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To Gary Ter Haar

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FROM Theodore J. Benya

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SUBJECT Report on Vinyl Chloride Research Co-ordinators Meeting at MCA , March 21, 1979

DATE Apr. 10, 1979

Attendees:

Z.G. Bell,	PPG
T.J. Benya	Ethyl
W.M. Busey	EPL
W.D. Harris .	Uniroyal
K. Hatfield	Diamond Shamrock
C.A. Hilberger	Air Products & Chemicals
M.N. Johnson	B.F. Goodrich
C.D. Kary	Shell Oil
J. Stafford	Imperial Chemical Industries
T.R. Torkelson	Dow Chemical Co.
M. Utidjian	Union Carbide
R.N. Wheeler	Union Carbide

I. Texas City Brain Tumors

Discussion

According to Dr. Wagoner, Director of OSHA's Office of Carcinogen Identification, vinyl chloride exposure causes a specific brain tumor in humans called glioblastoma multiforme. However, this is the most common single type of primary brain tumor in humans ranging from 40 to 60% of all cases. It is a poorly differentiated, highly malignant astrocytoma (grades III and IV) with unknown etiology. A higher than expected incidence of "glioblastomas" (>60%) has been reported by plants in Texas City, Texas. However, no correlation has been established between VC1 and these cases.

In November 1978, a Union Carbide worker claimed that he contracted a brain tumor from vinyl chloride exposure. To date a total of 21 cases from several plants have been reported as follows:

Union Carbide	11 cases
Monsanto	5 cases
Two unidentified plants	5 cases

EC- 2259

APR 17 1979

Gary Ter Haar/T.J. Benya
VCl Meeting/MCA
April 10, 1979

2

NIOSH has launched an investigation in order to determine the cause. However, these cases did not qualify for the MCA-sponsored epidemiology study conducted by Equitable Environmental Health, Inc., on vinyl chloride exposure of workmen. Of the total sample, 431 were from the Union Carbide Texas City plant and classified as either low, medium, or high occupational exposure to VCl.

Mike Utidjian of Union Carbide stated that neither brain tumors nor hemangiosarcomas have been diagnosed within this sample. Examination of 454 death certificates of Union Carbide employees (retired or employed, not terminated) since 1941 has disclosed 110 deaths due to cancer, which is normal.

However, the frequency of 11 cases of brain tumor at Union Carbide, out of 110 deaths, is approximately 4 to 5 times higher than the normal frequency of 2.14%. Furthermore, seven cases have been diagnosed as glioblastoma multiforme and two additional cases diagnosed as malignant gliomas may be "glioblastomas" according to Utidjian.

In order to obtain further data regarding relative exposures of these cases, I called Mike Utidjian who gave me the following information:

Case	Diagnosis	Position	"Exposure"
1	Glioblastoma	Shipping Clerk	4 years
2	Glioblastoma	Plantwide equipment Oper.	16 years
3	Glioblastoma	Ethylene oxide production Polyethylene production	6 years 19 years
4	Glioblastoma	Polyethylene production Machine shop	2 years 20 years
5	Glioblastoma	Power Plant	17 years
6	Glioblastoma	PVC weighmaster Storeroom	1 year 12 years
7	Glioblastoma	Plantwide laborer	23 years
8	Malignant glioma	Polyethylene production	17 years
9	Malignant glioma	Producer gas	22 years
10	"Brain Tumor"	Ethyl alcohol production H ₂ SO ₄ production	22 years 2.5 "
11	"Brain Tumor"	Instrument foreman Gen'l Maintenance foreman	3 years 28 years

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Recommendations

The MCA-VC1 Research Coordinators made the following recommendations in response to the reported brain tumors:

- 1) Have all brain tissues from rats, mice, and hamsters exposed to vinyl chloride during the I.B.T. inhalation study examined by a neuropathologist.
- 2) Request a written Epidemiology Protocol from NIOSH/OSHA for the Texas City investigation. If acceptable, then MCA would provide NIOSH with the Equitable Environmental Health (EEH) survey data.
- 3) Obtain a commitment from EEH to release the survey data to MCA which J. Wagoner has also been attempting to review.
- 4) Request Gaffey and Tabershaw, now independently employed, to determine feasibility of updating the EEH study in order to correlate brain tumors with relative degree of exposures -- i.e., proportion of VCM, PVC, EDC, PVC dust, PVC emulsion and/or dispersion.

II. PVC Dust

At present, PVC appears to be a problem in a number of European factories. Dr. Stafford presented the following information:

- 1) The French have reported one case of PVC dust-related pneumoconiosis.
- 2) An Italian union-sponsored study reported 24 cases of pneumoconiosis in one or two factories -- denied by corresponding medical directors.
- 3) Dr. C. Wagner of the Medical Research Council, Surrey, England, has been conducting animal experiments to determine whether PVC dust is carcinogenic by injecting PVC into the pleural cavity. He has identified human lung tumors of B.P. factory workers which appear to be associated with PVC dust (identified by a ICI histopathology staining procedure). Wagner is convinced that PVC dust is carcinogenic based upon suggestive data reported by R.J. Waxweiler (Ph.D thesis). Torkelson pointed out that Waxweiler did not establish a correlation between PVC dust and lung cancer; however, Folk reported an increase in lung tumors in PVC plant workers in Louisville not due to VCM.

- 4) ICI has attempted to develop animal models to study the effect of PVC dust, but MRC has not found the designs acceptable.
- 5) ICI is presently sponsoring an Industrial Hygiene survey to determine the effect of PVC dust levels on lung efficiency.
- 6) MRC would like to lower the present PVC dust TLV of 10 mg/m³ to 5 mg/m³. ICI plants are <10 mg/m³; however, an ICI customer using an American process to produce PVC bottle caps exceeds the present TLV.
- 7) Scleroderma cases are on the increase in PVC plants, and achroosteolysis (AOL) is increasing among VCM autoclave workers.

III. Status of Other Vinyl Studies

1) University of Louisville (VC1)

No report; study will be completed this year.

2) CIVO ("Dutch Research Institute")

PVC resin was fed to rats at 0, 1.7, 5.0 and 14.1 mg equivalent of VCM/kg and in corn oil at 300 mg equivalent of VCM/kg.

Angiosarcomas were reported only at the 300 mg level; and hepatocarcinomas at lowest level (1.7 and 5.0).

Brain tumor frequencies do not appear significant.

	Brain Tumors				
	mg VCM/kg				
	0	1.7	5.0	14.1	300
♂	1/80	1/60	2/60	1/80	1/80
♀	0/80	2/60	0/60	0/80	0/80

Feeding will continue at 0.017 and 0.17.

3) BIBRA (British Industrial Biological Research Assoc.)

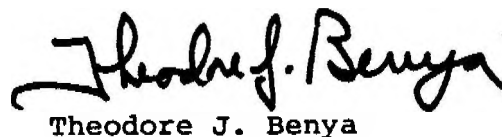
VCM was fed to rats in drinking water. Angiosarcomas were reported only at 250 ppm (equivalent to 14.1 CIVO dose which did not produce angiosarcoma). No tumors reported

Gary Ter Haar/T.J. Benya
VCl Meeting/MCA
April 10, 1979

5

at the two lower levels (2.5 ppm at 25 ppm).

Final report from BIBRA will be available this month.



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EC- 2263