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MEMORANDUM

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
CENTER FOR DISEASE CONTROL
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH

TO : Mr. Edward Klein
Office of the Solicitor
Department of Labor

DATE: August 22, 1974

FROM : Director

SUBJECT: OSHA Public Hearing on Vinyl Chloride

Enclosed is a review of the Connecticut cases by Dr. Louis B. Thomas, Chief, Laboratory of Pathology, National Cancer Institute, which should be included in the record of the OSHA Public Hearing on Vinyl Chloride.

In accordance with Public Health Service policy, I have blacked out the names of the patients. However, for your purpose it should be sufficient to note that case #5 in Dr. Thomas' memorandum was the accountant at the vinyl cloth plant, and case #6 worked in an electric company applying PVC insulation.

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

Enclosure

URL 17414

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
NATIONAL INSTITUTES OF HEALTH
BETHESDA, MARYLAND 20014

31 July 1974

NATIONAL CANCER INSTITUTE

Dr. Philip Landrigan
Communicable Disease Center
1600 Clifton Road, N.E.
Atlanta, Georgia 30322

Dear Dr. Landrigan:

On July 19th we sent you pathology reports for six of the eight Connecticut cases. Enclosed are reports for the other two patients; [redacted]

After completing the individual reports, Dr. Popper, Dr. Lingeman and I reviewed the eight cases once more in order to make some evaluation about their possible similarity or dissimilarity to lesions seen in VC-PVC workers. Our comments about this are listed below:

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(1) [redacted] We believe the angiosarcoma of the liver of this patient is different from most of the angiosarcomas seen in VC-PVC workers. Sinusoidal dilatation and/or megalocytosis of hepatocytes were not seen. Also there was no hepatic fibrosis similar to that seen in the VC-PVC workers.

(2) [redacted] Carcinoma involving pancreas and liver, possibly primary in the pancreas. We do not have a carcinoma of this type among the known VC-PVC workers whose lesions we have reviewed.

(3) [redacted] The carcinoid type bronchial adenoma seen in the lung of this patient almost surely has no relationship to the hepatic lesions (? hemangiomas) in the liver. We have not seen any bronchial adenomas in the VC-PVC worker sections we have examined.

(4) [redacted] The angiosarcoma in this patient forms capillary, slit-like spaces and replaces hepatic tissues. We only occasionally found this type of histological pattern in the angiosarcomas of the VC-PVC workers and, in those patients, always also found multicentric areas of angiosarcoma with a sinusoidal and/or papillary pattern. We did not see these types of pattern in Mr. Mulloy's section. Thus we do not think his hepatic angiosarcoma is characteristic of the angiosarcomas seen in the VC-PVC workers. Also [redacted]

liver is definitely cirrhotic with large deposits of iron. These features also were not seen in the VC-PVC workers with hepatic fibrosis and with or without hepatic angiosarcomas.

(5) [redacted] We cannot be certain, one way or another, about this case. One histologic feature, i.e. the cells of the angiosarcoma are somewhat "fibroblastic," is dissimilar to angiosarcomas seen in most of the VC-PVC workers. However several other histological features are similar to the VC-PVC workers hepatic lesions; namely, sinusoidal dilatation, tectorial and enveloping features of the sinusoidal lining cells, portal tract fibrosis, and variability in size of hepatocytes. In summary, there are sufficient histological similarities that we cannot exclude this as a so-called "VC-PVC type case."

(6) [redacted] Please refer to the note on our surgical pathology report S74-1506. In brief, we are not completely certain that this is an angiosarcoma of the liver or even a primary sarcoma of the liver. It is not like any of the other tumors we've seen in the livers of VC-PVC workers.

(7) [redacted] The histological features of the hepatic angiosarcoma and portal tract fibrosis seen in this case are similar in nearly all respects to the lesions we have seen in most of the VC-PVC workers' livers.

(8) [redacted] We have reviewed needle biopsies only from this patient's angiosarcoma. The amount of material is insufficient for a definite comparative statement, but we do not see the histologic features which we believe are most characteristic of the angiosarcomas in VC-PVC workers.

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In conclusion we interpret five of these cases as having definite hepatic angiosarcomas and an additional case [redacted] as possibly having a hepatic angiosarcoma. In one patient [redacted] the overall histologic features are the same as or very similar to the hepatic lesions seen in most of the VC-PVC workers. In another case [redacted] there are several similar features and one or two dissimilar features.

We want to emphasize that we do not think there is any single, histological feature either of the angiosarcomas or of the hepatic fibrosis which is pathognomonic of vinyl chloride exposure. For example, all the changes we've seen in the livers of the VC-PVC workers can apparently be produced by exposure to arsenicals. However, certain types of hepatic fibrosis,

sinusoidal dilatation, multicentric angiosarcomas with sinusoidal, papillary and cavernous patterns together with megalocytosis of hepatocytes collectively form a spectrum of hepatic lesions which are "characteristic" of the VC-PVC workers' lesions. It is with these facts in mind that we have attempted to evaluate the Connecticut cases and compare their similarities and dissimilarities with the VC-PVC workers.

Thank you for getting this material for our review. We would like to keep the submitted sections awhile longer in order to take photomicrographs of the various lesions. Also our conclusions about some of these cases might be more definite if we examined additional sections or prepared additional sections and special stains. We will write you later about individual cases which might be studied further.

Sincerely,

Louis B. Thomas, M.D.
Chief, Laboratory of Pathology

URL 17417

June 25, 1974

TABLE 1

CONFIRMED CASES OF LIVER ANGIOSARCOMA AMONG WORKERS EXPOSED TO VINYL CHLORIDE OR POLYVINYL 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
			VC MONOMER PRODUCTION WORKERS					
Sweden	02	11-27-11	00-00-45	05-15-72	61	27	23	08-16-72
			POLYMERIZATION WORKERS					
United States	01	00-00-22	12-09-48	03-00-71	49	22	16	03-03-73
United States	02	00-00-34	11-15-55	05-00-70	36	14	13	09-28-71
United States	03	00-00-15	11-28-45	12-00-73	58	28	28	12-19-73
United States	04	00-00-24	07-06-52	08-00-67	43	15	15	01-07-68
United States	05	00-00-12	06-19-44	04-00-64	52	20	18	04-00-64
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	00-00-31	05-28-45	03-01-74	43	29	17	ALIVE
United States	10	08-16-13	06-00-51	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	05-00-69	50	20	15	05-02-69
United States	13	12-01-21	08-19-44	05-00-74	53	30	30	ALIVE
W. Germany	01	07-26-31	10-14-57	00-00-71	40	14	14	12-14-71
W. Germany	02	06-04-30	10-01-57	00-00-69	39	11	11	01-25-69
Great Britain	01	00-00-01	00-00-46	12-00-72	71	26	20	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
			[illegible] SECONDARY MANUFACTURING					
United States	14	00-00-13	08-18-38	06-00-73	60	36	00	07-03-73
United States	15	00-00-25	00-00-00	07-00-72	47	00	00	02-15-73

Note: '00' indicates unknown date

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