

Letters

NIOSH on vinyl chloride

SIR: "The May 20 issue of C&EN (page 16) says in an article on vinyl chloride, "A major question mark concerns what was said by MCA to the National Institute for Occupational Safety and Health in July 1973 and earlier."

A review of NIOSH records and staff notes discloses the following pertinent information concerning NIOSH's earliest knowledge of the possible effects upon animals and workers exposed to vinyl chloride:

1. On Jan. 30, 1973, NIOSH published in the *Federal Register* a request for information on potential hazards associated with occupational exposure to 23 chemical substances and physical agents. Vinyl chloride was among these; all were taken from the top of the NIOSH 1972 priority list.

Three responses on vinyl chloride were received. MCA, in a letter dated March 7, 1973, forwarded its recommended precautionary label as taken from MCA's Chemical Safety Data Sheet SD-566. There was no mention of toxic effects upon animals or workers.

(The second and third responses, dated March 16, 1973, and May 3, 1973, respectively, were provided by a mine safety appliance firm and an industrial safety equipment trade group. Neither dealt with toxic effects upon animals or workers.)

2. On July 17, 1973, I and several members of my staff met at MCA's request in the Parklawn Building with an MCA delegation which included representatives of Imperial Chemical Industries, Ethyl Corp., Dow Chemical, and Union Carbide.

3. At this meeting, the ICI representative critically reviewed the work of Prof. P. L. Viola. The representative pointed out that the tumors Viola had induced at very high levels of vinyl chloride were of the Zymbal gland or Zymbal gland tumors metastatic to other sites, and not primary lung tumors as Viola had interpreted.

The ICI representative also reported an uncompleted, industry-sponsored study of several rodent species at more reasonable levels of vinyl chloride. He said that several tumors interpreted as confirmation of Viola's work had been observed. NIOSH asked MCA to keep NIOSH advised of progress with the MCA study.

4. At this meeting, there was no mention of angiosarcoma of the liver in humans or animals, no reference to production of liver tumors in animals by another Italian investigator, and no reference to Prof. Cesare Maltoni by name.

5. On Jan. 22, 1974, NIOSH received word from B. F. Goodrich Co. of three deaths from angiosarcoma of the liver among employees of the Goodrich plant in

Louisville. On the same day, the MCA representative for the first time informed NIOSH of Prof. Maltoni's studies and preliminary results. NIOSH promptly sent a team to Louisville to investigate.

Obviously, this pertinent information contradicts a statement issued recently in Great Britain by the Chemical Industries Association that NIOSH was told of Prof. Maltoni's observations of angiosarcoma of the liver in mid-1973. NIOSH did not know in January 1973; NIOSH was not told in July 1973; and NIOSH learned only after three deaths from angiosarcoma of the liver were reported in January 1974.

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Something to think about

SIR: Your recent article "NAS profiles Ph.D. jobs, salaries in 1973" (C&EN, May 6, page 18) reminded me of your remarkable article "Employers tell how they avoid layoffs" (Dec. 3, 1973, page 13). It also reminded me of a letter in your columns (which I will never forget), which said: "To become unemployed means to die."

When I discussed this important subject with friends, someone remarked: "The elimination of layoffs is impossible in a capitalistic system. It can be achieved only in a totalitarian economy." This widely held tenet is contradicted by a number of large and not-so-large firms in the U.S. which manage to avoid dismissals by "good management practices." Japan is a good example where a job means lifetime employment. It would be difficult to deny that the Japanese have a very successful capitalistic economy. During the recent energy crisis they were hit much harder than we, yet they did not dismiss any of their employees. If they can manage it as a nation, why couldn't we do it?

I am wondering whether companies that lay off their employees at a decline of sales realize the disturbing psychological effect on the morale of their work force. It is well known that the most valuable asset of every firm is the loyalty of its employees.

Apart from such considerations which are of primary importance for the lasting financial success of a firm, there is another ethical aspect. To throw out a man on the street who worked loyally for years is not a very nice thing to do. As a matter of fact, it is pretty terrible and no self-respecting company should do it.

Not long ago, a civic-minded organization helped the families of inmates at a Minnesota state penitentiary. A released prisoner, who had just completed an 18-year term, declared: "If the community had shown this much interest in me when I was a teenager, I probably wouldn't have wound up in prison." Something to think about. The sooner we realize that we are our brothers' keepers, the better for us.

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Date 6/12/74

Gordon, H. L., 2030
Langner, R. R., 607
Oelfke, K. H., Freeport
Rausch, D. A., 2020
Roberts, D. J., 2030

Blair, E. H., 2020
Gehring, P. J., 1803

Hoerger, F. D., 9008
Rowe, V. K., 1803

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9008

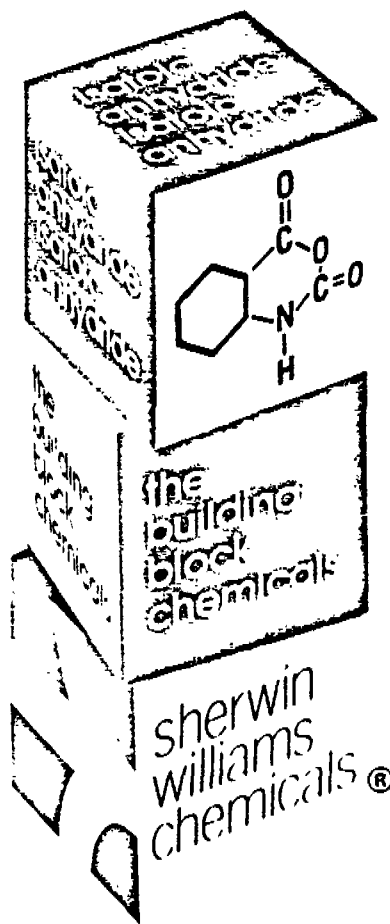
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R&S 104462



U.K. DISASTER HURTS CAPROLACTAM SUPPLY

R&S 104463

Tragedy struck Nypro's caprolactam operations at Flixborough in the U.K. June 1, when an explosion almost completely demolished production units there, resulting in a loss of 28 lives. Fire raged out of control for several days and many houses near the site were damaged. Financial losses may be as high as \$100 million.

Nypro, owned 55% by DSM of the Netherlands and 45% by the U.K.'s National Coal Board, had a total annual caprolactam capacity of nearly 75,000 metric tons. Because the company was the only British producer of the product, the blast will seriously affect the country's nylon 6 plastics and fibers industries. All raw material for nylon 6 now will have to be imported, and caprolactam supplies are already tight the world over. The accident also will affect fertilizer supplies; about 190,000 metric tons per year of by-product ammonium sulfate were produced in the Flixborough operation. Indications are that Nypro will rebuild, but a new plant is not likely to be completed for at least two years.

Two caprolactam units were located at Flixborough. The newest one, a 50,000 metric-ton-per-year plant costing about \$60 million, started up less than a year ago (C&EN, July 23, 1973, page 7). It was based on an improved process, tradenamed HPO (for hydroxylamine phosphate oxime), developed by DSM's engineering subsidiary, Stamicarbon. DSM's wholly owned U.S. subsidiary, Nipro, Inc., has a 75,000 metric-ton-per-year caprolactam plant at Augusta, Ga., which uses the HPO process. It will double capacity there by late 1976 or early 1977.

It's still not clear what went

wrong at Flixborough. Leslie Granger, Nypro's chairman, thinks the explosion might have involved the highly explosive initial air-oxidation step, in which cyclohexane is converted to cyclohexanone. But nobody can explain how the explosion and fire could have spread throughout the entire plant in a few seconds unless a conjunction of circumstances led to the disaster. The only part of the plant still intact, though badly damaged, is that in which cyclohexanone is converted to caprolactam by the HPO process. That leads one DSM observer to guess that that part of the operation didn't trigger the accident. He also points out that the HPO process has been used by Japan's Ube Industries without any problems for the past two years or so.

British nylon 6 makers are still uncertain about how severely they will be affected by the sudden cutoff of a major portion of their feedstock. The U.K. consumes 5000 metric tons of nylon 6 polymer annually for plastics production. Courtaulds and British Enkalon, the two major producers of nylon 6 fibers, between them make about 116 million pounds of that product, and plant expansions now under way should raise their combined capacity to about 140 million pounds per year in 1975.

The British blast could affect U.S. caprolactam supplies. Nipro vice president Clem White says DSM in the Netherlands is looking into the possibility of shipping caprolactam from the U.S. to the U.K. "We would certainly exert every effort to be helpful to customers of Nypro in Great Britain," he tells C&EN.

Such help could worsen the current caprolactam shortage in the

U.S., where Nipro already has customers on allocation. Although Mr. White agrees that sending caprolactam to Europe would present problems, he adds that the raw materials pinch, which has cut into production, seems to be easing.

The two other U.S. producers of caprolactam, Allied Chemical at Hopewell, Va., and Dow Badische at Freeport, Tex., both have current capacities about double that of Nipro. Both also are expanding their plants. Allied's output is now entirely for captive use. One U.S. market observer, however, thinks DSM will be able to scrape up enough production from the other worldwide plants in which it has an interest to meet the needs of the British market.

EPA asks emission data on vinyl chloride

The Environmental Protection Agency has requested 27 U.S. chemical companies that make vinyl chloride and polyvinyl chloride to provide the agency with "process, emission, and air quality data" on 49 plants by June 14.

In letters to manufacturers dated May 30, EPA says it wants the information "for possible use in the development of air pollution control standards for vinyl chloride in accordance with the Clean Air Act of 1970." At present, no federal air pollution control standards exist for vinyl chloride.

Meanwhile, EPA has been taking samples for the past month near 14 plants to determine amounts of the gas present in ambient air. Public disclosure of EPA's findings is imminent. These findings probably will show existing vinyl chloride ambient air levels near plants to be higher than the levels the Occupational Safety and Health Administration has proposed for inside plants. A likely outcome of all this is that EPA will set an air quality standard near to or identical with the OSHA in-plant standard of "no detectable level."

EPA also wants ambient air quality data collected by the manufacturers near 14 vinyl chloride and 35 PVC plants. Further, EPA wants the manufacturers to identify in each of their plants "emission

Financial loss from blast at Nypro caprolactam works may reach \$100 million



points in the manufacturing process and the amounts lost from these points" and "emission control procedures that have been or could be instituted and an evaluation of their effectiveness." And EPA wants "cost and economic data, including the capital and operating costs for each emission control device or procedure." For instance, in the economic data category, EPA wants information such as total investment cost, cost of installation, and operating and maintenance cost including details on labor costs, capital charges, cost of utilities used, fuel costs, and costs of chemicals and other materials. And, the agency requests the companies "give amount and value of any material recovered, both annually and per unit of production."

EPA authority to require submission of such information is contained in section 114 of the Clean Air Act of 1970, which authorizes the agency to "secure any information deemed necessary for development of standards." The agency's letter points out that any information supplied will be made public "unless a satisfactory showing has been made" to the EPA administrator that "the release of the information obtained would divulge a trade secret." In any event, EPA says that emission data "will always be available to the public." And it warns that information cannot be withheld because a manufacturer considers the information to be confidential.

High court reaffirms equal pay for women

The Supreme Court may have written the final chapter to the long fight to obtain equal pay for equal work regardless of sex. Last week in a five-to-three decision, the court found that the Equal Pay Act of 1963 "is broadly remedial, and it should be construed and applied so as to fulfill the underlying purposes which Congress sought to achieve." The court rules that the act's objective in cases where depressed wages are due to discrimination "is not to drag men workers to the wage levels of women, but to raise women to the levels enjoyed by men." This must be done not only as a matter of simple justice to employees, but also as a matter of market economics since wage discrimination on the basis of sex constitutes unfair competition.

A Labor Department official tells C&EN that the ruling will have a

"tremendous impact" on the whole spectrum of pay discrimination cases, since the ruling affirms that there "just cannot be any discrimination" in this area. He further speculates that the decision will impel many employers who had been dragging their heels to begin looking seriously at their practices in this area.

The decision came in a case brought by the Labor Department against Corning Glass Works, charging them with violating the act by maintaining wage differentials that had their origin in the 1920's between day and night shift inspectors. At that time women day-shift inspectors were earning 20 to 30 cents per hour, but men performing the same work at night had to be paid 53 cents per hour to do what was regarded as "women's work."

The court further ruled that Corning did not achieve full compliance with the act in 1966 when it opened the higher paying night jobs to women, nor in 1969 when the company equalized future pay scales but maintained wage preferences for employees already enjoying them.

Albert Plant named editor of C&EN

Albert F. Plant has been appointed editor of *Chemical and Engineering News*. He comes to this position from *Industrial Research*, with

which he has been associated since 1968, having been editor since 1972.

Mr. Plant is a graduate in chemistry from Carnegie Institute of Technology and also holds a degree in industrial management from Carnegie. He began his professional career in 1954 with Shell Chemical in Houston, Tex. From 1960 to 1965 he worked with Fisher Scientific in product development and instrument design, after which he became director of research for Kontes Glass, a position he held until joining *Industrial Research*. In addition to his editorship, he was responsible for direction of the IR-100 conference and award competition.

Mr. Plant will assume the editorship of C&EN June 24. He replaces Patrick P. McCurdy, who resigned November 1973 to become editor-in-chief of *Chemical Week*.



Goodyear, Tosco team to recycle scrap tires

Schemes for making use of the 200 million worn-out tires discarded annually in the U.S. have proliferated in recent years—from direct use as offshore reefs for protecting game fish to processing and recovery of the materials in the tires. The latest effort directed toward recovery, revealed last week, teams Goodyear Tire & Rubber with Oil Shale Corp. (Tosco).

The companies are joining in a program to apply Tosco oil shale technology to recovery of energy and re-usable materials from scrap tires. Basically, the program involves further demonstration of scrap tire processing technology that Tosco began developing in 1971 and which it has tested in a 25 ton-per-day pilot plant. A pyrolysis technique, the process involves heating ground-up tires by direct contact with hot ceramic pellets.

In the first phase of the program, Goodyear will supply ground-up waste tires to Tosco's Rocky Flats research center near Golden, Colo. The companies will carry out economic feasibility evaluations, compiling data on the cost of building and operating a recovery system and evaluating the quality of recovered products. The program, the companies say, is expected to lead to commercialization.

According to Goodyear chairman Charles J. Pilliod, Jr., a full-scale scrap tire recovery plant could handle 8 million scrap tires a year and recover enough petrochemicals and other materials to build an additional 2 million tires. Such a plant has the potential for annually turning out 15 million gallons of oil, 73 million pounds of carbon black, and 2 million pounds of steel. The oil, he says, could be further refined.

A major factor most likely on the list of items to be investigated is whether the quality of recovered carbon black is good enough for the material to be useful. Carbon black has been something of a stumbling block in the economics of some recovery schemes proposed by others, since the costs made recovered material economically unattractive, compared to virgin carbon black. However, the new economic climate being created by changes in fuel and feedstock availability and prices should enhance the economics of recovered materials. For example, carbon black users face the threat of substantially higher prices as well as shortages (C&EN, June 3, page 12).

R&S 104464

Vinyl chloride cancer controversy continues

MCA and NIOSH apparently are at odds on disclosure of Italian research results linking vinyl chloride exposure to tumors in rats

More information has emerged on the "confidentiality" of an Italian animal toxicity study that helped link vinyl chloride exposure to deaths among U.S. polyvinyl chloride workers from a rare, invariably fatal form of cancer, angiosarcoma of the liver. C&EN, in its May 20 issue, said that "preliminary, albeit significant scientific findings" from the Italian work had been held in confidence by U.S. and European chemical firms and a U.S. trade association for at least a year (C&EN, May 20, page 16).

A spokesman for the National Institute for Occupational Safety and Health firmly denies that agency officials had knowledge of the studies of Prof. Cesare Maltoni, director of the Istituto Di Oncologia, Bologna, Italy, prior to learning of the deaths of U.S. workers from this rare cancer on Jan. 22, 1974. (See also letter by NIOSH director Marcus M. Key, page 3.)

However, the Manufacturing Chemists Association, in a "vinyl chloride chronology" released last month, states that during its meeting at NIOSH on July 17, 1973, "a representative of the European group (a physician), reporting on the European studies, said that tumors had been observed in rats down to 250 p.p.m., but that an epidemiological survey had indicated no increase in gross mortality from cancer and no increase in cancer morbidity or incidence of cancer among workers exposed to [vinyl chloride]." MCA does not identify the sponsor of the epidemiological survey, nor the physician. The sponsors of Prof. Maltoni's study are Montedison, Imperial Chemical Industries, Solvay, and Rhône-Progil.

Presumably, the tumors at the level of 250 p.p.m. vinyl chloride in air were from rats in Prof. Maltoni's study. MCA's chronology also notes that "a further progress report of Prof. Maltoni's studies was given to MCA by a European group representative" on Nov. 28, 1973. According to MCA, "Results confirmed earlier observation of malignant tumors in rats at 10,000, 6000, 2500, 500, and 250 p.p.m. [vinyl

chloride], but not at 50 p.p.m." (MCA's emphasis). These exposure levels agree with those from Prof. Maltoni's paper discussed before the Occupational Safety and Health Administration on Feb. 15, 1974 (C&EN, Feb. 25, page 16).

MCA's chronology states, "While it had been recognized for decades that exposure to high concentrations of vinyl chloride ... might cause liver and kidney injuries, the U.S. chemical industry was not aware of any cancer-related potential of [vinyl chloride] until May 1970." Such a potential was then suggested through the research of Dr. P. L. Viola, of Regina Elena Institute for Cancer Research in Rome, Italy.

A preliminary report of Dr. Viola's studies was made during the 10th International Cancer Congress in Houston, Tex., May 22-24, 1970. Subsequently, the research was published [*Cancer Res.*, 31, 516 (1971)]. In this published account, Dr. Viola reported tumors of the skin, lung, and bones in rats exposed to 30,000 p.p.m. vinyl chloride for four hours a day, five days a week, for 12 months.

MCA invited Dr. Viola to come to the U.S. "as a guest of the industry" to discuss his results with the trade association's occupational health committee on May 5 and 6, 1971. During these meetings, Dr. Viola is said by MCA to have referred to other studies that, according to the trade association's statement to OSHA on Feb. 15, 1974, were "completed or under way." MCA at this hearing further stated that Dr. Viola at the MCA meeting "declined to reveal details" of these unreported studies.

In any event, on May 6, 1971, MCA's occupational health committee recommended that U.S. vinyl chloride and polyvinyl chloride producers sponsor animal exposure and epidemiological research on vinyl chloride carcinogenicity to be administered by MCA, according to the chronology.

The chronology then traces MCA efforts to learn more of the other studies under way and to plan its own studies. Among the highlights (supplemented here, in part, by MCA's Feb. 15 statement to OSHA):

- At a Nov. 16, 1971, meeting in Washington, D.C., which included representatives of U.S., Canadian, and European firms, a "European representative of Solvay et Cie. reported that he was aware of further studies just beginning in Europe."

- On March 30, 1972, "Seventeen

U.S. firms had agreed to financially support [vinyl chloride] studies."

- During April-June 1972 "overtures were made by MCA to establish technical liaison with the new European research mentioned at the Nov. 16, 1971, meeting in Washington."

- A letter dated Aug. 16, 1972, "sent on behalf of the European sponsors," was received by MCA. The letter, MCA says, offered "technical cooperation" subject to a confidentiality restriction whereby there was to be no release of information outside of individuals comprising a task group "without the specific consent of the European group." MCA adds that the "purposes" of the restriction were "that preliminary indications not be released until they had been validated, thereby to minimize unwarranted speculation" and "that releases remain subject to the control of the project's proprietors."

- During December 1972, in an MCA "communication" to a European group representative, MCA and participating U.S. firms agreed "with great reluctance" to confidentiality.

- On Jan. 17, 1973, the U.S. vinyl chloride-polyvinyl chloride industry technical delegation "visited the European sponsors and Prof. Maltoni's facilities to learn in more detail about his experimental procedures and results."

- At a Jan. 30, 1973, MCA meeting, "a brief oral progress report on Prof. Maltoni's work was presented by those who had visited him. It was reported that, in experiments with rats, in addition to tumors of the ear canal, tumors of the kidney and liver were observed at concentrations as low as 500 and 250 p.p.m. [vinyl chloride], but not at 50 p.p.m. nor in the controls."

- MCA-administered animal toxicity and human epidemiological studies were contracted for subsequently.

Prof. Maltoni's rat studies resulted in the observation of the first angiosarcoma of the liver during August 1972, he has disclosed. The scientist is also said, by U.S. sources, to have discussed his results during the Second International Symposium on Cancer Detection and Prevention, April 9-12, 1973, in Bologna, Italy. A preprint of his results is said to be available.

The July 17, 1973, meeting with NIOSH officials included representatives of MCA, Union Carbide, Dow Chemical, Ethyl Corp., and Imperial Chemical Industries, the trade association has acknowledged.