

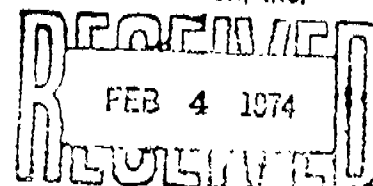


DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
CENTER FOR DISEASE CONTROL

JAN 31 1974

NATIONAL INSTITUTE FOR OCCUPATIONAL
SAFETY AND HEALTH
5600 FISHERS LANE
ROCKVILLE, MARYLAND 20852

MANUFACTURING CHEMISTS
ASSOCIATION, INC.



Mr. George E. Best
Manufacturing Chemists Association
1825 Connecticut Avenue, N.W.
Washington, D.C. 20009

Dear Mr. Best:

On January 22, 1974, representatives from the B. F. Goodrich Chemical Company, met with myself and other staff of the National Institute for Occupational Safety and Health (NIOSH) to present their concerns that recent deaths of several of their employees at their Louisville, Kentucky plant might be related to occupational conditions. Had not the Company taken the initiative it did in following up on suspicions aroused by the occurrence of the rare type of liver cancer (i.e. angiosarcoma) discovered in several of its employees at autopsy, it is entirely possible that the significance presently attached to the appearance of those tumors would not have been realized for several more years.

As a result of this information, a walk-through survey was conducted on January 24 in the Company's facility in Louisville by NIOSH. Also participating in the survey at the specific request of NIOSH were representatives from the Department of Labor of the State of Kentucky, the Occupational Safety and Health Administration of the U.S. Department of Labor and the Epidemic Intelligence Service (EIS) of the Center for Disease Control (CDC).

We were most pleased with the Company's excellent cooperation with the survey team in providing access to Company employees, union representatives and Company records of medical and employment history significance. The agreement of officials of the Louisville facility to provide continuing cooperation with the organizations participating in the survey demonstrates the sincerity and concern of the B. F. Goodrich Chemical Company in determining the significance of past and present conditions of employment which may have either precipitated or initiated the induction of tumors in certain of its employees.

On February 1, NIOSH will brief representatives of the National Cancer Institute (NCI), the Food and Drug Administration (FDA),

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and the National Institute for Environmental Health Sciences (NIEHS), as to the results of the initial survey of the Louisville plant and also review the results of the investigation thus far. Subsequent to this meeting, NIOSH will develop a protocol for further field studies as well as recommendations for medical diagnosis and follow up.

At this time the etiologic role of vinyl chloride in the induction of the observed liver tumors is not certain. The occupational exposure of the deceased workers to over 50 other chemicals at the Louisville facility precludes a clear definitive role for this substance as a carcinogenic agent until the degree of exposure to other chemical substances and work histories of deceased employees can be evaluated. However, the implication of vinyl chloride as the possible etiologic agent is not readily dismissable and, unless an association with another of the chemical substances is revealed, vinyl chloride must remain as the principal etiologic agent of suspicion.

Until well-documented recommendations to OSHA can be developed, we are recommending that the preliminary work practices and monitoring and control procedures for the polymerization of vinyl chlorides (Enclosure 1) be instituted as interim measures. These preliminary procedures are based, in part, on the information on hand concerning the operation of the Louisville facility and on the results of the walk-through survey conducted by members of the Institute's staff. These recommendations in more specific detail have been transmitted to the B. F. Goodrich Chemical Company for implementation at their Louisville facility.

Mr. Vernon E. Rose, Acting Assistant Institute Director for Research and Standards Development will provide NIOSH coordination in development of controls and/or standards to be recommended to OSHA.

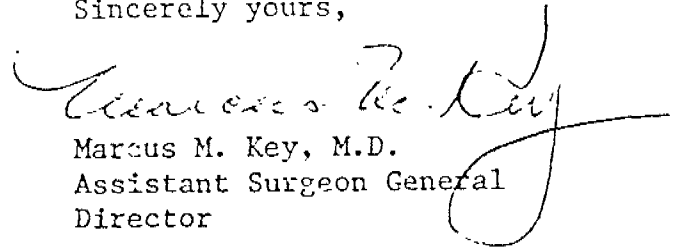
Mr. Rose or members of his staff may be reached by telephone at (301) 443-3680. They will insure that all requests for technical information or assistance concerning this situation are directed to appropriate NIOSH staff or members of the other Federal agencies involved with the ongoing study.

The possible significance of vinyl chloride as a carcinogenic substance requires close cooperation between the vinyl chloride industry and State and Federal agencies. Consequently, it is my hope that through your organization the above information and

Page 3 - Mr. George E. Best

enclosed recommendations can receive the widest distribution to other companies using these processes.

Sincerely yours,

A handwritten signature in cursive script, appearing to read "Marcus M. Key". The signature is written in dark ink and is positioned above the printed name and title.

Marcus M. Key, M.D.
Assistant Surgeon General
Director

Enclosure

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Enclosure 1

NIOSH Recommended Precautionary Monitoring and Control Procedures for
Polymerization Processes Involving Vinyl Chloride

I. General Housekeeping Procedures

A. The spillage of Vinyl Chloride and Polyvinyl Chloride in and around the production facilities should be controlled as follows:

1. Housekeeping procedures should be implemented to assure immediate removal of VC and PVC material around polymerization operations including drying, packaging and loading operations.
2. Recovered PVC material which is to be packaged should be stored in closed containers.
3. Waste PVC material should be stored in closed containers and consideration should be given to the adequacy of its disposal and/or destruction. Care should be taken in the storage of closed containers to insure that unsafe conditions do not result from an internal build-up of pressure in the container.

B. Inventories of beginning and recovered quantities of VC and quantities of PVC produced, packaged and recovered should be made to determine losses and probable areas affected.

C. PVC material should be removed from overhead structures and conduits where it tends to collect.

D. Consumption of food should be permitted only in separate facilities provided for this purpose, and no food products should be permitted elsewhere in the polymerization facility.

II. Protective Clothing

A. A daily change of protective clothing including full coveralls, or the equivalent, should be provided each employee in areas where possible exposure to VC PVC could occur. Clothing contaminated by accidental spills should be changed as soon as feasible.

B. Protective gloves and footwear, or footcovers, should be worn as appropriate in those PVC operations where exposure to PVC material is possible.

C. Protective head covers should be worn during PVC operations as appropriate (e.g. hard hats in those areas where physical protection of the head is necessary and hair coverings, or the equivalent, in

operations such as cleaning of polymerization reactor tanks and packaging operations).

D. Where employees are engaged in maintenance or cleaning operations of polymerization reactors tanks they should wear full impervious suits to guard against skin contact of PVC material and VC vapors. Procedures for safe entry to confined spaces should be observed.

III. Showers

Showers at the termination of an eight-hour work shift should be mandatory for all workers with possible contact with VC-PVC.

IV. Monitoring

A. Environmental Monitoring

1. In-plant environmental monitoring programs should be implemented; and where workers are required to enter polymerization tanks, a survey of the VC concentrations should be made in the reactors immediately after opening, immediately prior to entry of maintenance personnel and during the tank cleaning operation.

2. Data obtained from the environmental monitoring program should be used to indicate those areas where efforts should be directed to reduce airborne levels of VC.

3. Positive programs to initially control VC levels well below the present Federal Standard of 500 ppm should be developed (some companies are targeting at 50 ppm) and efforts to further reduce levels should be given consideration concomitantly with the necessary modifications in engineering and design controls.

4. The concentration of VC in exhaust ventilation should be determined to estimate the amount of VC lost during operations and the possible exposure of personnel immediately outside the facility.

5. Monitoring for PVC particulate material should be accomplished to estimate the degree of exposure to this substance throughout the facility.

B. Personal Monitoring

1. Integrated, eight-hour personal monitoring samples should be obtained from those employees considered to receive the greatest exposure to VC or PVC.

2. Breathing zone samples should be obtained to complement environmental monitoring program for VC, and similar samples should be obtained for PVC.

V. Respiratory Protection

Because VC is a gas under ambient conditions and PVC is a solid under these conditions, it is recommended that respiratory protection for employees take these circumstances into consideration.

A. Where employees are engaged in cleaning and maintenance operations inside polymerization reactors they should be equipped with an atmosphere-supplied respirator in order to protect against both VC vapor and PVC particulates.

B. During housekeeping procedures and packaging operations where the possibility of PVC dust inhalation is a factor, it is recommended that an air-purifying respirator equipped with a mechanical filter designed to remove particulate material be worn. Respiratory protective devices which meet this requirement, as well as protect against VC vapors in concentrations less than 0.1% have been approved by the NIOSH Testing and Certification Laboratory and bear the numbers: TC-23C-40, TC-23C-47, TC-23C-48.

C. Where employees are engaged in transfer operations of VC from railway tankcars to storage facilities or at any similar transfer point which requires manual operations, they should wear a self-contained breathing apparatus (SCBA) during such operations to guard against unexpected release of VC during such operations.

D. Other operations involving possible exposure to VC or PVC should be evaluated as the individual situation exists and respiratory protection provided as appropriate.

EVIDENCE MOUNTS LINKING VINYL CHLORIDE AND CANCER

The growing suspicion that exposure to vinyl chloride has led to the deaths of polyvinyl chloride workers from a most rare form of liver cancer has apparently been reinforced. A research study in which rats exposed to high levels (apparently 30,000 p.p.m.) of vinyl chloride vapor also develop angiosarcoma of the liver was slated to be disclosed publicly in the U.S. by Prof. Cesare Maltoni of the University of Bologna, Italy, just after press time. The study has been supported by a consortium of European firms, including Imperial Chemical Industries (C&EN, Feb. 11, page 8).

What's more, the view that the deaths are an isolated event limited to just one of B. F. Goodrich's U.S. plants and not proved to be occupationally linked is fast disappearing. Four angiosarcoma deaths now have been confirmed at the BFG plant instead of the three revealed earlier (C&EN, Jan. 28, page 6). Another diagnosed case of angiosarcoma occurred in an ICI employee who worked in a U.K. vinyl chloride operation for 20 years, sources in the U.K. and U.S. say.

The clustering of the four BFG cases "cannot be explained by chance alone," Dr. Marcus M. Key, director of the National Institute for Occupational Safety and Health, told those at a Cleveland briefing on the cancer hazard earlier last week.

What action the U.S. takes, if any, beyond interim procedures NIOSH has recommended hinges upon the outcome of a fact-finding hearing at the Labor Department on Feb. 17. Prof. Maltoni, BFG, Dow Chemical, organized labor, and others were scheduled to testify.

AFL-CIO was to present a unified, organized labor position urging the department to promulgate an emergency temporary standard, a procedure used earlier for 14 other carcinogens. Dr. V. K. Rowe, Dow's top toxicologist, was expected to oppose this procedure, asking instead for regular rule-making for a permanent standard. He suggests the deaths result from gross exposure 10 to 30 years in the past.

All four BFG deaths, as well as

another four liver disease cases at the plant under investigation, involved persons who cleaned polymerization reactors after this step in the suspension process for PVC. BFG has used a less hazardous cleaning process for the past five years, however.

Significantly, the latency period for most cancers to develop nearly



Key: not explained by chance

matches the great growth in the U.S. PVC industry that has taken place over the past two decades or so. NIOSH estimates there are 3000 workers at risk in U.S. PVC plants and 1500 at vinyl chloride plants.

NIOSH will contract out an epidemiology study that will be independent of the study on workers already under way at member firms of the Manufacturing Chemists Association. MCA's results will not be ready for "at least two to three months," a spokesman says. Earlier, MCA halted circulation of its 1972 safety data sheet on vinyl chloride, which stated that human carcinogenicity had not been observed.

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Plastic prices get big boosts

As U.S. chemical makers sort out the fine points of the recent Cost of Living Council action relaxing Phase IV price controls on petrochemicals, plastics resins, and synthetic fibers (C&EN, Feb. 4, page 4), price hikes are being announced with resin makers leading the way.

So far three major resin producers—Dow Chemical, Monsanto, and Union Carbide—have spelled out large and wide-ranging price increases for resins following the CLC action. These boosts come after a year in which listed chemical prices have moved up relatively modestly. According to Labor Department data, the price index for plastics resins and materials moved up 4.1% between December 1972 and December 1973. For chemicals and allied products the gain was 4.9%. Of course, the "gray market" price for resins and many other chemical products has been spiraling upward for some months.

Among the recent price moves Monsanto has posted increases of 5 cents a pound on bulk shipments of polystyrene resins, and increases of 4 cents a pound on bulk acrylonitrile-butadiene-styrene (ABS) and styrene-acrylonitrile (SAN) resins. New price for general-purpose polystyrene is 19 cents a pound. Truckload quantities of ABS resins now range from 32 to 45 cents a pound, and SAN in truckload bags is 27 cents a pound. Monsanto says that "these increases are consistent with the Cost of Living Council action of Jan. 30" and reflect increased cost of raw materials, energy, and distribution, among other factors.

Dow, citing reasons much the same as Monsanto's, has raised the price of its general-purpose polystyrene from 17 to 26 cents a pound. ABS and SAN now go for 32 cents a pound, up from 23.5 and 24 cents a pound. Price of high-density injection- and blow-molding polyethylene was increased from 14.5 to 18.5 cents a pound. Dow's low-density film-grade polyethylene is now 17 cents a pound, up from 13 cents. The company says that these new prices still do not match those of the world market but should help it compete on the world market for petrochemical feedstocks.

Carbide's new prices for high-density injection- and blow-molding polyethylene are the same as Dow's, but its low-density film grade is a bit higher at 18.5 cents a pound. SAN is now 28 cents a pound, up from 22 cents, while high-impact polystyrene increased from 16.5 cents a pound to 21.5 cents a pound. Carbide raised the tab on its polyvinyl chloride resin suspensions by 5 cents bringing the

Letters

Chasing rainbows?

SIR: Once more we are regaled by the report of a committee composed—“as usual”—of leading educators—that of the Panel on Alternate Approaches to Graduate Education (C&EN, Dec. 24, 1973, page 35). I feel at a great disadvantage in having only the C&EN report in front of me but the necessity of making at least some reply before, hopefully, this report follows others into oblivion, mandates a quick (and mercifully brief) comment.

Once more the universities are being told that they must buckle on their soup kitchen aprons and save society! Let's make sure that we train these students in all those things which this panel *thinks* society wants and yet we of the universities are so ill qualified to do! The list of shibboleths is breath-taking: “enhance preparation for problem solving,” “increase the breadth of students' outlooks,” “make them aware . . . of industry” (Do I get cucumbers from sunshine or sunshine from cucumbers? I always forget!)—away with discipline-oriented attitudes (!)—“reorient themselves to fulfill a pivotal role in societal planning” (I enjoyed that one!), “too many overtrained students” (whatever that means!), “each major discipline . . . re-examine its . . . aims and social uses,” “preferential treatment to groups hitherto discriminated (unfairly?) against” (Dr. Page's pronouncements on that question in column 3 of page 36 were sophistry of a high order). Need I continue?

One might seriously ask many questions but surely the first one is whether, perhaps, we have not already chased too many rainbows and whether each of us individually and departmentally should not simply ask ourselves whether we have not already strayed too far from our field of competence and expertise, that of educating students to think in chemical terms.

The hilarity engendered by the metaphor (?) at the end of the article prompted me to recall that, no doubt apocryphal, story about the great leader (or was it a committee?) who, having exhorted his followers on to greater things replied to the anguished question of “but what should we do” with the ringing phrase “EVEN MORE!”

Thomas M. Dunn
Professor of Chemistry, University of Michigan, Ann Arbor, Mich.

More on petrochemicals

SIR: The Jan. 7 issue of C&EN (page 5) quotes the Shah of Iran as saying, “You cannot get petrochemical products from atomic energy.” Most of your readers will realize that statement is not quite correct. Mineral oil, the Shah's oil, is basically a grand mixture of hydrocarbons. Give time, stone as a source of carbon, e. CO₂, water as a source of hydrogen via electrolysis, heat and electrical energy from nuclear power plants and some selected catalysts, the chemical industry can produce hydrocarbons as desired. Coal may now be a cheaper source of carbon than limestone and can yield either carbon monoxide or

dioxide, or carbon monoxide and hydrogen with addition of water, without nuclear energy.

My point is that production of petrochemicals is possible without natural oil or gas, and even without coal given nuclear energy. The process is just one of energy conversion. The cost of hydrocarbons via this route sets an upper limit, in the long run, on the price of oil. That upper limit is probably not as much above the present price for oil as many would imagine. Much further along the road, an upper limit on the price of uranium is in turn set by the cost of recovery from the Gulf Stream for example, and doesn't frighten me at all.

I do agree with the Shah in the sense that an overall systems approach to oil consumption should be taken, and the best use be made of this nonrenewable resource. However, I remember two lines from my first chemistry textbook, authored by Prof. Cornish, “You can make anything from a salve to a star, if you only know how from black coal tar.” The textbook was written before Chadwick proposed the existence of the neutron, and before oil was a commodity in the Middle East.

Deep River, Ont.

W. H. Stevens

Use your right to vote

SIR: I am in accord with your editorial concern about the lack of votes sent in by ACS members in various elections and other matters where voting of the membership is concerned.

How about increasing the membership charges for those members who can't muster enough energy to vote? As an alternate, give reduced rates to those who are sufficiently interested in the Society to utilize their voting rights. That should gather a few more votes.

R. W. Curtis

Commercial Development Dept., Cincinnati
Milacon, Cincinnati, Ohio

No asbestos here

SIR: I would like to point out that on page 19 of your Dec. 10, 1973, issue of C&EN, under the article “Asbestos health question perplexes experts,” you have published a picture of a cement worker shaking out a bag of Utility Cement, which happens to be an insulating cement manufactured by C-E Refractories. We have not used asbestos in this product since early 1972, and we certainly don't appreciate the implication that this product is one that is dangerous to workers.

In the future, I would suggest that before using proprietary items in your articles you check with the manufacturer as to contents of materials, particularly in such sensitive areas as asbestos.

R. T. Hegeman

President, C-E Refractories, Valley Forge, Pa.

Yes, Dominique, there are . . .

SIR: Yes, Dominique, in spite of all rumors to the contrary, chemists are people (C&EN, Feb. 4, page 3). Some of us love the beauty of sun, stars and wind; some of us even write poems about sunsets.

A long time ago it was shown that there is a positive correlation between all human excellencies if you are willing to accept large feet as an excellency. So chemists, who are well above average in intelligence, are also musical, good kind, and great people in general—with a few exceptions.

H. B. Hass

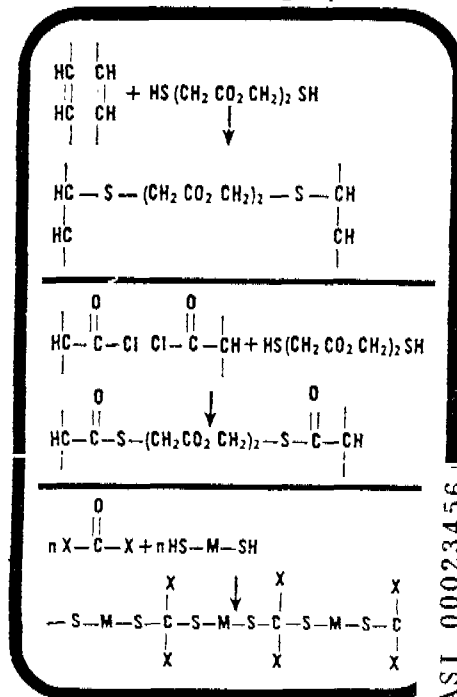
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