



DEPARTMENT OF HEALTH &amp; HUMAN SERVICES

Public Health Service

Centers for Disease Control  
National Institute for  
Occupational Safety & Health  
Robert A. Taft Laboratories  
4678 Columbia Parkway  
Cincinnati OH 45226-1098

September 29, 1989  
HETA 89-356

Mr. Thomas G. Grumbles, C.I.H.  
Environmental Quality Manager  
Vista Chemical Company  
P.O. Box 19029  
Houston, Texas 77224

Dear Mr. Grumbles:

I am writing in response to your letter of August 24, 1989, requesting a health hazard evaluation at your vinyl chloride monomer (VCM) production facility in Westlake, Louisiana. According to your letter and a subsequent telephone conversation September 5, your request is limited to an evaluation of the occurrence of brain tumors among plant employees.

Information supplied by you and by Vista's corporate physician, Dr. J.R. Drumwright, indicated that one current employee has a brain tumor, a glioblastoma. Another reported brain tumor was actually a lung cancer that metastasized (spread) to the brain. In addition, 5 or 6 years ago a former employee had an ependymoma. (Glioblastomas and ependymomas are considered different types of brain tumors, although both arise from neuroglial cells.) Other tumors were reported in a spouse and a child of employees. Finally, there was a case in an employee who worked at the plant prior to the beginning of VCM production.

Eighty to 90 employees are involved in the VCM production process. There is relatively little turnover, and there have been only about 140 employees in VCM production since it began about 20 years ago.

In the United States, the age-adjusted incidence of brain tumors (all types) in men is about 6/100,000/year, and the incidence of glioblastoma, the most common type, is about 3/100,000/year. Thus, the occurrence of two primary brain tumors, or even one glioblastoma, in a population of 140 over a 20-year period would appear to be an excess. This, however, is a very crude analysis and would be affected by the age distribution of the workforce and the number of person-years at risk (rather than simply the number of workers). Glioblastomas comprise about half of all adult brain tumors, are more common in men than women, and have a peak incidence at about age 60. Ependymomas, a much less common type of brain tumor, occur about equally in men and women and also have a peak incidence at 50-60 years of age.

Assuming that the VCM production workforce at Vista's Westlake plant is mostly men, and that the size of the workforce has been constant, composed of 90



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people at any one time, there have been approximately 1800 person years at risk since VCM production began. The expected incidence of glioblastoma, assuming most of the workforce is now in the 40-60 age range, would be about 5 per 100,000 person-years, yielding about 0.1 expected cases. The expected incidence of ependymoma would be about 0.15 per 100,000 person-years, or 0.003 cases. These expected numbers of cases are only accurate to the extent that the assumptions about the workforce are correct. The actual number of expected cases, for example, is probably less; lower incidence rates would be used in a more rigorous calculation since, in previous years, the workforce was most likely younger than it is now. Also, if there were additional cases in former workers, the difference between the observed and expected numbers of cases would be even greater.

Previous studies of workers at facilities that made or used VCM, including one done by NIOSH (Haxweiler RJ, et al. Neoplastic risk among workers exposed to vinyl chloride. Ann NY Acad Sci 1976;271:40-48) and one done for the Chemical Manufacturers Association (CMA) (Wong O, et al. An update of an epidemiologic study of vinyl chloride workers 1942-1982, final report to Chemical Manufacturers Association. Oakland CA: Environmental Health Associates, 1986, unpublished), which updated earlier CMA-sponsored studies, have indicated an excess of brain cancer, particularly glioblastoma. The CMA study included Vista's Westlake workers and is reportedly being updated again. A recent update of the NIOSH study (Wu W, et al. Cohort and case-control analyses of workers exposed to vinyl chloride: an update. J Occup Med 1989;31:518-523), however, which enlarged the earlier NIOSH study cohort and included more recent mortality information and a more detailed exposure classification, did not find an excess risk of brain cancer attributable to VCM exposure.

It is unclear why the previously identified increased incidence of brain cancer was not corroborated by the recent NIOSH study, which had greater statistical power. Perhaps the earlier studies' findings were confounded by other exposures. The anticipated report of the updated CMA study may shed more light on this, but given the relatively few cases of brain cancer among Westlake workers, a study limited to that facility would resolve neither the issue of whether VCM exposure increases the risk of brain cancer nor the question of whether the brain tumors there are work-related. There is no way to determine whether a small cluster of an uncommon, but not rare, tumor is more than a chance occurrence, especially in the absence of a known association between an exposure and the tumor.

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