

*No. 12118* *49 No* *File*

TO JERRY C. BIALKO FIELD POINT OR DEPT. & BLDG. NO. ALTC DATE YOUR LETTER

FROM R. D. HARDESTY FIELD POINT OR DEPT. & BLDG. NO. ALTC DATE THIS LETTER MARCH 25, 1982

SUBJECT *see them on this* RDH-27-82

AREA MONITORING UNIT FOR B/413

The VCM polymerization labs in B/413, currently have a six cycle total hydrocarbon analyzer. A yellow warning light comes on at 3PPM, a red light at 5PPM, and a horn at 100PPM.

These labs have been expanded with the addition of the two story remodeled stockroom. J. C. Bialko listed the possible locations for monitoring points. The total number of points was 17; 6 of which were reactors and 2 were weighing stations.

The labs in question are not officially designated "regulated areas" as described in the VCM OSHA regulation § 1910.1017, because the vinyl chloride concentrations as measured by personnel monitoring, are not in excess of the permissible exposure level.

I analyzed the section of the VCM standard requiring continuous monitoring and have determined that legally such a system is not required in this case. Listed below are my arguments.

1. Section § 1910.1017 (g)(6) applies only where air-purifying respirators are used. These labs use supplied air respirators with continuous flow.
2. A very strict reading of (g)(6)(ii) leads one to conclude that the purpose of continuous monitoring is to alert employees where the use of a certain respirator is inadequate, not when to don a respirator. In this case, the alarm level would be 3,600 PPM. Except for catastrophic failure of a vessel this level would never be reached in a lab situation.
3. A more liberal reading of (g)(6)(ii) and adding a similar ruling of OSHA of the acrylonitrile standard § 1910.1045 (i)(2) which requires employees to be alerted when the ceiling limit exposure to AN is exceeded, would mean that continuous monitoring should be done to determine when employee exposure exceeds 5PPM VCM for 15 minutes. This interpretation suggests warning employees when to don respiratory protection. Even accepting this interpretation, there are probably only three operations where 5PPM is likely to be exceeded:
  - a. Charging lab VCM cylinders
  - b. Charging reactors
  - c. Dropping reactors into 5 gal pails

Therefore, I feel that as a minimum, the existing THA system should be modified to monitor these operations. If each reactor had a monitor, this would be possible. It would be possible to double up on some of the reactor stations and get the existing 6 station unit.

*4 leak detection + control.*

A better solution which would give more peace of mind and a larger safety margin to our employees would be to purchase another collection and GC unit to measure only VCM. This would give us probably 10 VCM monitoring points every 11 minutes and 6 total hydrocarbon monitoring points every 12 minutes. While I can't say this solution is absolutely required by the regulations, I do feel, due to the experimental nature and associated uncertainty of the operations, it is the desirable solution. It should also be borne in mind that some of these operations are run 24 hrs. per day, 5 days a week with only one operator on the off shifts. This type operation increases the need for early warning of major leaks.

Another possible solution which I do not find acceptable, would be to add another collection unit to the existing THA. This would lengthen the turn around time between the same sample point to 24 or 32 minutes which is just too long for a meaningful warning system.

*Richard D. Hardesty*  
Richard D. Hardesty

cc: ~~T. S. Bialke (Akron)~~  
D. Witenhafer

Attachments: OSHA Stds. Highlighted

RDH/wb

NGC 15116

# RULES AND REGULATIONS

35897

| Atmospheric concentration of vinyl chloride | Required apparatus                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (i) Unknown, or above 3,000 ppm             | Open-circuit, self-contained breathing apparatus, pressure demand type, with full facepiece.                                                                                                                                                                                                                                                                                           |
| (ii) Not over 3,000 ppm                     | (A) Combination type C supplied air respirator, pressure demand type, with full or half facepiece, and auxiliary self-contained air supply; or<br>(B) Type C, supplied air respirator continuous flow type, with full or half facepiece, and auxiliary self-contained air supply.                                                                                                      |
| (iii) Not over 100 ppm                      | (A) Combination type C supplied air respirator demand type, with full facepiece, and auxiliary self-contained air supply; or<br>(B) Open-circuit self-contained breathing apparatus with full facepiece, in demand mode; or<br>(C) Type C supplied air respirator, demand type, with full facepiece.                                                                                   |
| (iv) Not over 25 ppm                        | (A) A powered air-purifying respirator with hood, helmet, full or half facepiece, and a canister which provides a service life of at least 4 hours for concentrations of vinyl chloride up to 25 ppm; or<br>(B) Gas mask, front- or back-mounted canister which provides a service life of at least 4 hours for concentrations of vinyl chloride up to 25 ppm.                         |
| (v) Not over 10 ppm                         | (A) Combination type C supplied-air respirator, demand type, with half facepiece, and auxiliary self-contained air supply; or<br>(B) Type C supplied-air respirator, demand type, with half facepiece; or<br>(C) Any chemical cartridge respirator with an organic vapor cartridge which provides a service life of at least 1 hour for concentrations of vinyl chloride up to 10 ppm. |

(5) (i) Entry into unknown concentrations or concentrations greater than 36,000 ppm (lower explosive limit) may be made only for purposes of life rescue; and

(ii) Entry into concentrations of less than 36,000 ppm, but greater than 3,500 ppm may be made only for purposes of life rescue, firefighting, or securing equipment so as to prevent a greater hazard from release of vinyl chloride.

(6) Where air-purifying respirators are used:

(i) Air-purifying canisters or cartridges shall be replaced prior to the expiration of their service life or the end of the shift in which they are first used, whichever occurs first, and

(ii) A continuous monitoring and alarm system shall be provided where concentrations of vinyl chloride could reasonably exceed the allowable concentrations for the devices in use. Such system shall be used to alert employees when vinyl chloride concentrations exceed the allowable concentrations for the devices in use.

(7) Apparatus prescribed for higher concentrations may be used for any lower concentration.

(h) Hazardous operations. (1) Employees engaged in hazardous operations, including entry of vessels to clean polyvinyl chloride residue from vessel walls, shall be provided and required to wear and use;

(i) Respiratory protection in accordance with paragraphs (c) and (g) of this section; and

(ii) Protective garments to prevent skin contact with liquid vinyl chloride or with polyvinyl chloride residue from vessel walls. The protective garments shall be selected for the operation and its possible exposure conditions.

(2) Protective garments shall be provided clean and dry for each use.

(i) Emergency situations. A written operational plan for emergency situations shall be developed for each facility storing, handling, or otherwise using vinyl chloride as a liquid or compressed gas. Appropriate portions of the plan shall be implemented in the event of an emergency. The plan shall specifically provide that:

(1) Employees engaged in hazardous operations or correcting situations of existing hazardous releases shall be equipped as required in paragraph (h) of this section;

(2) Other employees not so equipped shall evacuate the area and not return until conditions are controlled by the methods required in paragraph (i) of this section and the emergency is abated.

(j) Training. Each employee engaged in vinyl chloride or polyvinyl chloride operations shall be provided training in a program relating to the hazards of vinyl chloride and precautions for its safe use.

(1) The program shall include:

(i) The nature of the health hazard from chronic exposure to vinyl chloride including specifically the carcinogenic hazard;

(ii) The specific nature of operations which could result in exposure to vinyl chloride in excess of the permissible limit and necessary protective steps;

(iii) The purpose for, proper use, and limitations of respiratory protective devices;

(iv) The fire hazard and acute toxicity of vinyl chloride, and the necessary protective steps;

(v) The purpose for and a description of the monitoring program;

(vi) The purpose for, and a description of, the medical surveillance program;

(vii) Emergency procedures;

(viii) Specific information to aid the employee in recognition of conditions which may result in the release of vinyl chloride; and

(ix) A review of this standard at the employee's first training and indoctrination program, and annually thereafter.

(2) All materials relating to the program shall be provided upon request to the Assistant Secretary and the Director.

(k) Medical surveillance. A program of medical surveillance shall be instituted for each employee exposed, without regard to the use of respirators, to vinyl chloride in excess of the action level. The program shall provide each such employee with an opportunity for examinations and tests in accordance with this paragraph. All medical examinations and procedures shall be performed by or under the supervision of a licensed physician, and shall be provided without cost to the employee.

(1) At the time of initial assignment, or upon institution of medical surveillance;

(i) A general physical examination shall be performed, with specific attention to detecting enlargement of liver, spleen or kidneys, or dysfunction in these organs, and for abnormalities in skin, connective tissues and the pulmonary system (See Appendix A).

(ii) A medical history shall be taken, including the following topics:

(A) Alcohol intake;

(B) Past history of hepatitis;

(C) Work history and past exposure to potential hepatotoxic agents, including drugs and chemicals;

(D) Past history of blood transfusions; and

(E) Past history of hospitalizations.

(iii) A serum specimen shall be obtained and determinations made of:

(A) Total bilirubin;

(B) Alkaline phosphatase;

(C) Serum glutamic oxalacetic transaminase (SGOT);

(D) Serum glutamic pyruvic transaminase (SGPT); and

(E) Gamma glutamyl transpeptidase.

(2) Examinations provided in accordance with this paragraph shall be performed at least:

(i) Every 6 months for each employee who has been employed in vinyl chloride or polyvinyl chloride manufacturing for 10 years or longer; and

(ii) Annually for all other employees.

(3) Each employee exposed to an emergency shall be afforded appropriate medical surveillance.

(4) A statement of each employee's suitability for continued exposure to vinyl chloride including use of protective equipment and respirators, shall be obtained from the examining physician promptly after any examination. A copy of the physician's statement shall be provided each employee.

(5) If any employee's health would be materially impaired by continued exposure, such employee shall be with-

Table I.—Respiratory Protection for Acrylonitrile (AN)

| Concentration of AN or condition of use | Respirator type                                                                                                                                                          |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (c) Firefighting                        | (2) Self-contained breathing apparatus with full facepiece in positive pressure mode.                                                                                    |
| (f) Escape                              | Self-contained breathing apparatus with full facepiece in positive pressure mode.<br>(1) Any organic vapor respirator, or<br>(2) Any self-contained breathing apparatus. |

(ii) The employer shall select respirators from among those approved for use with organic vapors by the National Institute for Occupational Safety and Health under the provisions of 30 CFR part 11.

(3) *Respirator program.* (i) The employer shall institute a respiratory protection program in accordance with 29 CFR 1910.134 (b), (d), (e), and (f).

(ii) Where air-purifying respirators (chemical cartridge- or canister-type) are used, the air-purifying canister or cartridges shall be replaced prior to the expiration of their service life or at the completion of each shift, whichever occurs first. A label shall be attached to the cartridge or canister to indicate the date and time at which it is first installed on the respirator.

(iii) *Testing.* Fit testing of respirators shall be performed to assure that the respirator selected provides the protection required by table I.

(A) *Qualitative fit.* The employer shall perform qualitative fit tests at the time of initial fitting and at least semiannually thereafter for each employee wearing respirators.

(B) *Quantitative fit.* Each employer with more than 10 employees wearing negative pressure respirators shall perform quantitative fit testing at the time of initial fitting and at least semiannually thereafter for each such employee.

(iv) Employees who wear respirators shall be allowed to wash their faces and to wipe clean the face-to-facepiece seals on their respirators to minimize potential skin irritation associated with respirator use.

(i) *Emergency situations.*—(1) *Written plans.* (i) A written plan for emergency situations shall be developed for each workplace where liquid AN is present. Appropriate portions of the plan shall be implemented in the event of an emergency.

(ii) The plan shall specifically provide that employees engaged in correcting emergency conditions shall be equipped as required in paragraph (h) of this section until the emergency is abated.

(iii) Employees not engaged in correcting the emergency shall be evacuated from the area and shall not be permitted to return until the emergency is abated.

(2) *Alerting employees.* Where there is the possibility of employee exposure

to AN in excess of the ceiling limit, a general alarm shall be installed and used to promptly alert employees of such occurrences.

(j) *Protective clothing and equipment.*—(1) *Provision and use.* Where eye or skin contact with liquid AN may occur, the employer shall provide at no cost to the employee, and assure that employees wear, impermeable protective clothing or other equipment to protect any area of the body which may come in contact with liquid AN. The provision of §§ 1910.132 and 1910.133 shall be complied with.

(2) *Cleaning and replacement.* (i) The employer shall clean, launder, maintain, or replace protective clothing and equipment required by this section as needed to maintain their effectiveness.

(ii) The employer shall assure that impermeable protective clothing which contacts or is likely to have contacted liquid AN shall be decontaminated before being removed by the employee.

(iii) The employer shall assure that an employee whose nonimpermeable clothing becomes wetted with liquid AN shall immediately remove that clothing and proceed to shower. The clothing shall be decontaminated before it is removed from the regulated area.

(iv) The employer shall assure that no employee removes protective clothing or equipment from the change room, except for those employees authorized to do so for the purpose of laundering, maintenance, or disposal.

(v) The employer shall inform any person who launders or cleans protective clothing or equipment of the potentially harmful effects of exposure to AN.

(k) *Housekeeping.* (1) All surfaces shall be maintained free of visible accumulations of liquid AN.

(2) For operations involving liquid AN, the employer shall institute a program for detecting leaks and spills of liquid AN, including regular visual inspections.

(3) Where spills of liquid AN are detected, the employer shall assure that surfaces contacted by the liquid AN are decontaminated. Employees not engaged in decontamination activities shall leave the area of the spill, and shall not be permitted in the area until decontamination is completed.

(k) *Waste disposal.* AN waste, scrap, debris, bags, containers, or equipment shall be decontaminated before being incorporated in the general waste disposal system.

(m) *Hygiene facilities and practices.*

(1) Where employees are exposed to airborne concentrations of AN above the permissible exposure limits, or where employees are required to wear protective clothing or equipment pursuant to paragraph (j) of this section, the facilities required by 29 CFR 1910.141, including clean change rooms and shower facilities, shall be provided by the employer for the use of those employees, and the employer shall assure that the employees use the facilities provided.

(2) The employer shall assure that employees wearing protective clothing or equipment for protection from skin contact with liquid AN shall shower at the end of the work shift.

(3) The employer shall assure that, in the event of skin or eye exposure to liquid AN, the affected employee shall shower immediately to minimize the danger of skin absorption.

(4) The employer shall assure that employees working in the regulated area wash their hands and faces prior to eating.

(n) *Medical surveillance.*—(1) *General.* (i) The employer shall institute a program of medical surveillance for each employee who is or will be exposed to AN at or above the action level, without regard to the use of respirators. The employer shall provide each such employee with an opportunity for medical examinations and tests in accordance with this paragraph.

(ii) The employer shall assure that all medical examinations and procedures are performed by or under the supervision of a licensed physician, and that they shall be provided without cost to the employee.

(2) *Initial examinations.* At the time of initial assignment, or upon institution of the medical surveillance program, the employer shall provide each affected employee an opportunity for a medical examination, including at least the following elements:

(i) A work history and medical history with special attention to skin, respiratory, and gastrointestinal systems, and those nonspecific symptoms, such as headache, nausea, vomiting, dizziness, weakness, or other central nervous system dysfunctions that may be associated with acute or with chronic exposure to AN;

(ii) A complete physical examination giving particular attention to the peripheral and central nervous system, gastrointestinal system, respiratory system, skin, and thyroid;

(iii) A 14- by 17-inch posteroanterior chest X-ray; and

AN

NGC 15118