

FROM (NAME & LOCATION): S. A. Roberts - MTPDCI 1703

DATE : December 3, 1974

cc: C. D. Bohl - A2SA
S. W. Burdge - 1703
J. A. Englehardt - 1703
H. N. Friedlander - 1703
H. E. Webb, Jr. - R3B

SUBJECT : Lab 204 Process (VDC, VBr)

REFERENCE : Letter: Hobson to Roberts 10/18/74

TO : P. H. Hobson

Pursuant to your request in the referenced letter, a preliminary survey of Lab 204 operations was made. Initial analysis of air samples show exposures to vinylidene chloride and vinyl bromide that appear to be significantly greater than the Threshold Limit Values recommended by the American Conference of Government Industrial Hygienists and the Corporate Medical Department. I would, therefore, recommend the following program to reduce the possibility of health and property hazards (in conjunction with proposal by Gary Wentworth and Roger Evans):

1. Engineering Control of Hazards

A. Equipment Design

1. Process should be located at least 50' away from open flames and spark sources, heated surfaces or other sources of ignition because of material flammability.
2. Processes should be designed so the operator is not exposed to direct contact with the monomers or their vapor.

B. Ventilation

1. All operations involving manual transfer of the substances should be provided with local ventilation or the operations should be relocated to a walk-in hood supplemented with local exhaust at points of possible vapor exposure. Outdoor transfers should be further monitored to determine exposure.

The most important consideration in ventilation should be to ensure a substantial air flow away from the work area, with provisions made for periodic inspection. (Please note that present lab hood face velocities are inadequate in your work area.)

B. Ventilation (cont'd)

2. The reactor cleaning operation should also be well ventilated with a local exhaust system of sufficient design to control the vapors.
3. After installation, the exhaust system discharge point should be sampled to ensure that harmful or hazardous amounts of chemicals are not released to the outside environment.

II. Employee Safety**A. Employee Education and Training**

1. Employee education, training, and proper supervision are recognized as fundamental, precautionary measures. Unauthorized and untrained employees should not be permitted in areas where the monomers are being handled.
2. Written operating procedures should be developed for handling the substances. The procedures should include designation of personal protective equipment required in handling the substances.
3. Employees should be trained to report all suspected malfunctions and any signs of illness or skin irritation.
4. All training programs should be well documented to assure positive intent to prevent exposures.

B. Personal Protective Equipment

1. Recognizing that under conditions which are sufficiently hazardous to require protective equipment, the use of such equipment should be carefully supervised, employees should be instructed to use the following as minimum protection whenever there is a possibility of liquid or vapor contact:
 - a) Chemical safety goggles (cup type or rubber frame)
 - b) In atmospheres containing less than 2% concentration and no less than 16% oxygen, organic vapor canister type gas masks may be used.
 - c) Air or oxygen-supplied masks, equipped with full face pieces, must be worn for protection when the following conditions may be encountered:

- 1) In emergencies when the vapor concentration is not definitely known.
 - 2) When the vapor concentration is over 2% by volume.
 - 3) When the O_2 content is less than 16%.
 - 4) When the exposure period may exceed 15 minutes.
 - 5) In tank or process equipment cleaning and repair work when any of the conditions above are present.
- d) Foot protection should be provided when there is a risk of foot exposure (such as transfer spillage).
 - e) Gloves and aprons of neoprene or Buna-N should be worn during transfer operations.

III. Medical Management

- A. Dow Chemical's recommendation for suggested health surveillance measures (copy attached) should be followed by all employees who potentially might suffer exposure.
- B. Employees involved in the operation should be trained in the specific first aid measures associated with the substances. Chemical Association Data Sheets No. SD-31 (Acrylonitrile), SD-37 (Styrene Monomer), SD-52 (Sulfur Dioxide), and the Monsanto Medical Department Bulletins in the MTPDCI First Aid Room.

Additionally, a monitoring program should be started to ensure the collection of adequate data to determine the risks of exposure and to check the effectiveness of the control measures. The monitoring program should be well documented and supervised by professionals. The current vinyl chloride standard provides a guide for the basic requirements of a monitoring program. Exposure goals should be to reduce exposures to one-half (1/2) of the Threshold Limit Value (TLV) except for vinyl bromide which should be < 1 ppm as the ultimate target with 25 ppm and 10 ppm as interim goals. Present TLV's for acrylonitrile and vinylidene chloride are 20 ppm and 10 ppm respectively.

All monitoring, control methods, installation changes and program modifications should be coordinated through John A. Englehardt.

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John will also arrange consultation with the industrial hygiene section, corporate medical, as additional information concerning toxicity and controls is sought or received.

S. A. Roberts

Steven A. Roberts

Attachments

RSV 0010452

SUGGESTED HEALTH SURVEILLANCE MEASURES

VINYLDENE CHLORIDE

Before beginning work with vinylidene chloride, and at approximate one year intervals thereafter, the employe should have a medical examination to determine his suitability for such work. The exam should consist of a standard history and physical exam, with special attention to liver function.

It is recommended the following be included in these examinations.

- (1) History
- (2) Physical Exam
- (3) Eye Check
- (4) Chest X-ray (every year)
- (5) Audiometer (only if required because of noise levels)
- (6) Electrocardiogram (40 and over -- yearly)
- (7) Red and White Blood Counts
- (8) Urinalysis
- (9) Chemistry - 12 Group

Glucose	Transaminase - SGOT or SGPT
Urea Nitrogen	Lactic Dehydrogenase
Uric Acid	Alkaline Phosphatase
Cholesterol	Inorganic Phosphorus
Total Protein	Calcium
Albumin	Total Bilirubin

(The above chemistry group is often most economical, but contains many tests not pertinent to liver function.)

An alternate to the Chemistry - 12 Group would be strictly a liver function group, such as:

Total Bilirubin
Transaminases - SGPT and SGOT
Alkaline Phosphatase and GGTP (Gamma Glutamyl Transpeptidase)

Of course, if any abnormalities are discovered, the doctor should seek to establish the cause and help determine the desirability of further exposure to vinylidene chloride.

We do not recommend placing any individual with impaired liver function, history of liver disease, or alcoholism, in work where he is potentially exposed to vinylidene chloride.

If the examining physician wishes to discuss these suggestions further, he may call collect: Dr. Harold L. Gordon or Dr. Charles G. Kramer
Phone: (517) 636-2106.