours exposed/day
3	Cumulative toxicity only	Exposed greater than 40 hours/week	Adj. PEL = PEL X 40 hours/ hours exposed/week
4	Both acute and cumulative toxicity	Exposed greater than 8 hours/day and/or exposed greater than 40 hours/week	The equation for category 2 or 3, whichever results in the greatest protection

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4. No adjustment should be made to the PELs of substances in category 1. For all other categories, the equivalent PELs should be calculated according to the methods described in paragraphs C.1 through 6 and used as a professional guide or in the evaluation of actual employee risk.
5. In all situations, the equivalent PEL will be equal to or lower (i.e. more restrictive) than the PEL values listed in 29 CFR 1910.1000.
6. The Industrial Hygienist should also elicit from the employees and document any symptomatology that may be related to the exposure.

C. Work Schedule Categories.

1. Category 1A: Ceiling Limit Standards. Substances in this category (e.g., butylamine) have ceiling limit standards which were intended never to be exceeded at any time, and so, are independent of the length or frequency of work shifts. The ceiling PELs for substances in this category should not be adjusted.
2. Category 1B: Standards Preventing Mild Irritation. Substances in this category have a PEL designed primarily to prevent acute irritation or discomfort (e.g., cyclopentadiene). There are essentially no known cumulative effects resulting from exposures for extended periods of time at concentration levels near the PEL. The PELs for substances in this category should not be adjusted.
3. Category 1C: Standards Limited by Technologic Feasibility. The PELs of substances assigned to this category have been set either by technologic feasibility (e.g., vinyl chloride) or good hygiene practices (e.g., methyl acetylene). These factors are independent of the length or frequency of work shifts. The PELs for substances in this category should not be adjusted.

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4. Category 2: Acute Toxicity Standards.

- a. The substances in this category have PELs which prevent excessive accumulation of the substance in the body during 8 hours of exposure in any given day (e.g., carbon monoxide). *partial pressure?*
- b. The following equation determines a level which ensures that employees exposed more than 8 hours/day will not receive a dosage (i.e. length of exposure X concentration) in excess of that intended by the standard.

$$\text{Equivalent PEL} = 8\text{-hour PEL} \times \frac{8 \text{ hours}}{\text{hours of exposure in one day}} \quad (\text{Equation XIII-1})$$

- c. The Industrial Hygienist should normally conduct sampling for the entire shift minus no more than one hour for equipment set-up and retrieval (e.g., at least 9 hours of a 10-hour shift). In situations where an employee works multiple shifts in a day (e.g., two 7-hour shifts), and the Industrial Hygienist can document sufficient cause to expect exposure concentrations to be similar during the other shifts, the sampling should be done during only one shift.

5. Category 3: Cumulative Toxicity Standards

- a. Substances assigned to this category present cumulative hazards (e.g., lead, mercury, etc.). The PELs for these substances are designed to prevent excessive accumulation in the body resulting from many days or even years of exposure.
- b. The following equation ensures that workers exposed more than 40 hours/week will not receive a dosage in excess of that intended by the standard.

$$\text{Equivalent PEL} = 8\text{-hour PEL} \times \frac{40 \text{ hours}}{\text{hours of exposure in one week}} \quad (\text{Equation XIII-2})$$

- c. It is the responsibility of the Industrial Hygienist to conduct sufficient sampling to document exposure levels for the entire week when evaluating conditions on the basis of this equivalent PEL. For most operations the Industrial Hygienist will be able to sample during one shift only and then document sufficient cause to predict exposure concentrations during the other shifts.
6. Category 4: Acute and Cumulative Toxicity Standards.
Substances in this category may present both an acute and a cumulative hazard. For this reason, the PELs of these substances should be adjusted by either equation XIII-1 or XIII-2; i.e. whichever provides the greatest protection.
7. Refined Adjustment Equations for Specific Standards.
The adjustment equation presented for categories 2 and 3 reflect an oversimplification of the actual accumulation and removal of a toxic agent from the body. Additional research, however, is needed in order to apply more complex equations to estimate resulting body burden and health risk due to prolonged exposure periods. This chapter will be updated when the necessary data become available. Industrial Hygienists having sufficient data to validate adjusting PELs by a more rigorous method such as those proposed in the following articles are encouraged to do so following approval from the ARA for Technical Support:

Brief, R.S. and R.A. Scala, "Occupational Exposure Limits for Novel Schedules," Amer. Ind. Hyg. Assn. Jour. 36:467, 1975.

Roach, S.A., "A More Rational Basis for Air Sampling Programmes," Ann. Occup. Hyg. 20:65, 1977.

Hickey, J.L.S. and P.C. Reist, "Application of Occupational Exposure Limits to Unusual Work Schedules," Amer. Ind. Hyg. Assn. Jour. 38:613, 1977.