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MANUFACTURING CHEMISTS ASSOCIATION

1825 CONNECTICUT AVENUE, N.W. WASHINGTON, D.C. 20009 (202) 483-6126

June 16, 1975

RECEIVED

JUN 30 1975

R. N. WHEELER, JR.

TO: Technical Panel on Vinyl Chloride Research

SUBJECT: Enclosures with Minutes of May 22 Meeting.

1. Response to May 16, 1975 "Science" article - letter of Mr. A. C. Clark to editor, June 2.

2. Experimental design changes with letter to Dr. Torkelson May 6, 1975 from Dr. Hehir, Consumer Product Safety Commission.

3. "Angiosarcoma of the Liver in Vinyl Chloride/Polyvinyl Chloride Workers" by J. W. Lloyd, Sc.D., Journal of Occupational Medicine, Vol. 17, No. 5, May 1975. (Courtesy of Dr. Torkelson)

4. NIOSH Tables dated April 10, 1975 I, "Report d Cases of Angiosarcoma of the Liver Among Vinyl Chloride Polymerization Workers," and II, for non-polymerization workers received via Dr. Mayo Smith.

5. Letter from Dr. D. I. Mount, Environmental Protection Agency, May 19, 1975 to M. Freifeld on aquatic studies with VCM.

Sincerely,

Milton Freifeld

Milton Freifeld
Project Manager

MF/etv

Attachments

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MANUFACTURING CHEMISTS ASSOCIATION

1825 CONNECTICUT AVENUE, N. W. WASHINGTON, D. C. 20009 (202) 483-6126

ALBERT C. CLARK
VICE PRESIDENT
TECHNICAL DIRECTOR

June 2, 1975

Philip H. Abelson, Editor
"Science"
1515 Massachusetts Avenue, N. W.
Washington, D.C. 20005

Dear Dr. Abelson:

The Edsall article, "Scientific Freedom and Responsibility" (J. T. Edsall, "Science," May 16, 1975) requires comment. I presume Dr. Edsall is not responsible for the content of the article, but merely prepared it from the AAAS committee report. However, scientific freedom and responsibility are as important for AAAS committees as they are for other scientists. The "case of data suppression concerning the carcinogenicity of vinyl chloride" (pg. 690) is a melange of omissions and untruths inconsistent with scientific freedom and responsibility. Since so much pertinent information has been omitted concerning this matter readers may be misled into believing Dr. Edsall's report.

Edsall states that, "up to that time (May 1970) there had apparently been no research in the plastics industry concerning the possible hazards of vinyl chloride...". This is untrue. In fact, the basic published data on vinyl chloride toxicity came from American industry. (references 1-7) The information in references 4, 5, 6, and 7 had been publicly disclosed and presented prior to their publication dates. Furthermore, the investigations of Dr. P. L. Viola and Dr. Maltoni have been supported by European industries.

Edsall correctly states that Manufacturing Chemists Association (MCA) member companies entered into an agreement with the European sponsors of Maltoni's work not to reveal preliminary Italian data. The agreement was not dissimilar to that between American sponsors (Government, Industry, and Academic) and research institutions that new data remain the property of the institution and not be disclosed until the study is completed and evaluated prior to disclosure of final results in proper scientific channels. There was no intention to withhold adverse data. Under MCA rules, all data developed under its auspices must be promptly reported publicly. Without exception, this has been done with all data on vinyl chloride.

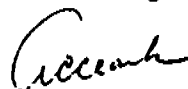
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U. S. Government scientists knew of Maltoni's preliminary results early in 1973 but considered it as preliminary as did U. S. industry. At the Second International Symposium on Cancer Detection and Prevention in Bologna, April 9-12, 1973, Dr. Maltoni showed a table of preliminary results linking vinyl chloride with cancer formation⁸ (not published until 1974). Dr. Umberto Saffiotti, Associate Director of Carcinogenesis, National Cancer Institute, was present at the meeting and subsequently discussed the results with Maltoni at his Italian laboratory.⁹ Saffiotti felt that the work needed to be included in "a well documented report" to be assessed by the World Health Organization (Review Panel of the International Agency for Research on Cancer of which the United States is a member). This committee also considered Maltoni's data preliminary at that time and "decided to postpone compilation of the definitive review to the next meeting of the committee."⁹

Following a period in which epidemiological and animal studies were being established, MCA on April 17, 1973 asked the Europeans to jointly make presentations to United States and European Government authorities. The Europeans readily agreed, and on June 15, 1973 MCA called the National Institute for Occupational Safety and Health (NIOSH) and requested an opportunity to bring new information to that agency's attention. The appointment was set by NIOSH for July 17. Five European and American industry representatives presented to NIOSH the information that tumors had been observed at concentrations below that reported by Viola. At that time, human cases had not been reported; therefore, no special significance could be attached to the types of tumors observed by Maltoni.

The MCA suggested label referred to by Edsall was illustrated in the Chemical Safety Data Sheet (SD56) on vinyl chloride, revised April 1972. Section 10.1 on Health Hazards refers to Viola's published studies. The Data Sheet states "Recent research studies reported from Italy indicate that repeated, long-term high level exposures of rats to vinyl chloride monomer vapor can result in the development of malignant tumors. However, many years of industrial experience with human exposures to concentrations frequently far above current standards have not demonstrated any carcinogenicity to humans." Thus the statement by Edsall that MCA "...appears to have deliberately deceived NIOSH regarding the true facts." is inaccurate and misleading.

Sincerely,



References:

- (1) Torkelson, T. R., F. Oyen, and V. K. Rowe. The toxicity of vinyl chloride as determined by repeated exposure of laboratory animals. American Industrial Hygiene Association Journal, 22(5), 354-361. 1961.
- (2) Wilson, R. H., W. E. McCormick, C. F. Tatum, and J. L. Creech. Occupational Acroosteolysis, report of 31 cases. The Journal of the American Medical Association, 201(8), 577-581. 1967.
- (3) Baretta, E. D., R. D. Stewart, and J. E. Mutchler. Monitoring Exposure to vinyl chloride vapor: breath analysis and continuous air sampling. American Industrial Hygiene Association Journal, 30, 537-544. 1969.
- (4) Dinman, B. D., W. A. Cook, W. M. Whitehouse, H. J. Magnuson, and T. Ditchek. Occupational Acroosteolysis: I. An Epidemiological Study. Archives of Environmental Health, 22, 61-73. 1971.
- (5) Cook, W. A., P. M. Giever, B. D. Dinman, and H. J. Magnuson. Occupational Acroosteolysis: II. An Industrial Hygiene Study. Archives of Environmental Health, 22, 74-82. 1971.
- (6) Dodson, V. N., B. D. Dinman, W. M. Whitehouse, A. N. M. Nasr, and H. J. Magnuson. Occupational Acroosteolysis: III. A clinical study. Archives of Environmental Health, 22, 83-91. 1971.
- (7) Kramer, C. G., and J. E. Mutchler. The correlation of clinical and environment measurements for workers exposed to vinyl chloride. American Industrial Hygiene Association Journal, 33(1), 19-30. 1972.
- (8) Maltoni, C. Occupational Carcinogenesis. Proceedings of the Second International Symposium on Cancer Detection and Prevention. Bologna, April 9-12, 1973. Excerpta Medica, Amsterdam. 1974.
- (9) Hearing before the Subcommittee on Environment of the Committee on Commerce, United States Senate, August 21, 1974, (Serial No. 93-110) on Dangers of Vinyl Chloride, pages 54-56.



MAY 14 1975

U.S. CONSUMER PRODUCT SAFETY COMMISSION

WASHINGTON, D.C. 20207

May 6, 1975

Dr. Theodore R. Torkelson
Corporate Medical Department
The Dow Chemical Company
Bennett Building
2030 Dow Center
Midland, Michigan 48640

Dear Dr. Torkelson:

Thank you for your letter dated April 23, 1975, regarding CPSC's proposed protocol for inhalation studies on vinyl chloride.

As I remember, you have a copy of the original protocol scheduled to be performed at Edgewood Arsenal.

Attached is a copy of the proposed changes. In regard to the schedule, the acute study of 1 hour only with rats and mice and holding for 24 months is now in its second month.

The three generation reproductive studies are now in the 60 day exposure stage.

The sub-acute inhalation stage is entirely new and is just beginning.

If I can be of any further help, do not hesitate to call or write.

Sincerely,

Robert M. Hehir, Ph.D.
Director
Bureau of Biomedical Science

Attachment

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CONSUMER PRODUCT SAFETY COMMISSION

During a visit to Biomedical Laboratory by Drs. McLaughlin and Wyer on 27 March 1975, it was mutually agreed by the contract project officer, Dr. McLaughlin and Dr. McNamara, Edgewood Arsenal Contract Administrator, that the following technical changes would be made in the toxicological testing of Vinyl Chloride monomer:

1. No biochemical or enzymatic work would be performed in the vinyl chloride studies.
2. The three generation reproductive studies will be changed as follows:
 - a. The number of animals per dose will be increased from 10 to 25.
 - b. The exposure concentration and time of exposure will be 50 and 500 ppm, 5 days week/10 weeks.
 - c. The parent generation will be held and observed for 2 years.
 - d. No teratology studies will be performed.
3. A sub-acute inhalation study will be added to the acute work. The exposure schedule is as follows:

Sub-Acute Vinyl Chloride Inhalation Study
(Exposure Schedule)

Dose Level	Species (Strain)	Number Exposed	Frequency of Exposure
50	Rat (Fisher)	180	5 dy/wk - 20 wks
	Mouse (A/J)	180	" "
500	Rat (Fisher)	180	5 dy/wk - 2 wks
	Mouse (A/J)	180	" "
Control	Rat 50 ppm	100	-
	500 ppm	100	-
	Mouse 50 ppm	100	-
	500 ppm	100	-

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The observation and sacrifice schedule is as follows:

Sub-Acute Vinyl Chloride Inhalation Study
(Observation and Sacrifice Schedule)

Dose Level (ppm)	Time of Observation & Sacrifice (Months)					
	8		16		24	
	Rat	Mouse	Rat	Mouse	Rat	Mouse
50	20 20	20 20	20 20	20 20	50 50	50 50
500	20 20	20 20	20 20	20 20	50 50	50 50
Controls						
50 ppm level	10 10	10 10	10 10	10 10	30 30	30 30
500 ppm level	10 10	10 10	10 10	10 10	30 30	30 30
Totals	120	120	120	120	320	320

Total Animals: Rats - 560
Mice - 560

Current Intelligence

Angiosarcoma of the Liver in Vinyl Chloride/Polyvinyl Chloride Workers

In the December, 1974, issue of the JOM (16:809), 26 cases of angiosarcoma of the liver were reported. As of January 22, 1975, 38 cases have been collected. The new data are given in this report.

J. William Lloyd, Sc.D.

On January 22, 1974, the National Institute for Occupational Safety and Health was advised of three deaths from angiosarcoma of the liver at a single vinyl chloride polymerization plant. Since that time, 29 additional cases among polymerization workers in the United States and nine other nations have been reported. Details are given in Table 1.

Review of these cases according to date of diagnosis shows that all but three were diagnosed within the last seven years. Although the cases have clustered since that time, it is probable that the high risk of this disease for polymerization workers might have gone unnoticed except for the observation of a case in 1973 by a plant physician who reviewed earlier records and identified four cases during the prior ten-year period. The difficulty of making an early determination of an association of such a rare disease with an occupational exposure, even when the exposed worker is at very high risk, is also pointed up by the distribution of cases over time. Of the first eight cases diagnosed between 1961 and the end of 1968, six were from four plants in the United States, one was from France, and one was from West Germany.

While an exact estimate of the incidence of liver angiosarcoma among polymerization workers cannot be determined until exposed-to-risk figures become available, it is already apparent that these workers are at very high risk of

Dr. Lloyd is Director, Office of Occupational Health Surveillance and Biometrics, NIOSH, Rockville, Md.

Reprint requests to NIOSH, Rm. 3-10, 5600 Fishers Lane, Rockville, MD 20852

Table 1. — Reported Cases of Angiosarcoma of the Liver Among Vinyl Chloride Polymerization Workers.

Country	Case No.	Birth Date	1st VC or PVC Exposure	DX Angio-Sarcoma	Age At DX	Yrs 1st Exp To DX	Total Yrs Exp	Date of Death
Canada	01	AWAITING DETAILS						
Canada	02	AWAITING DETAILS						
Canada	03	AWAITING DETAILS						
Canada	04	AWAITING DETAILS						
Czechoslovakia	01	AWAITING DETAILS						
Czechoslovakia	02	AWAITING DETAILS						
France	01*	00-00-00	00-00-00	00-00-00	43	19	19	03-09-67
Great Britain	01*	00-00-01	00-00-46	12-00-72	71	26	20	12-00-72
Great Britain	03	05-00-37	02-00-56	00-00-74	35	8	4	12-24-74
Italy	02*	11-13-29	00-00-57	12-13-72	43	15	6	12-09-72
Norway	01*	12-23-15	03-00-50	12-20-71	56	22	21	01-04-72
Romania	01	AWAITING DETAILS						
Sweden	01*	06-23-27	08-14-51	02-00-70	43	19	18	10-20-70
United States	01*	10-17-23	12-09-48	03-03-73	49	22	16	03-03-73
United States	02*	08-19-33	11-15-55	05-00-70	36	14	13	09-28-71
United States	03*	05-23-15	11-28-45	12-19-73	58	28	28	12-19-73
United States	04*	01-15-24	07-06-52	08-19-67	43	15	15	01-07-68
United States	05*	01-25-12	06-19-44	04-09-64	52	20	18	04-08-64
United States	06*	00-00-29	01-17-62	02-00-74	45	12	12	ALIVE
United States	07*	05-03-22	08-00-44	00-00-68	45	24	18	03-23-68
United States	08*	05-06-20	10-07-46	08-00-61	41	15	15	08-29-61
United States	09*	11-08-31	09-09-54	03-01-74	43	17	17	ALIVE
United States	10*	08-16-13	05-12-51	05-00-68	55	17	17	05-10-68
United States	11*	05-27-09	10-14-46	03-00-70	61	23	23	03-16-70
United States	12*	11-17-18	09-13-49	05-02-69	50	20	15	05-02-69
United States	13*	12-01-21	08-15-44	05-00-74	53	30	30	07-04-74
United States	16*	11-04-27	05-08-50	00-00-60	41	17	4	03-27-69
United States	17	05-06-31	05-23-55	10-11-74	43	19	19	ALIVE
W. Germany	01*	07-28-31	10-14-57	09-25-70	40	11	11	12-14-71
W. Germany	02*	06-24-30	10-01-57	09-19-68	38	13	13	01-25-69
W. Germany	04*	00-00-00	00-00-00	00-00-00	44	17	11	00-00-00
W. Germany	05*	00-00-00	00-00-00	00-00-00	49	11	11	ALIVE
Total Reported Cases: 32								
Median Values:								
15 U.S. Cases					45.0	19.0	17.0	
10 Non U.S. Cases					43.0	16.0	12.0	
25 Total Cases					44.0	17.0	16.0	

* Indicates microscopically confirmed angiosarcoma of the liver
"00" Indicates unknown data.

Table 2. — Reported Cases of Angiosarcoma of the Liver Among Non-Polymerization Workers Exposed to Vinyl Chloride.									
Country	Case No.	Birth Date	1st VC or PVC Exposure	DX Angio-Sarcoma	Age At DX	Yrs 1st Exp To DX	Tot Yrs Exp	Date of Death	
Great Britain	02*	09 08 14	00 00 46	02 09 70	55	24	11	12 00 70	Note 1
Italy	01	05 15 74	00 00 65	04 17 71	36	6	3	04 16 71	Note 2 & 7
Sweden	02*	11 27 11	00 00 45	05 15 72	61	27	23	08 16 72	Note 3
United States	14	00 00 13	03 18 38	06 00 73	60	36	00	07 03 73	Note 4 & 8
United States	15*	00 00 25	00 00 00	07 00 72	47	00	00	02 15 73	Note 5
W. Germany	03*	07 16 30	00 00 00	02 00 68	43	14	14	10 10 73	Note 6

Note 1: Pouring PVC Oil mixture onto fabric bases

Note 2: Production of PVC sacks

Note 3: Production of Vinyl Chloride

Note 4: Machine Operator covering electrical wire with PVC plastic insulation

Note 5: Accountant at plant making PVC fabric

Note 6: Loading pesticide cans with VC propellant

Note 7: Angiosarcoma involving liver, lung, and pericardium. Although difficult to determine, primary site seems to be pericardium.

Note 8: Diagnosis: Sarcoma (possibly "angiosarcoma"), liver. Possibility of generalized neoplasm of the reticuloendothelial cell system cannot be ruled out.

* Indicates microscopically confirmed angiosarcoma of the liver.

"00" Indicates unknown data.

this disease. Approximately 5,600 men are currently employed at 36 facilities in the United States. To date, 15 cases of angiosarcoma of the liver have been reported from four of these facilities, all of which have been in operation for more than 25 years. Nine cases have been reported from a single facility which employs less than 300 workers. A further indication that the earliest cases

are coming from the older plants is seen in the distribution by date of initial exposure. All but one case was initially employed prior to 1958 and more than 70% of the cases were initially employed 20 or more years ago. Since the average latent period from first exposure to diagnosis is about 19 years, we would not expect to see many cases at this time from the newer plants.

Preliminary findings from continuing epidemiological investigations of U S polymerization workers indicate that these men also may be at high risk for other malignant neoplasms, particularly of the brain where a significant excess has been noted.

Details of reported cases of angiosarcoma of the liver among other workers with exposure to vinyl chloride are shown in Table 2. It should be noted that in two of these cases primary angiosarcoma of the liver cannot be definitely confirmed. While too few cases have been reported to draw any definitive conclusions regarding a cause and effect relationship, the age of diagnosis for these cases, which like that for the polymerization workers is considerably lower than that observed for cancer of the liver in the general population, suggests the possibility of a common etiology. It also should be pointed out that with such a rare disease it may be some time before we can determine whether workers exposed to lower levels of vinyl chloride are at excess risk for angiosarcoma of the liver or other malignancies. It is, therefore, imperative that the non-polymerization workers be kept under continued surveillance.

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NIOSH
April 10, 1975

MAY 28 1975

W. M. SMITH

TABLE I

REPORTED CASES OF ANGIOSARCOMA OF THE LIVER AMONG
VINYL CHLORIDE POLYMERIZATION WORKERS

COUNTRY	CASE #	BIRTH DATE	1st VC or PVC EXPOSURE	DX ANGIO-SARCOMA	AGE AT DX	YRS 1st EXP TO DX	TOT YRS EXP	DATE OF DEATH
Canada	01*	AWAITING DETAILS						
Canada	02*	AWAITING DETAILS						
Canada	03*	AWAITING DETAILS						
Canada	04*	AWAITING DETAILS						
Canada	05*	AWAITING DETAILS						
Canada	06*	AWAITING DETAILS						
Canada	07*	AWAITING DETAILS						
Canada	08	AWAITING DETAILS						
Canada	09	AWAITING DETAILS						
Canada	10	AWAITING DETAILS						
Czechoslovakia	01	00-00-28	00-00-57	00-00-73	46	16	16	00-00-74
Czechoslovakia	02	00-00-26	00-00-51	00-00-66	40	15	15	00-00-66
France	01*	04-15-24	01-00-46	02-18-67	43	21	19	02-19-67
Great Britain	01*	00-00-01	00-00-46	12-00-72	71	26	20	12-00-72
Great Britain	03	06-00-37	02-00-66	00-00-74	38	8	4	12-24-74
Italy	02*	11-13-29	00-00-57	12-13-72	43	15	6	12-00-72
Norway	01*	12-23-15	03-00-50	12-20-71	56	22	21	01-04-72
Sweden	01*	06-23-27	08-14-51	02-00-70	43	19	18	10-20-70
United States	01*	10-17-23	12-09-48	03-03-73	49	22	16	03-03-73
United States	02*	08-19-33	11-15-55	05-00-70	36	14	13	09-28-71
United States	03*	05-25-15	11-28-45	12-19-73	58	28	28	12-19-73
United States	04*	01-15-24	07-06-52	08-19-67	43	15	15	01-07-68
United States	05*	01-25-12	06-19-44	04-09-64	52	20	18	04-09-64
United States	06*	00-00-29	01-17-62	02-00-74	45	12	12	ALIVE

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TABLE I (continued)

REPORTED CASES OF ANGIOSARCOMA OF THE LIVER AMONG
VINYL CHLORIDE POLYMERIZATION WORKERS

COUNTRY	CASE #	BIRTH DATE	1st VC or PVC EXPOSURE	DX ANGIO-SARCOMA	AGE AT DX	YRS 1st EXP TO DX	TOT YRS EXP	DATE OF DEATH
United States	07*	05-03-22	08-00-44	00-00-68	45	24	18	03-23-68
United States	08*	05-06-20	10-07-46	08-00-61	41	15	15	08-29-61
United States	09*	11-08-31	09-09-54	03-01-74	43	17	17	03-00-75
United States	10*	08-16-13	06-12-51	05-00-68	55	17	17	05-10-68
United States	11*	05-27-09	10-14-46	03-00-70	61	23	23	03-16-70
United States	12*	11-17-18	09-13-49	05-02-69	50	20	15	05-02-69
United States	13*	12-01-21	08-19-44	05-00-74	53	30	30	07-04-74
United States	16*	11-04-27	05-08-50	00-00-69	41	17	4	03-27-69
United States	17	05-06-31	06-23-55	10-11-74	43	19	19	ALIVE
United States	18	00-00-29	00-00-54	00-00-75	46	21	13	ALIVE
W. Germany	01*	07-26-31	10-14-57	09-25-70	40	13	12	12-14-71
W. Germany	02*	06-24-30	10-01-57	09-19-68	38	11	11	01-25-69
W. Germany	04	09-04-30	04-16-57	00-00-74	44	17	11	11-25-74
W. Germany	05*	04-28-25	02-00-57	07-00-74	49	17	12	ALIVE
W. Germany	06*	01-01-32	07-26-62	00-00-75	43	13	12	01-09-75

Total Reported Cases = 39

Median Values:

16 U.S. Cases	45.0	19.0	16.0
13 Non-U.S. Cases	43.0	16.0	12.0
29 Total Cases	44.0	17.0	15.0

* Indicates microscopically confirmed angiosarcoma of the liver.

"00" Indicates unknown data.

NIOSH
April 10, 1975

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TABLE I.

REPORTED CASES OF ANGIOSARCOMA OF THE LIVER AMONG
NON-POLYMERIZATION WORKERS EXPOSED TO VINYL CHLORIDE

COUNTRY	CASE #	BIRTH DATE	1st VC or PVC EXPOSURE	DX ANGIO-SARCOMA	AGE AT DX	YRS 1st EXP TO DX	TOT YRS EXP	DATE OF DEATH	
Great Britain	02*	09-08-14	00-00-46	02-00-70	55	24	11	12-00-70	Note 1
Italy	01	06-15-34	00-00-65	04-19-71	36	6	3	04-16-71	Note 2 & 7
Sweden	02*	11-27-11	00-00-45	05-15-72	61	27	23	08-16-72	Note 3
United States	14	00-00-13	08-18-38	06-00-73	60	36	00	07-03-73	Note 4 & 8
United States	15*	00-00-25	00-00-00	07-00-72	47	00	00	02-15-73	Note 5
W. Germany	03*	07-16-30	06-09-52	03-00-73	43	21	14	10-10-73	Note 6

Note 1 Pouring PVC oil mixture onto fabric bases

Note 2 Production of PVC sacks

Note 3 Production of Vinyl Chloride

Note 4 Machine operator covering electrical wire with PVC plastic insulation

Note 5 Accountant at plant making PVC fabric

Note 6 Loading pesticide cans with VC propellant

Note 7 Angiosarcoma involving liver, lung, and pericardium. Although difficult to determine, primary site seems to be pericardium.

Note 8 Diagnosis: Sarcoma (possibly "angiosarcoma"), liver. Possibility of generalized neoplasm of the reticuloendothelial cell system cannot be ruled out.

* Indicates microscopically confirmed angiosarcoma of the liver.

"00" Indicates unknown data.

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MAY 22 1975



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

NATIONAL WATER QUALITY LABORATORY
6201 CONGDON BOULEVARD
DULUTH, MINNESOTA 55804

May 19, 1975

Dr. Milton Freifeld, Project Manager
Vinyl Chloride Research
Manufacturing Chemists Association
1835 Connecticut Avenue, NW
Washington, D.C. 20009

Dear Dr. Freifeld:

Your letter of May 5, 1975 to Dr. Walter Sanders has been referred to me for additional comment, since we have an assignment to examine the toxicity of vinyl chloride to aquatic organisms. At the present time, we have only done an exploratory bioassay at our Corvallis, Oregon laboratory and in that test we did not measure vinyl chloride concentrations, so we do not know what the exposures really were in our test chambers. This is a particularly important question with vinyl chloride, since it doesn't stay in water for very long periods of time, at least according to the chemists.

We are presently trying to negotiate an agreement with Bob Metcalf to prepare some labeled vinyl chloride so that we can make some analyses in these bioassays. At the moment we really do not have any information on vinyl chloride toxicity, but we hope to have some within the next few months. I would suggest that you contact John Eaton of my staff some time in August or September to ascertain the status of our work by that time.

Very truly yours,

(Signature)
Donald I. Mount, Ph.D.
Director

cc: Mr. Walter Sanders SERL, Athens

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