American Chemical Society

DEPARTMENT OF CHEMISTRY
AND PUBLIC AFFAIRS

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April 15, 1974
120-227-74

MEMORANDUM

TO: Mr. H. H. Fawcett

FROM: S. T. Quigley

SUBJ: OSHA Emergency Temporary Standard for Exposure to Vinyl Chloride

I have enclosed a copy of the published emergency temporary standard for exposure to vinyl chloride previously described in my memoranda of March 29, 1974 (120-02LA-74) and April 1, 1974 (120-03LA-74). Since the petitions for an emergency standard requested that the standard be based on the recommendations of the Standards Advisory Committee on Carcinogens, I have enclosed a copy of those recommendations as published in the Federal Register.

You will note that a rulemaking proceeding will soon be initiated to develop a "permanent" standard. A proposed rule is expected to be published by April 19, 1974. It is based on the emergency standard and is more complete than the emergency standard in that it addresses the fire hazards of vinyl chloride as well as its toxicological properties.

Once the proposed "permanent" rule for exposure to vinyl chloride is published, I shall forward a copy. A period of 60 days from the date of publication is generally provided for submission of comments to the Department of Labor. Thus, assuming publication of the proposed rule by April 19, 1974 as expected, a tentative date of May 20, 1974 would be convenient for receiving the recommended comments of the Committee on Chemical Safety to allow coordination with any recommendations of the Committee on Environmental Improvement prior to transmitting a draft statement to the ACS Board of Directors for approval.

If you have any questions regarding this matter, please contact this office.

Enclosures (2)

S. T. Quigley (NJK)

cc: Dr. V. C. Brum
Dr. R. W. Cairns
Dr. R. L. Kenyon
Dr. T. E. Larson
Mr. H. A. Merrell
CEI subcommittee to develop a model protocol in setting regulatory standards:
Dr. D. G. Crosby, Chairman
Dr. E. V. Kleber
Dr. D. MacDougall
Dr. T. F. Yen

Pp. 12342 - 12344

Title 29—Labor

CHAPTER XVII—OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION, DEPARTMENT OF LABOR

PART 1910—OCCUPATIONAL SAFETY AND HEALTH STANDARDS

Emergency Temporary Standard for Exposure to Vinyl Chloride

1. *Background.* Vinyl chloride (chloroethene), Chemical Abstracts Service Registry No. 75015, is a synthetic chemical made by oxychlorination of ethylene or by hydrochlorination of acetylene. It is the parent compound of a series of thermoplastic resin polymers and copolymers which are widely used for containers, wrapping tissues, electrical insulation, pipe, conduit and a variety of other products. Vinyl chloride has been made commercially in this country since 1939 and present production is in excess of seven billion pounds per year.

Vinyl chloride (VC) is a gas at ambient temperature and pressure and is a chlorinated hydrocarbon which has moderate liver toxicity. The present standard sets a ceiling value of 500 parts per million (ppm) (29 CFR 1910.93).

On January 22, 1974, the Occupational Safety and Health Administration was informed by the National Institute for Occupational Safety and Health (NIOSH) that the B. F. Goodrich Chemical Company reported that deaths of several of its employees from a rare form of liver cancer may have been occupationally related. As a result of this notification, and after consultation with NIOSH and a joint inspection of the plant by OSHA, NIOSH, and the Kentucky Department of Labor, a fact-finding hearing on possible hazards involved with the manufacture and use of both VC and polyvinyl chloride was announced on January 30, 1974 (39 FR 3874), and held on February 15, 1974.

2. *Carcinogenicity of VC.* Information produced at the hearing demonstrated that exposure of laboratory animals (mostly Sprague-Dawley rats) to VC by inhalation at and below the current OSHA standard of 500 ppm induced tumors, including angiosarcomas of the liver. Professor Cesare Maltoni, of the Instituto di Oncologia, Bologna, Italy, reported on a series of experiments on the effect of exposure of rats, mice, and hamsters to VC at concentrations of 10,000; 6,000; 2,500; 500; 250; and 50 ppm for varying periods of time (TR 43–63). Some of the experiments have been concluded, and others are still ongoing. The experimental results so far reported are that tumors have been observed in groups of animals exposed to VC at concentrations as low as 250 ppm. No tumors have been observed in the group of animals exposed to VC at a concentration of 50 ppm. It also appears so far that the total number of tumors, as well as the numbers of angiosarcomas of the liver, decrease as the concentrations of VC are reduced to 250 ppm. Finally, another experiment by Professor Maltoni is underway involving the exposure of 300 animals to VC at concentrations of 50 ppm, in order to assess in a more definitive way whether that level of exposure produces tumors in animals. Data reported by Torkelson, Oyen and Rowe (American Industrial Hygiene Association J 22:354–361 (1961)) indicate that exposure to VC at concentrations of 50 ppm failed to induce tumors in rats, hamsters, rabbits, and dogs.

The employees of the B. F. Goodrich Chemical Company who died from angiosarcoma of the liver had an average exposure of approximately 10 years to vinyl chloride, at unknown concentrations, and variable exposures to other volatile chemicals. (TR 93). Some employees of Union Carbide Company and Goodyear Company are also reported in a post-hearing comment from NIOSH dated March 11, 1974, to have had exposure to vinyl chloride and to have died from angiosarcoma of the liver. Finally, autopsies of four deceased employees revealed that liver angiosarcoma tumors were histologically indistinguishable from the angiosarcoma tumors observed in Professor Maltoni's experimental animals. It is concluded therefore, that vinyl chloride is carcinogenic for humans.

We therefore conclude that the present standard for VC should be lowered from a ceiling of 500 ppm to a ceiling of 50 ppm for the following reasons:

(a) In light of the evidence referred to above including the Maltoni experiments demonstrating that VC is carcinogenic in animals at 250 ppm, we conclude that VC must be considered carcinogenic in man at the same level;

(b) Although Professor Maltoni did not induce tumors in his experimental animals at an exposure concentration of 50 ppm, these data do not support the concept that occupational exposure of employees to concentrations of 50 ppm throughout their working lifetime would be without detrimental health effects;

(c) The question whether safe levels of exposure to carcinogens exist for humans and, if so, what such levels would be, is the subject of continuing scientific deliberation. In the case of VC, Professor Maltoni did not observe tumors in his animals at exposure concentrations of 50 ppm. In addition, Torkelson, Oyen, and Rowe found that exposure to concentrations of 50 ppm of VC failed to induce tumors in rats, hamsters, rabbits, and dogs. Accordingly, there is insufficient evidence at this time to conclude that VC at concentrations of 50 ppm or below poses a grave danger to humans.

(d) The emergency temporary standard adopted represents a substantial reduction in the permissible level of exposure and, in our practical judgment, is the lowest level that can be complied with immediately; and

(e) This standard will be in effect for a period of no longer than six months, during which time the whole question of possible safe exposure of humans to VC will be reconsidered more fully and in the light of more information, including experiments which are under way at this time (TR 47, 49, 71–74).

3. *Petitions for an emergency temporary standard.* In a telegram to the Assistant Secretary of Labor, received on or about March 14, 1974, the President of the United Rubber Workers International Union urged the establishment of an emergency temporary standard for VC. During the hearing of February 15, 1974, the Industrial Union Department, AFL–CIO, and the United Rubber Workers International Union made a joint petition for an emergency temporary standard for VC (TR 141–148), which was also joined by the Oil, Chemical and Atomic Workers International Union (TR 37). At the same hearing, several participants urged, on the other hand, a regular rulemaking proceeding as the most suitable for the orderly development of relevant information (TR 112, 180).

The petitions for an emergency temporary standard specified in detail the contents of the standard requested. In substance, the request is to issue a comprehensive fully-developed standard based on the recommendations of the Standards Advisory Committee on Carcinogens submitted to the Assistant Secretary of Labor on or about August 27, 1973. The recommendations are far-ranging, and cover special categories of operations, signs and labels, medical surveillance, reporting, etc., including a permit system for the use of a carcinogen.

We agree that an emergency temporary standard is necessary; we cannot say on the basis of the information developed so far that a comprehensive standard, such as the one requested, is either necessary or even desirable. It has been decided to promulgate a standard containing only those essential provisions which are deemed necessary to provide protection to employees from grave danger until a regular rulemaking proceeding in accordance with sections 6 (b) and (c) of the Act can be concluded. The reasons for a decision to establish a ceiling value of 50 ppm have already been stated. A decision on other possible, appropriate provisions is best made after consideration of all relevant data and views that interested persons may submit during the proceeding soon to be initiated.

With respect to arguments in opposition to issuance of an emergency temporary standard, the concern and efforts of several companies participating at the hearing for the protection of their employees are recognized. It may also be that some employers in some plants have fully complied with the interim controls recommended by NIOSH on January 30, 1974. There is, however, reason to believe that employees are currently being exposed to VC at concentrations well above 50 ppm. This was asserted several times at the hearing, and not seriously questioned. Moreover, a report, dated March 1974, of a survey by the staff of the Office of Standards Development, OSHA, of several facilities manufacturing VC and polyvinyl chloride revealed concentrations for some job classifications as high as 229 ppm. Therefore, a regulation is considered necessary to provide, immediately, adequate protection to workers ex-

posed to VC. Also, the eight-hour, time-weighted average standard suggested by several participants at the hearing (see, for instance, Tit 178), has been rejected. The March 1974 report of the survey revealed that several kinds of work or operations are of short duration. Loading or unloading of a tank car may require approximately 15 minutes. The cleaning of a reactor may require approximately half an hour. An eight-hour, time-weighted average standard would permit exposure to VC at concentrations of 400 ppm for one hour. Such upward excursions, several times the 50 ppm level, cannot be permitted to occur.

4. *The standard.* The standard set out below contains only the requirements deemed necessary to provide protection before the conclusion of the rulemaking proceeding to be commenced shortly.

Because exposure to VC is hazardous, and because such exposure can occur in the processes of synthesizing or polymerizing of VC or in the handling of VC polymers or copolymers which contain absorbed VC, this standard applies to all such processes and to the handling, reacting, manufacturing, processing, releasing, repackaging, or storage of any of these materials. The monitoring requirements serve two purposes, to trigger into operation a compliance program and to check the effectiveness of the program. Also, engineering controls are favored for compliance, and respirators are intended to provide protection until such controls can be installed or in cases where such controls are not feasible.

Accordingly, by reason of the foregoing and on the basis of the record of the hearing of February 15, 1974, with exhibits, the written submissions received before the hearing pursuant to the notice of the hearing, the post-hearing written submissions by the participants at the hearing, the March 1974 report of a fact-finding survey recommendations received from NIOSH, and the other data referred to herein, it is found (1) that VC at concentrations in excess of 50 ppm is physically harmful and carcinogenic; (2) that exposure to VC at concentrations in excess of a concentration of 50 ppm poses a grave danger to employees; (3) that employees are presently exposed to VC at concentrations in excess of 50 ppm; and (4) that the emergency temporary standard set out below is necessary to provide immediate protection to employees from such danger.

Pursuant to section 6(c) of the Occupational Safety and Health Act of 1970, a proceeding will commence shortly in accordance with section 6(b) of the Act, in which the emergency temporary standard will serve as a proposed rule, together with other subsidiary rules. As soon as possible a draft environmental impact statement will be filed with the President's Council on Environmental Quality, and copies will be provided to other appropriate Federal agencies for their comments.

Pursuant to sections 6(c) and 8(c)(3) of the Williams-Steiger Occupational Safety and Health Act of 1970 (84 Stat. 1596, 1599; (29 U.S.C. 655, 657)), and Secretary of Labor's Order No. 12-71 (36 FR 8754), 29 CFR Part 1910 is amended by adding thereto a new § 1910.93q to read as set forth below. In addition, pursuant to section 4(b)(2) of the Act (84 Stat. 1592; (29 U.S.C. 653)), the standard in the new § 1910.93q is determined to be more effective than the corresponding standards now in Subpart B of Part 1910, in Parts 1915, 1916, 1917, 1918, and 1926 of title 29, Code of Federal Regulations, and in Part 50-204 of Title 41 of the Code of Federal Regulations. Therefore, these corresponding standards are superseded by the new standard in § 1910.93q.

1. In 29 CFR Part 1910, § 1910.93 is amended by deleting from Table G-1 the line: "* * * C Vinyl chloride * * * 500 * * * 1300".

2. Part 1910 of Title 29 of the Code of Federal Regulations is amended by adding thereto a new § 1910.93q to read as follows:

§ 1910.93q *Vinyl chloride.*

(a) *Scope and application.* (1) This section applies to any area or operation in which vinyl chloride (chloroethene), Chemical Abstracts Service Registry Number 75015, is manufactured, reacted, handled, processed, released, repacked, or stored.

(2) This section does not apply to the handling, storage, or other use of vinyl chloride polymers and copolymers in the form of fabricated products.

(b) *Permissible exposure.* The occupational environment shall be controlled so that no employee is exposed to vinyl chloride at a concentration in excess of 50 parts per million (ppm) (127.0 mg/cum).

(c) *Monitoring*—(1) *Initial monitoring.* As soon as possible but not later than April 22, 1974, every employer of an employee working in an area or operation in which vinyl chloride is manufactured, reacted, handled, processed, released, repacked, or stored shall begin monitoring the ambient air of the area to determine whether it contains vinyl chloride in concentrations in excess of 50 ppm.

(2) *Frequency.* Monitoring of a sufficient number of employees so that a representative sample of exposures to vinyl chloride may be determined shall be accomplished not less frequently than weekly until all results for three consecutive weeks are at or below 50 ppm. Thereafter, monitoring shall be conducted not less frequently than monthly so long as the concentrations of vinyl chloride do not exceed 50 ppm. If a monitoring sample reveals vinyl chloride in concentrations in excess of 50 ppm, weekly monitoring shall be resumed until all results for three consecutive weeks are at or below 50 ppm.

(3) *Method of monitoring.* Personnel monitoring shall be accomplished by collecting samples by suitable devices worn by the employee. The samples shall be analyzed by gas chromatography or by any other method which is of equivalent sensitivity. The analytical procedure shall be sensitive to 5 ppm of vinyl chloride in air with an accuracy of ±20 percent for a ten minute air sample.

(4) *Employee observation of monitoring.* Employees working in an area or operation whose ambient air is monitored, or their representatives, shall be given a reasonable opportunity to observe the personnel monitoring required by this section.

(5) *Recordkeeping.* The results of all monitoring shall be recorded in writing. The records shall be retained for at least 5 years and shall be made available for inspection and copying by representatives of the Assistant Secretary of Labor for Occupational Safety and Health and the Director of the National Institute for Occupational Safety and Health (NIOSH).

(6) *Employee access.* Each employee and former employee shall have access to such records of the results of monitoring required by this section as will indicate his own exposure to airborne concentrations of vinyl chloride.

(7) *Employee notification.* Each employer shall promptly notify any employee who has been or is being exposed to vinyl chloride in concentrations in excess of 50 ppm, and shall inform him of the corrective action being taken.

(d) *Compliance.* (1) Whenever any monitoring sample reveals vinyl chloride at a concentration in excess of 50 ppm, or whenever any accident, such as rupture of equipment or spillage, indicates the likelihood of a greater than usual release of vinyl chloride into the ambient air, all employees exposed to such concentrations shall be withdrawn to a safe area and shall not be permitted to reenter the work area unless they wear either Type C continuous flow or pressure demand air supplied respirators or self-contained breathing apparatus.

(2) Work which may reasonably be expected to release vinyl chloride in concentrations in excess of 50 ppm, such as repair, maintenance or cleaning of reactors or other equipment containing vinyl chloride, shall be accomplished only by employees wearing Type C continuous flow or pressure demand air supplied respirators or self-contained breathing apparatus.

(3) In any case covered by paragraphs (d)(1) or (d)(2) of this section, in addition to providing the required respirators, the employer shall examine and analyze the source of the excessive concentrations of vinyl chloride in order to determine feasible engineering or operational controls appropriate to reduce the airborne concentrations to the permissable level. Such controls shall be implemented as quickly as possible.

(4) Periodic tests shall be conducted for equipment leaks and for emissions of vinyl chloride which may result from work practices.

3. In 29 CFR Part 1910, § 1910.19 is revised to read as follows:

§ 1910.19 *Special provisions for air contaminants.*

(a) *Asbestos dust.* Section 1910.93a shall apply to the exposure of every employee to asbestos dust in every employment and place of employment covered by § 1910.12, § 1910.13, § 1910.14, § 1910.15, or § 1910.16, in lieu of any dif-

ferent standard on exposure to asbestos dust which would otherwise be applicable by virtue of any of those sections.

(b) *Vinyl chloride.* Section 1910.93q shall apply to the exposure of every employee to vinyl chloride in every employment and place of employment covered by § 1910.12, § 1910.13, § 1910.14, § 1910.15, or § 1910.16, in lieu of any different standard on exposure to vinyl chloride which would otherwise be applicable by virtue of any of those sections.

Effective date. These amendments shall become effective on April 5, 1974.

(Secs. 4, 6, and 8, 84 Stat. 1592, 1596, 1599 (29 U.S.C. 653, 655, 657); Secretary of Labor's Order No. 12–71, 36 FR 8754.)

Signed at Washington, DC., this 2d day of April 1974.

JOHN STENDER,
Assistant Secretary of Labor.

[FR Doc.74–7890 Filed 4–4–74;8:45 am]

PROPOSED RULES

DEPARTMENT OF LABOR

Occupational Safety and Health Administration

[29 CFR Part 1910]

STANDARDS ADVISORY COMMITTEE ON CARCINOGENS

Notice of Receipt of Recommendations of the Committee and of Their Availability for Public Inspection

Notice is hereby given that the Standards Advisory Committee on Carcinogens, established under section 7 of the Williams-Steiger Occupational Safety and Health Act of 1970 (84 Stat. 1592), submitted to the Assistant Secretary of Labor for Occupational Safety and Health, on August 27, 1973, its recommendations for a standard for certain carcinogens. The full text of the recommended standard is set forth in an appendix to this notice.

The number appearing in parentheses in the lower right corner of each recommendation records the voting of the Committee members. The first number indicates the affirmative votes, the second number indicates the negative votes, and any third number indicates abstentions.

Copies of the recommended standard will also be made available for inspection, and copying, upon request, at the U.S. Department of Labor, Office of Standards, Railway Labor Building, Room 500, 400 First Street NW., Washington, D.C. 20210, and at the following regional offices:

John F. Kennedy Federal Building, Government Center, Room No. E303, Boston, Mass. 02203; 1515 Broadway, New York, N.Y. 10036; Penn Square Building, Room 623, 1317 Filbert Street, Philadelphia, Pa. 19107; 1375 Peachtree Street NE., Suite 587, Atlanta, Ga. 30309; 300 South Wacker Drive, Room 1201, Chicago, Ill. 60606; Seventh Floor, Texaco Building, 1512 Commerce Street, Dallas, Tex. 75201; 823 Walnut Street, Waltower Building, Room 300, Kansas City, Mo. 64106; Federal Building, Room 15010, Post Office Box 3588, 1961 Stout Street, Denver, Colo. 80202; 9470 Federal Building, 450 Golden Gate Avenue, Box 36017, San Francisco, Calif. 94102; 506 Second Avenue, 1808 Smith Tower Building, Seattle, Wash. 98104.

Signed at Washington, D.C. this 29th day of August 1973.

JOHN H. STENDER,
Assistant Secretary of Labor.

APPENDIX

PROPOSED STANDARD FOR CERTAIN CARCINOGENS AS RECOMMENDED BY THE STANDARDS ADVISORY COMMITTEE ON CARCINOGENS AUGUST 27, 1973

§ 1910.93c Carcinogens.

(a) *Purpose.*—The purpose of this standard is to prevent any worker contact or exposure to any of the listed carcinogens as detected by the most sensitive, feasible sampling and analytical methods available.

(b) *Scope and application.*—This section applies to any workplace in which a carcinogen is manufactured, processed, used, repackaged, released handled or stored, but shall not apply to any workplace involving only shipment of carcinogens in appropriate, sealed containers.

(c) *Terminology.*—For the purpose of this standard: (1) "carinogen" includes one or more of the fourteen substances listed below.

Compound No.	Chemicals	Chemical abstract registry No.
1	2-Acetylaminofluorene	53963
2	4-Aminobiphenyl	92671
3	Benzidine (and its salts)	92875
4	3,3'-Dichlorobenzidine (and its salts).	91941
5	4-Dimethylaminoazobenzene	60117
6	alpha-Naphthylamine	134327
7	beta-Naphthylamine	91598
8	4-Nitrobiphenyl	92933
9	N-Nitrosodimethylamine	62759
10	beta-Propiolactone	57578
11	bis-Chloromethyl ether	542881
12	Methyl Chloromethyl ether	107302
13	4,4'-Methylene (bis)-2-chloroaniline.	101144
14	Ethyleneimine	151564

(2) "Regulated area" is an area in which there is potential exposure to a carcinogen and where entry and exit shall be restricted and controlled by the employer.

(3) "Decontamination" is the safe removal from the work environment or inactivation of a carcinogen to eliminate residual carcinogen as detectible by the most sensitive, feasible sampling and analytical methods available.

(4) "Disposal" is the safe removal or inactivation of a carcinogen to prevent introduction of the carcinogen into regulated areas, nonregulated areas, or the external environment.

(5) "Feasible" is capable of being accomplished successfully within the best practicable technology as it exists or may develop.

(6) "Closed system" is an operation involving a carcinogen where the containment prevents the release of the carcinogen, as detected by the most sensitive, feasible, continuous sampling and analytical methods available, into regulated areas, non-regulated areas, or the external environment.

(7) "Isolated system" is a fully enclosed structure, which is impervious to the passage of a carcinogen, other than the vessel of containment of the carcinogen, and which would prevent the entry of the carcinogen into regulated areas, non-regulated areas, or the external environment, should leakage or spillage from the vessel of containment occur.

(8) "Laboratory type hood" is a device enclosed on three sides and the top and bottom, designed and maintained so as to draw air inward at an average linear face velocity of 150 feet per minute with a minimum of 125 feet per minute; designed, constructed, and maintained in such a way that an operation involving a carcinogen within the hood does not require the insertion of any portion of any employees' body other than his hands and arms, c.f. the American Conference of Governmental Industrial Hygienists "Industrial Ventilation, A manual of Recommended Practice" section on laboratory hoods details and operation when handling and using highly toxic substances, and the section "Hood Design Data."

(9) "Open vessel system" is an operation involving a carcinogen in an open vessel, not in an isolated system, not in a laboratory-type hood, nor in other systems affording equivalent protection, which may allow the entry of a carcinogen into regulated areas, non-regulated areas, or the external environment.

(10) "Nonregulated area" is any area under the control of the employer which is not subject to the provisions of this section because there is no potential for exposure to a carcinogen.

(11) "External environment" is any environment external to the regulated and non-regulated areas.

(12) "Redundant protection" is a backup system for operations involving carcinogens which is capable of providing immediate protection should the primary system fail.

(13) "Protective work clothing" is clothing designed to protect the worker against contact with or exposure to carcinogens in the regulated areas.

(14) "Emergency" is an unforeseen circumstance or set of circumstances resulting in the release of a carcinogen which may result in the exposure or contact with the carcinogen as evidenced by its detection either by the most sensitive, feasible sampling and analytical methods available or by other obvious evidence such as physical detection or an indication of equipment failure or impending failure, which emergency calls for immediate action.

(d) *Requirements for areas containing carcinogens.*—A regulated area shall be established by the employer where a carcinogen is manufactured, processed, used, repackaged, released, handled or stored. All such areas shall be regulated in accordance with the requirements for the following categories of operations involved:

(1) *Isolated System.*—Where a carcinogen is contained within an isolated system, such as a "glove box", employees and other authorized individuals working with such a system shall be required to wash their hands and arms upon completion of the assigned task and before engaging in other unrelated activities.

(2) *Closed system operation.*—Where a carcinogen is stored in sealed containers, or contained in a closed system, such as fully enclosed process or transfer equipment, including pipes; sample ports or openings, if present, are not in use while a carcinogen is contained within:

(i) Access to the regulated area shall be restricted to only employees who work in that area and other authorized individuals.

(ii) Before entering the regulated area each workday all employees and other authorized individuals shall be provided with and be required to wear new or decontaminated appropriate protective work clothing

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(iii) During the workday, such employees and other authorized individuals shall be required to remove and leave that clothing at the point of exit upon each exit from the regulated area.

(iv) Such employees and other authorized individuals shall be required to wash hands and face upon each exit from the regulated area, close to the point of exit.

(v) Such employees and other authorized individuals shall be required to remove and place all protective work clothing in an appropriate container (for purposes of decontamination or disposal) after last exit of the day from the regulated area.

(vi) Such employees and other authorized individuals shall be required to shower after last daily exit from the regulated area, close to the point of exit.

(3) *Transfer from a closed system, charging or discharging point operations,* or otherwise opening a closed system. In operations involving "laboratory type hoods", or in locations where a carcinogen is contained in an otherwise "closed system", but is transferred, charged, or discharged into other normally closed containers:

(i) Access to the regulated area shall be restricted to only employees who work in that area and other authorized individuals.

(ii) Continuous local exhaust ventilation followed by appropriate decontamination and disposal shall be maintained to prevent the dispersion of the carcinogen to regulated areas, non-regulated areas, or the external environment.

(iii) Before entering the regulated area each work day, all employees and other authorized individuals shall be provided with and be required to wear new or decontaminated, appropriate protective work clothing, such as smocks, coveralls or long-sleeved shirts and long pants.

(iv) Such employees and other authorized individuals shall be required to remove and leave that clothing at the point of exit upon each exit from the regulated area.

(v) Employees and other authorized individuals in the regulated area involved in carcinogen handling operations shall be provided with and be required to wear and use appropriate personal protective equipment adequate to prevent exposure to a carcinogen.

(vi) Such employees and other authorized individuals shall be required to wash hands and face upon each exit from the regulated area, close to the point of exit.

(vii) Such employees and other authorized individuals shall be required to shower after last exit of the day from the regulated area, close to the point of exit.

(viii) Employees and other authorized individuals in the regulated area shall be required to remove and place all protective equipment in an appropriate container at the hood site or charging, discharging or transfer point after work at that site or point.

(4) *Open vessel systems.*—(i) Open vessel system operations, as defined above in paragraph c(9), shall be prohibited.

(5) *Maintenance and Decontamination Activities.*—In decontamination of carcinogen(s), either as a part of clean-up of leaks or spills, maintenance or repair where direct contact with a carcinogen could result, each employee or other authorized individual entering that area shall:

(i) Be provided with, and be required to wear, a decontaminated, full, impervious, pressurized, air-supplied suit upon entering that area and while engaged in such operations;

(ii) Be decontaminated before leaving that area and before removing the suit; and

(iii) Be required to shower after removing such suit.

(6) *"Out-of-doors systems".*—No distinction shall be made between out-of-door regulated areas and indoor regulated areas.

(e) *General regulated areas requirements.*—In addition to the regulated types of systems listed in paragraph (d) of this section the following requirements apply to all regulated areas:

(1) Each employer shall establish and maintain a list of employees entering a regulated area. The list shall be made available on request to authorized representatives of the Secretary of Labor and the Secretary of Health, Education, and Welfare.

(2) The employer shall provide all work clothing, protective clothing, equipment, and wash and shower supplies including towels, required by this section.

(3) Any required shower rooms shall be provided in accordance with § 1910.-141. Shower supplies may be introduced into a shower room only through a non-contaminated area.

(4) No food, beverage, drug, or cosmetic shall be permitted within a regulated area.

(5) No smoking or smoking materials, tobacco products, or chewing materials shall be permitted within a regulated area.

(6) Appropriate instructions and signs shall be posted at the entrance to, and exit from, regulated areas to inform employees of the procedures that must be followed in entering and leaving a regulated area.

(7) Any equipment, material, or any other items that are to be taken into or removed from a regulated area by any employees or other authorized individuals shall be taken in or removed from such area in such a manner which does not contaminate outside the regulated area.

(8) When only removal of outer clothing or personal protective equipment is required under paragraph (d) of this section, at point of exit from a regulated area, an employee must be able, upon exit from the regulated area, to enter the change room, remove outer work garments and equipment and leave them in that room in an appropriate container.

(9) When change and shower facilities are required under paragraph (d) of this section at point of exit from a regulated area, they shall be arranged so that upon exit, an employee must be able to enter a separate dirty change room where he can undress completely and leave every item of clothing and equipment in approved containers. All clothing shall be decontaminated before laundering. He must then be able to shower in an adjacent room which he can enter through an entrance designed to prevent the escape of carcinogens from the dirty change room to the shower enter a clean change room where his street clothes are in his locker.

(10) When work area garments or protective clothing and equipment are required under paragraph (d) of this section to be worn in a regulated area, a clean change room must be provided so that before entering the regulated area, the employee or other authorized individuals can change into clean work area garments or protective clothing and equipment in an area not containing contaminated or used work clothing or equipment and without passing through such a contaminated area to enter the regulated area. The clean change room shall have individual storage facilities for storage of street clothes and clean protective clothing and equipment.

(11) Continuous general mechanical exhaust ventilation shall be provided in regulated areas, or other positive means provided, so that contaminated air from the regulated area does not flow to non-regulated areas. Local exhaust ventilation may satisfy this requirement. Clean makeup air shall replace air removed.

(12) In emergencies, immediate measures shall be initiated, including all of the following:

(i) Evacuation from potentially affected area as soon as the emergency has been determined.

(ii) The release shall be contained and stopped as expeditiously as possible by duly-trained, authorized, and continually available emergency team operating under the conditions described in (d)(5). The makeup of the team shall be determined by need.

(iii) Medical surveillance shall be instituted for any individuals present in the potentially affected area.

(iv) Normal operations in the area are to be resumed only after effective decontamination.

(v) Safe escape in case of an emergency shall be readily possible by satisfactory means of egress.

(vi) Specific emergency procedures shall be prescribed, the terms of such procedures shall be posted, and the employees shall be familiarized with their terms and rehearsed in their application.

(vii) The emergency first aid procedures that shall be used shall be specifically appropriate to the hazard for each carcinogen and these procedures shall be generally recognized as effective.

(f) *Signs and labels.*—(1) Entrances to regulated areas shall be prominently posted with legible signs bearing the legend:

CANCER HAZARD AREA

AUTHORIZED PERSONNEL ONLY

For isolated environment operations, the sign shall be posted on or near the structure containing the isolated system.

(2) Equipment, material, and clothing contaminated with a carcinogen shall not be removed from a regulated area, unless it is either decontaminated or sealed in impervious containers bearing the legend:

DANGER

Contaminated with
CANCER HAZARD AGENT

(3) Entrances to every regulated area for operations described in paragraph (d)(5) of this section shall be prominently posted with legible signs bearing the legend:

CANCER HAZARD IN THIS AREA

FULL IMPERVIOUS PRESSURIZED AIR-SUPPLIED SUIT REQUIRED AT ALL TIMES

AUTHORIZED PERSONNEL ONLY

(j) *Decontamination.*—Decontamination processes shall be established and implemented to remove carcinogens from decontamination facility, that are known to be contaminated with a carcinogen.

(h) *Waste disposal.*—Waste disposal methods and processes shall be established and implemented which do not permit carcinogens to be introduced into regulated areas, non-regulated areas, or the external environment.

(i) *Performance Standard.*—(1) Whenever a carcinogen is present, no measurable exposure or contact shall be permitted by any route, oral, respiratory, or skin.

(2) For the purpose of this paragraph "present" shall mean manufactured, processed, used, packaged, released, handled, stored, or otherwise present.

(3) For the purpose of this paragraph "measurable" shall mean detectable, by

(i) the most sensitive, feasible, approved reliable methods of environmental and personal monitoring, and

(ii) the most sensitive approved tests for detecting a carcinogen or its metabolites in biological fluids.

(j) *Monitoring.*—To provide information enabling the employer to comply with the requirements of this regulation, personal and environmental sampling procedures and monitors appropriate to each carcinogen or combination of carcinogens and capable of detecting by the most sensitive, feasible methods available, shall be used by employers to detect and provide a record of the presence of [illegible] level of carcinogen in regulated areas and non-regulated areas, and to monitor the discharge of carcinogen into the external environment.

Note.—It should be an urgent concern of the Department of Labor in conjunction with the National Institute for Occupational Safety and Health and the Environmental Protection Agency to undertake and/or contract for the development of monitors which shall have a sensitivity of at least one part of carcinogen per billion parts of air (v/v), individual analytical results to be produced by such monitor at intervals no greater than two hours throughout the working day. Of equally urgent concern should be the development of backup detection methods capable of producing a warning or signal at intervals no greater than ten minutes, with sensitivity of at least 100 parts per billion. Methods of equivalent detection shall be developed for water and other wastes. These achievements shall be viewed as milestones on the pathway to achieve the objective of no exposure rather than as ultimate targets.

(k) *Medical.*—(1) *Surveillance.*—(i) The employer, at his cost shall provide and make available to all employees by a company designated physician, or by another duly-qualified physician of their choice, a comprehensive history and physical examination consisting of diagnostic tests and periodicity specific to the carcinogen and in no less detail than guidelines set forth by the Secretary of the Department of Labor after consultation with the Secretary of Health, Education, and Welfare.

(2) *Records.*—(i) The physician(s) charged with the implementation of the medical program shall maintain the appropriate medical records. If the examination by other than a company-designated physician, a copy of the results of that examination shall be forwarded to the company-designated physician and these records shall be treated in a confidential manner.

(ii) Only physicians and medical consultants of the Department of Labor, physicians designated by the company, and physicians designated and authorized by the employee shall have access to the medical records, where confidentiality of these documents shall be preserved.

(iii) Medical records shall be maintained for the duration of the employee's employment; a copy of these records shall be maintained by the company-designated physician; and in addition, at the termination of employment, the records shall be forwarded by registered mail to the Director of the National Institute for Occupational Safety and Health.

(iv) In the event that an employer ceases business without a successor, medical records shall be forwarded by registered mail to the Director of the National Institute for Occupational Safety and Health.

(l) *Labeling.*—All containers of carcinogens for use other than process equipment shall be labeled prominently with the words:

CANCER—HAZARD

DANGER—AVOID ALL CONTACT AND EXPOSURE

For opening and use by authorized personnel. The chemical and common name shall be clearly identified.

(m) *Training and indoctrination.*—(1) All employees who may periodically or routinely enter a regulated area, including maintenance and supervisory personnel, where any carcinogen is manufactured, processed, used, repackaged, released, handled or stored, shall be provided with an indoctrination program which shall include definitive information concerning:

(i) The nature of the hazards, including local and systemic toxicity, of any of the carcinogens or other potentially hazardous chemicals present in the regulated area,

(ii) The specific nature of the operation or procedure, such as manufacturing, processing, use, repackaging, releasing, handling or storing, which could result in exposure to employees to any of the carcinogens.

(iii) The purpose for and application of a medical surveillance program.

(iv) The purpose for and application of an air monitoring program, and basic understanding of the significance of the various monitoring values.

(v) The purpose for and application of decontamination practices and procedures.

(vi) The purpose for and significance of emergency practices and procedures including bimonthly emergency drill procedures.

(vii) The employee's specific role in emergency procedures.

(viii) Specific information to aid the employee in the recognition and evaluation of conditions and situations which may result in the release of a carcinogen into a regulated area, non-regulated area, or the external environment.

(ix) The purpose for and applications of specific first aid procedures and practices.

(x) A presentation of the *Standard* on first indoctrination program and annually thereafter.

(xi) Assurance by the employer that the employee has a firm understanding of the purpose and applications of the basic information required above.

(xii) Specific training material for workers and supervisors shall be made available through the Office of the Assistant Secretary of Labor for Occupational Safety and Health or the Director of the National Institute for Occupational Safety and Health.

(xiii) The employer shall maintain a record of the administered indoctrination program.

(n) *Reporting.*—Every employer subject to this section shall report in writing to the Occupational Safety and Health Administration, Office of Standards, the following information:

(1) The address of each of his regulated areas;

(2) The name and other identifying information as to the particular carcinogens present in each of his regulated areas;

(3) The approximate number of employees entering each of his regulated areas during a representative week of normal operations in the regulated areas; and

(4) The manner in which the carcinogens are present in each of his regulated areas, e.g., whether a carcinogen is manufactured, processed, used, repackaged, released, or otherwise handled.

(o) *Permit for the Use of Carcinogens.*—A use permit system shall be initiated as an integral part of the permanent standard to provide for effective regulation of conditions and practices concerning carcinogens to enhance the implementation of the standard.

[FR Doc.73-16869 Filed 8-6-73;8:45 am]

DCPA/lml
9/10/73

GENC 009514