

CERTIFIED MAIL # 695 154 518
RETURN RECEIPT REQUESTED

April 15, 1988

VISTA

Assistant Attorney General
Land & Natural Resources Division
U.S. Department of Justice
10th & Constitution Avenue, N.W.
Washington, D.C. 20530

Dear Sir:

Enclosed is a copy of the quarterly progress report detailing actions taken toward completion of the tasks enumerated in the Compliance and Emission Control Plan. This report covers the period 1-1-88 to 3-31-88 and is the ninth progress report to be issued following the February 7, 1986 inclusion of the Emission Control Plan as an enforceable addendum to the Consent Decree. This letter and the enclosed material is being sent by Conoco Inc. and Vista Chemical Company in accordance with Section V.B. of the Consent Decree entered with the United States District Court for the Western District of Louisiana on August 19, 1985 in Civil Action No. 83-2518 and constitutes the eighth quarterly progress report commencing on the eighth complete calendar quarter after entry of the Plan as an addendum to the Decree.

If you have any questions concerning this report contact George Hopkins, Chief Process Engineer, at (318) 494-5062.

Sincerely,



R. A. Conrad
VCM Plant Manager

bjr (C4)

bcc: WLM JCL JHN GF RAC PEM GEH WPS SVC ERT MGH

VVV 000002931

CERTIFIED MAIL # 695 154 517
RETURN RECEIPT REQUESTED

April 15, 1988

VISTA

Director of Air Pesticides & Toxics
U.S. Environmental Protection Agency
Region VI
1445 Ross Avenue
Dallas, TX 75202-2733

Dear Sir:

Enclosed is a copy of the quarterly progress report detailing actions taken toward completion of the tasks enumerated in the Compliance and Emission Control Plan. This report covers the period 1-1-88 to 3-31-88 and is the ninth progress report to be issued following the February 7, 1986 inclusion of the Emission Control Plan as an enforceable addendum to the Consent Decree. This letter and the enclosed material is being sent by Conoco Inc. and Vista Chemical Company in accordance with Section V.B. of the Consent Decree entered with the United States District Court for the Western District of Louisiana on August 19, 1985 in Civil Action No. 83-2518 and constitutes the eighth quarterly progress report commencing on the eighth complete calendar quarter after entry of the Plan as an addendum to the Decree.

If you have any questions concerning this report contact George Hopkins, Chief Process Engineer, at (318) 494-5062.

Sincerely,



R. A. Conrad
VCM Plant Manager

bjr (C4)

VVV 000002932

Quarterly Progress Report
Emission Control Plan
1-1-88 to 3-31-88

I. Emission Control Plan Schedule

The Emission Control Plan was made an enforceable addendum to the Consent Decree on February 7, 1986. The scheduled completion dates as outlined in the plan (Page 8 of Attachment I) and estimated percent completion to date are as follows:

<u>Description</u>	<u>Scheduled Completion Date</u>	<u>% Completion</u>	<u>Actual Completion Date</u>
a) Definitive Designs for Physical Measures	8-7-86	100	4-30-86
b) Formal Policies for Administrative Measures	8-7-86	100	8-06-86
c) First Four (4) Hours of Annual Review Training for Operations & Maintenance Staff	8-7-86	100	8-06-86
d) Eight (8) Hours of Annual Review Training for Operations & Maintenance Staff	2-7-87	100	1-23-87
e) Mechanical Completion of Physical Measures	4-7-87	100	4-06-87

II. Emission Control Plan Progress

All phases of the Emission Control Plan were completed within the scheduled completion dates. The following is a summary of progress for the various phases of the Emission Control Plan:

A) Definitive Designs - Physical Measures

The development of definitive designs for the Physical Measures outlined in the Emission Control Plan (Attachment I, pages 5-8) was completed on April 30, 1986. This portion of the Emission Control Plan is complete.

B) Formal Policy - Administrative Measures

The development of formal policies for the Administrative Measures outlined in the Emission Control Plan (Attachment I, pages 4-5 and Appendix C) was completed on August 6, 1986. This portion of the Emission Control Plan is complete.

C) Annual Review Training

As of January 23, 1987, the Operations and Maintenance Departments completed the first eight (8) hours of annual training per employee for the period February 7, 1986 to February 6, 1987.

This yearly training schedule was shifted from a February 7 to February 6 basis to a February 1 to January 31 basis as stated in a previous quarterly report dated April 15, 1987.

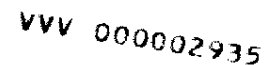
The second year of eight hours annual training for Operations and Maintenance personnel for the period beginning February 1, 1987 was completed by February 1, 1988. Training for the period February 1, 1988 to January 31, 1989 has not yet been initiated for Maintenance personnel while Operations is approximately 12% complete.

D) Mechanical Completion - Physical Measures

The Physical Measures portion of the Emission Control Plan was completed on April 6, 1987 as stated in a previous quarterly report dated April 15, 1987.

III. Audit of Administrative and Physical Measures

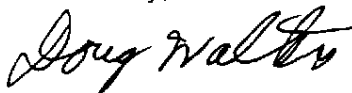
An audit of the VCM Plant Consent Decree Physical and Administrative Measures was conducted on December 1, 1987 by Martin E. Brittain (EPA-Region VI) and William H. Davis, William E. Coltrin, and Claude M. Beasely (LA DEQ) as was reported in a previous quarterly report dated January 15, 1988.



Mr. Conrad
May 17, 1988
Page 2

Please call if you have any questions.

Sincerely,

A handwritten signature in cursive script that reads "Doug Walters".

Doug Walters
Air Quality Dispersion
Modeling Coordinator

DW/frl

cc: Mr. Cliff Janney

VVV 000002936

TCG

10 3F

TO: Distribution

XF: _____

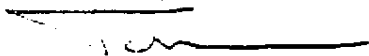
FROM: T. G. Grumbles
DATE: August 24, 1989

Interoffice
Communication

SUBJ: NIOSH INVESTIGATION AT THE LCVCM PLANT

VISTA

Attached are the employee letter regarding the subject and the NIOSH request sent today. We'll keep you informed on progress.


T. G. Grumbles

dlj
.739

Attachment

Distribution: T. H. Huffman, J. A. DeBernardi, R. D. Gamblin, M.
S. Reynolds, W. L. McClain-Houston
J. Friend-LCCP, J. Ware-LCLAB, R. W. Seymour-Aber,
H. D. Garrison-Okc

VVV 000002937

TO: VCM Plant Employees

FROM: R. A. Conrad
DATE: August 24, 1989

Interoffice
Communication

SUBJECT: Epidemiological Study - NIOSH

VISTA

In order to address your concerns over past illnesses and especially the two recent brain tumor occurrences, we have decided to request an independent third party assessment of the situation by the National Institute for Occupational Safety and Health (NIOSH).

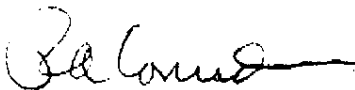
The National Institute for Occupational Safety and Health (NIOSH) is a federal agency that conducts research in the areas of occupational safety and health. In the health areas of research, NIOSH conducts Health Hazard Evaluations to investigate workplace health hazards or causes of occupational disease. They do have scientists that specialize in epidemiological studies, such as would be done to look at potential reasons for a specific health effect, such as brain tumors.

NIOSH has investigated the relationship between vinyl chloride and brain tumors before. In fact a copy of a study NIOSH completed in 1976 and a soon to be published update of that study are in the literature binder we now have at the plant.

Tom Grumbles will officially request a NIOSH Health Hazard Evaluation at our plant by early next week. Tom advises that the agency will normally provide feedback on such a request within two to three weeks. At that time they will advise as to their response and timing. We will keep you posted on the dates as they become firm.

The additional medical screening issue will be resolved and the results and action steps will be provided to you next week.

Thank you for your patience while we continue addressing this very difficult and complex matter.



R. A. Conrad

br(C)
Distribution
Dept. Heads
Supervisors
Bulletin Boards

VVV 000002938

Vista Chemical Company

900 Threadneedle
Houston, Texas 77079
(713) 588-3000

P.O. Box 19029
Houston, Texas 77224
Fax (713) 588-3236

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

August 24, 1989

VISTA

Hazard Evaluations and Technical
Assistance Branch
Division of Surveillance, Hazard
Evaluations and Field Studies
NIOSH
4676 Columbia Parkway
Cincinnati, Ohio 45226

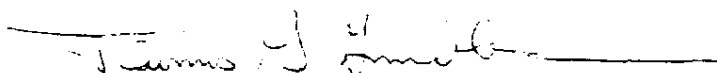
Dear Sirs:

Vista Chemical is requesting a NIOSH Health Hazard Evaluation at its Vinyl Chloride Monomer production facility in Westlake, Louisiana. This request is being made to investigate the incidence of cancer and particularly brain tumors at this manufacturing location. A plant profile is attached that describes the plant operation and provides details about the plant size and history.

The evaluation is being requested as a result of recent events in the current employee population. Two employees have recently been diagnosed as having cancerous brain tumors. According to the information available to us, one employee's tumor was a Glioblastoma Multiforme (astrocytoma) and one was an Adenocarcinoma (metastatic). Both employees have been employed at the plant for more than 15 years. Based on the facts available to us at this time, it appears the two tumors are of a different type and not related in any way. However, the occurrence of two brain tumors in a short time has raised employee concerns regarding the relationship between chemical exposures and brain tumors at the plant. For this reason, we believe an independent assessment of the situation would be beneficial.

Please contact the undersigned at 713-588-3445 if you have any questions concerning this matter and to provide information concerning the next step to be taken by NIOSH.

Sincerely,



Thomas G. Grumbles, C.I.H.
Environmental Quality Manager

dlj

Enclosures



VVV 000002939

TO: Distribution

TGG: JCL: MMG: AJO: RF

XF: _____

FROM: T. G. Grumbles

DATE: July 24, 1989

Interoffice
Communication

SUBJ: VINYL CHLORIDE AND BRAIN TUMORS

VISTA

For your information, attached is a copy of a Dow position paper regarding the 1979 study that indicated a possible excess of brain tumors related to VCM exposure.



T. G. Grumbles

dlj
.719

Attachment

cc: J. Friend-LCCP, J. Ware-LCLAB, H. D. Garrison-Okc, R. W.
Seymour-Aber

Distribution: T. H. Huffman, M. S. Reynolds, J. A. DeBernardi, N.
Frost, D. Conrad-LCVM

VVV 000002940

The Society of the
Plastics Industry, Inc.



355 Lexington Avenue
New York, New York 10017
(212) 573 9400

RECEIVED
MAR 14 1979
PLASTICS BUSINESS ARC

March 5, 1979

TO: THE PVC SAFETY GROUP

Gentlemen:

Further to my letters of February 16 and 23, 1979 regarding the incidence of brain tumors discovered among Union Carbide workers, I am enclosing for your internal use only, a copy of the Dow position on this subject.

For additional information contact John Soghigian of Dow Chemical Company 517/636-3587.

Very truly yours,

A handwritten signature in cursive script that reads "John R. Lawrence".

John R. Lawrence
Technical Director

:GM
Attachment

VVV 000002941

A joint OSHA-NIOSH investigation, prompted by a worker complaint in November, 1978, has revealed brain tumors caused the deaths of 9 Union Carbide Texas City workers. This number "would appear to be higher than expected" at that particular plant. About 455 death certificates from 1962 to 1978 have been examined to date.

The agencies have speculated a possible link of vinyl chloride monomer to the tumors. However, both a Union Carbide spokesman and OSHA administrator, Eula Bingham noted there are too many chemicals in use at the plant to reach a correlation at this time.

A tenth worker who is still living has been diagnosed as probably having the same form of tumor.

The investigation began December 13, 1978, with the preliminary announcement occurring February 15, 1979. OSHA said Union Carbide has been very cooperative.

Dow Position (for outside use as needed)

What we know about the health of Dow workers exposed to vinyl chloride enables us to conclude that such brain tumors are not a problem in our work force. Also, epidemiological studies on large worker populations in the United States and Great Britain show no correlation between such brain tumors and vinyl chloride exposure.

From our reading of the Texas City situation, it is too early to conclude that the cases of brain tumors were caused by vinyl chloride monomer. We do not mean to downplay the seriousness of current investigations, but we caution against jumping to conclusions as to the cause of the deaths.

The facts which we have at this time are incomplete, and we are attempting to obtain more information. In addition, we have notified all Dow employees involved with vinyl chloride of the Texas City situation.

Dow recently completed a mortality study among its vinyl chloride workers at Freeport, Texas which did not show any indication of a similar situation. A similar study completed last year on Dow workers at Plaquemine reached the same conclusion. Specifically, both studies showed no deaths from brain tumors among vinyl chloride workers.

Another Dow mortality study published in 1975, focused on 594 workers exposed to vinyl chloride in Midland, Michigan. Two brain cancer deaths were identified, but these cancers were not believed related to vinyl chloride exposures. One subject who had only a three months exposure to low concentrations of vinyl chloride, also had exposures to arsenic in another plant. Dow has previously published data indicating excess cancer in employees exposed to arsenic. The second individual had only a four year exposure prior to his death, a time period generally considered inadequate for cancer to result. The type of brain cancer in each case was not confirmed by autopsy.

Related Background

Outside studies have also been examined.

In Great Britain, a study of over 7,000 workers revealed 2 brain tumors, which was about half the number expected.

An epidemiology study on U.S. vinyl chloride (VCM) workers by Equitable Environmental Health, Inc, funded by the Manufacturing Chemists Association, reported "brain tumors were found to be in excess, 12 observed vs. 5.9 expected ... but the incidence was not related to either duration of exposure or to intensity of exposure to VCM."

An excess of malignant brain tumors was also reported by NIOSH researchers in a 1976 study of a small worker population.

In addition, the NIOSH group claimed to have identified altogether 9 histologically confirmed cases of glioblastoma multiforme (the brain tumor cited in the Texas City deaths) in U.S. workers exposed to vinyl chloride. We are attempting to determine if the Texas City chemical workers were included as part of this survey.

John Soghigian

Inorganic Chemicals

2020/MIDLM

6-3587

w

TGG

TO: VCM Plant Employees

Interoffice
Communication

FROM: R. A. Conrad
DATE: October 18, 1989

VISTA

SUBJECT: Request for Epidemiological Study - NIOSH

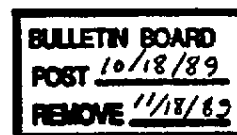
Attached is the response from the National Institute for Occupational Safety and Health (NIOSH) concerning our request for a health hazard evaluation at our VCM Plant. Essentially, the letter states that they do not believe the tumor incident data would result in a justifiable or meaningful study. The last paragraph of the letter perhaps best states their rationale for not proceeding with a study at this time.

By copy of this letter, I am requesting that the VCM Plant Department Heads survey their groups for the interest and further need to have another set of employee meetings with Tom Grumbles and Doctor Drumwright to further discuss the issue and to identify and answer any new questions or concerns that have arisen since the last meeting. Your supervisor will ask you to fill out a copy of the attached survey questionnaire by next Wednesday, October 25. Thank you for your help in this matter.



R. A. Conrad

br
Distribution
Bulletin Boards
Supervisors
Dept. Heads





Centers for Disease Control
National Institute for
Occupational Safety & Health
Robert A. Taft Laboratories
4676 Columbia Parkway
Cincinnati OH 45226-1998

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

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.

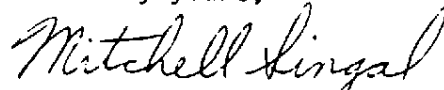
Previous studies of workers at facilities that made or used VCM, including one done by NIOSH (Waxweiler RJ, et al. Neoplastic risk among workers exposed to vinyl chloride. Ann NY Acad Sci 1976;271:40-48) and one done for the Chemical Manufacturers Association (CMA) (Wong O, et al. An update of an epidemiologic 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.

Page 3 - Mr. Thomas G. Grumbles, C.I.H.

This letter constitutes our official response to your request for a health hazard evaluation. It should be posted in a prominent place accessible to affected employees for a period of 30 days. Should there be any additional questions, I can be reached at (513) 841-4386. I would be happy to talk with any employee or any company or employee representative.

Sincerely yours,

A handwritten signature in cursive script that reads "Mitchell Singal".

Mitchell Singal, M.D., M.P.H.

Chief

Medical Section

Hazard Evaluations and Technical

Assistance Branch

Division of Surveillance, Hazard
Evaluations, and Field Studies

TO: VCM Plant Employees

FROM: R. A. Conrad
DATE: August 1.65, 1989

Interoffice
Communication

SUBJECT: Toxicity Studies

VISTA

A toxicity reference book will be made available Wednesday, August 16 at the Main Office. It will contain 21 different papers, studies and reports on epidemiological and toxicity data for VCM and EDC as well as some general studies for the Chemical Industry in Louisiana. Also, a set of file folders containing two (2) copies of each report has been prepared.

The reference book will be available for review at the office. It contains an index of papers and a copy of each. An employee may check out a copy of any of the reports he would like to read in detail. We ask that an employee take only one copy at a time and return it the next day so that other employees will have timely access. Contact either George Shirley or Betty Rogers for assistance.

Attached is a copy of the index of papers. While each paper usually has a summary, much of the data is very technical in nature and is not easy reading. However, I'm sure we can get needed clarification or interpretation of terminology or meaning by checking with Tom Grumbles or Dr. Drumwright.

The reference book and checkout papers will be available by noon, Wednesday, August 16, 1989. Tom Grumbles has advised that possibly one or two more papers may be available. We will add them to the package when received.



R. A. Conrad

br(2)
Distribution
Dept. Heads
Supervisors
Bulletin Boards

INDEX OF TOXICOLOGICAL PAPERS

<u>PAGE NO.</u>	<u>IT</u>	<u>SOURCE</u>	<u>DATE</u>
VCM No. 1	Effects of Exposure to Vinyl Chloride: An Assessment of the Evidence	Richard Doll	April 13, 1987
VCM No. 2	Cohort & Case-Control Analyses of Workers Exposed to Vinyl Chloride - An Update	Various	December, 1988
VCM No. 3	Vinyl Chloride - Draft Toxicological Profile	U.S. Public Health	November, 1987
VCM No. 4	Final Report on Epidemiologic Study of Vinyl Chloride Workers	Chemical Mfg. Association (CMA)	October, 1986
VCM No. 5	Occupational Exposure & Brain Tumors	Andrew Moss	1985
VCM No. 6	Excess Lung Cancer Risk in a Synthetic Chemicals Plant	Waxweiler, et al	October, 1981
VCM No. 7	Proportional Mortality Among Vinyl Chloride Workers	Monson, et al	June, 1975
VCM No. 8	Mortality & Cancer Morbidity in a Group of Swedish VCM and PVC Production Workers	Byren, et al	October, 1976
A No. 9	A Mortality Study of Vinyl Chloride Monomer Workers Employed in the United Kingdom in 1940-1974	Jones, et al	1988
VCM No. 10	Incidence of Cancer Among Vinyl Chloride & Polyvinyl Chloride Workers	Heldass, et al	1984
VCM No. 11	Mortality Experience of Workers in a Vinyl Chloride Monomer Production Plant	Buffler, et al	March, 1979
VCM No. 12	Neoplastic Risk Among Workers Exposed to Vinyl Chloride	Waxweiler, et al	1975
VCM No. 13	Mortality Study of Workers in the Manufacture of Vinyl Chloride and Its Polymers	Tabershaw, et al	1974
EDC No. 1	Toxicological Profile for 1,2- Dichloroethane (EDC) - Draft	Clement Associates	December, 1988
General No. 1	Occupational Risk Factors For Brain Tumors	Thomas, et al	1986
General No. 2	A Cohort Mortality Study of Petrochemical Workers	Austin, et al	April, 1983

<u>PER TITLE</u>	<u>SOURCE</u>	<u>DATE</u>
Mortality From Brain Tumor & Other Causes In a Cohort of Petrochemical Workers	Waxweiler, et al	January, 1983
Brain Tumors in the Chemical Industry	Selfoff, et al	1985
A Case - Control Study of Chemical Exposures & Brain Tumors in Petrochemical Workers	Austin, et al	April, 1983
Mortality Experience of a Cohort of Louisiana Chemical Workers	Olsen, et al	January, 1989
A Review of Cancer Epidemiology in Louisiana	ENSR	March, 1989

VVV 000002951

VISTA

Vista Chemical Company
Vista Polymers Inc.

Report of a Possible Adverse Effect To Health or the Environment

If you think a chemical substance or mixture has caused an adverse human effect, identify that substance and describe how affected. If you think the environment (for example, the air, water, soil, animals, or plants) has been adversely affected by one of the facility's chemical substances or mixtures, identify the substance (if known) and the affected plant and/or animal or contaminated area of the environment.

If you cannot identify the suspected chemical substance or mixture, identify the product, material, or item believed to be the cause of the adverse effect or describe the process or operation or the effluent, emission, or discharge from the facility that you think has caused the adverse effect.

On about 5/19/89 Dan Ross, Chief Operator,
called the reporter to get Dr. J. Drumwright's phone
number. During the conversation Mr. Ross told me he
had a brain tumor, diagnosed by cat-scan and MRI,
and he thought it could have been caused by EDC
and/or carbon tetrachloride exposure at the VCM Plant.

George M. Shirley, Jr.
Signature of Reporter

07/10/89
Date of Report

GEORGE M. SHIRLEY, JR.
Name of Reporter (Printed)

1968 - 1989
Date Adverse Effect Occurred

Send Completed Form To:

T. GRUMBLES - HOUSTON

CONFIDENTIAL

TO: Distribution

VISTA

Interoffice
Communication

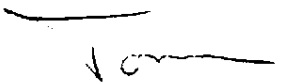
FROM: T. G. Grumbles
DATE: August 10, 1989

SUBJ: DRAFT TEXT FOR EMPLOYEE LETTER ON THE NIOSH HHE AND
NEUROLOGICAL EXAMINATION EXPLANATION

Attached is text that can be used in the letter to employees to notify them of our decision to ask NIOSH for a HHE and to provide a neurological examination.

This text would be the body of a Conrad letter to employees. Any questions or comments on the factual part should be addressed to me. I've attached JRD's original and my redraft on the medical screening information.

Conrad should draft the employee letter and send to THH and me for review. The final letter will be copied to Friend, Ware, Seymour and Garrison.


T. G. Grumbles

tmp

Distribution: THH, JAD, MSR, WLM, NCF
Dick Conrad

VVV 000002953

NIOSH HHE EXPLANATION

The National Institute for Occupational Safety and Health (NIOSH) is a federal agency that conducts research in the areas of occupational safety and health. In the health areas of research, NIOSH conducts Health Hazard Evaluations to investigate workplace health hazards or causes of occupational disease. They do have scientists that specialize in epidemiological studies, such as would be done to look at potential reasons for a specific health effect, such as brain tumors.

NIOSH has investigated the relationship between vinyl chloride and brain tumors before. In fact a copy of a study NIOSH completed in 1976 and a soon to be published update of that study are in the literature binder we now have at the plant.

TGG Revision of JRD Information

Brain tumors present clinical signs and symptoms including headache, altered mental status, progressive loss of function or neurologic deficit and convulsions or seizures. These same signs and symptoms can also be produced by various degenerative diseases, chronic cardiovascular problems and various toxic states-including medication.

A neurological evaluation/examination is performed to look for specific objective signs or findings and to attempt to localize the problem within the nervous system. Symptoms of problems experienced by the patient help the doctor to look at specific areas and identify potential causes. The diagnostic evaluation of a patient depends largely on his/her clinical history, cooperation, and ability to provide useful information to the doctor.

In addition to the clinical history, the doctor conducts a neurologic examination. This examination usually addresses five major areas: Mental status, Cranial nerves, Motor function, Sensation, and Reflexes. Specific tests are used to determine normal or abnormal functions of these areas.

Based on information obtained from the clinical history and neurological examination more specific tests may be requested - including dye studies, Electroencephalograms (EEG), Skull X-rays, CT Scans, or MRIs. These tests will help localize the problem and aid in determining treatment. Frequently, surgical procedures, biopsies, etc. are necessary to establish an absolute diagnosis.

VVV 000002955

RECEIVED

TO: Distribution

FROM: T. G. Grumbles
DATE: October 5, 1989

VISTA

Interoffice
Communication

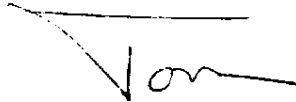
SUBJ: NIOSH RESPONSE TO OUR HHE REQUEST

Attached is NIOSH's official response to our request for a health hazard evaluation at the LCVCM plant. The bottom line is they are not going to do an investigation.

The letter is somewhat confusing but I believe a fair summary is that larger studies have failed to confirm an association, and studying a small population will not provide any definitive answers regarding causation.

With this response and the ongoing neurological evaluations, I believe we have completed the current outstanding action items. At this time, we need to decide what our next step is. For example is it useful for Dr. Drumwright and I to do another series of employee meetings?

Please let me know your thoughts on what we should do next.


T. G. Grumbles

dlj

A meeting / discussion between you, me, Jack & Bill & Conrad is being held in order to discuss the situation and what to do next.

Distribution: N. Frost, W. L. McClain, T. H. Huffman, J. R. Drumwright, R. D. Gamblin

R. A. Conrad-LCVCM

Attachment

VVV 000002956



Centers for Disease Control
National Institute for
Occupational Safety & Health
Robert A. Taft Laboratories
4676 Columbia Parkway
Cincinnati OH 45226-1998

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

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.

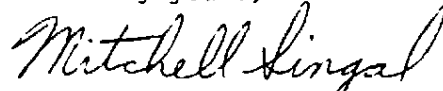
Previous studies of workers at facilities that made or used VCM, including one done by NIOSH (Waxweiler RJ, et al. Neoplastic risk among workers exposed to vinyl chloride. Ann NY Acad Sci 1976;271:40-48) and one done for the Chemical Manufacturers Association (CMA) (Wong O, et al. An update of an epidemiologic 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.

Page 3 - Mr. Thomas G. Grumbles, C.I.H.

This letter constitutes our official response to your request for a health hazard evaluation. It should be posted in a prominent place accessible to affected employees for a period of 30 days. Should there be any additional questions, I can be reached at (513) 841-4386. I would be happy to talk with any employee or any company or employee representative.

Sincerely yours,

A handwritten signature in cursive script that reads "Mitchell Singal".

Mitchell Singal, M.D., M.P.H.
Chief

Medical Section
Hazard Evaluations and Technical
Assistance Branch
Division of Surveillance, Hazard
Evaluations, and Field Studies

Tom

My understanding is that
you are to receive
all of these forms.

Thanks

JG Cole

7/24/89

VISTA

Vista Chemical Company
Vista Polymers Inc.

Report of a Possible Adverse Effect To Health or the Environment

If you think a chemical substance or mixture has caused an adverse human effect, identify that substance and describe how affected. If you think the environment (for example, the air, water, soil, animals, or plants) has been adversely affected by one of the facility's chemical substances or mixtures, identify the substance (if known) and the affected plant and/or animal or contaminated area of the environment.

If you cannot identify the suspected chemical substance or mixture, identify the product, material, or item believed to be the cause of the adverse effect or describe the process or operation or the effluent, emission, or discharge from the facility that you think has caused the adverse effect.

ON July 4, 1989, DAN ROSS MADE A STATEMENT IN MY
PRESENCE TO THE EFFECT THAT HE THOUGHT HIS EXPOSURE
TO VCM & EDC AT THIS PLANT WAS DIRECTLY RESPONSIBLE
FOR HIS HAVING A BRAIN TUMOR.

Ronald E. Fox
Signature of Reporter

7-7-1989
Date of Report

RONALD E. FOX (B-SHIFT SUPERVISOR)
Name of Reporter (Printed)

10-23-1967 — Present.
Date Adverse Effect Occured

Send Completed Form To:

VVV 000002961

What Vista intends to do

Vista Chemical recognizes and understands the concern felt by our employees and their families.

The company continues to evaluate the literature and participate in industry groups concerned with the health effects of exposure to chemicals used or manufactured in our plants.

In addition, the company is investigating new non-invasive testing measures which could be used to detect abnormalities.

As we move forward, we'll keep employees informed of our progress.

VISTA

Facts About...

**Brain
tumors
and chemical
exposure**

VISTA

Vista Chemical Company
Lake Charles VCM Plant

What studies show about brain tumors

The scientific literature and study results present conflicting evidence in regard to the association of brain tumors and vinyl chloride monomer.

Some studies have indicated a possible association between brain tumors and VCM. Others have shown no association at all.

In the studies which indicated a possible association, the number of tumors occurring in studied workers was compared to the number of cases known to occur in the general population. While the number of tumors among the workers was higher than those occurring among the population at large, the difference was small enough that one could not say for sure whether the difference was caused by worker exposure to VCM.

The information on exposure to ethylene dichloride and carbon tetrachloride does not indicate an association between these chemicals and brain tumors.

What are the symptoms of brain tumors?

For brain tumors, clinical findings or symptoms are variable.

Headaches seldom are the first indicators of the presence of a brain tumor. Other symptoms such as convulsions or seizures are probably the more common signs.

Intense headaches accompanied by vomiting, visual disturbances, (blurring or seeing double), weakness and/or trouble with coordination should be thoroughly investigated by a physician.

Also keep in mind that brain tumors may result from other causes as well. For example, certain forms of lung cancer may spread to the brain or other locations in the body.

Good health habits, taking part in Vista's health testing program and periodic visits to your own physician are important to stay ahead of any physical condition that could adversely affect you.

Tests that can detect brain tumors

There are a number of specific diagnostic tests which can be used to determine the presence of a brain tumor.

These tests include CAT scans, MRIs (magnetic resonance imaging), skull x-rays, injection of dyes, or combinations of these and other techniques.

However, most of these are invasive tests which carry some risks of their own. For instance, CAT scans involve exposure to more radiation than a normal chest x-ray and should not be undertaken lightly.

In addition, the multi-phasic testing offered by Vista is designed to provide broad screening, not specific diagnostic tests.

Vista's exam uses questionnaires and interviews to obtain good employee medical histories. These histories, used to determine signs and symptoms of potential health problems, are extremely important because problems are usually detectable before actual physical findings are. When screening evaluations indicate problems, more intensive diagnostic procedures may be recommended.

Questions & Answers

for employees of Vista Chemical Company's
Lake Charles VCM Plant
in response to employee questions
at the July 14 meetings

Q. What will Vista do if another brain tumor is found?

A. We will continue to communicate with you regarding what we are currently doing in response to the recent employee health problems and concerns. We believe our current efforts are the right ones to address the present situation. Another brain tumor in the near term would certainly add emphasis to our efforts. However, it must be stressed that the recent brain tumors are not known to be related in terms of type or origin.

Q. Have we talked to other vinyl plants?

A. Dr. Jack Drumwright, Vista Medical Manager, is discussing current health events with other chemical company medical directors to determine if other chemical companies are experiencing any brain tumor incidents, how they were discovered and what was done to respond to them. Vista also belongs to the Vinyl Institute and the Chemical Manufacturers Association. Those are industry groups that sponsor studies of workers and promote safety and health practices in the industry. Any pertinent information obtained will be shared with employees.

Q. Will Vista study our group, the LCVCM Plant?

A. We are currently attempting to review the medical and health records for employees and past employees known or suspected to have had cancer. Employees at the plant are providing us names and Dr. Drumwright is attempting to find their records. This may be difficult because some records are with Conoco and others may be held by private physicians. The matter of medical confidentiality and potential need for releases to obtain the information may slow the process.

The plant population was included in the CMA study, which is in the literature binder available at the plant. At this time, no decision has been made regarding further studies.

Q. How long will it take to answer our questions?

A. We cannot tell you exactly how long it will take to address and resolve all of the issues raised by the recent employee health problems. Addressing your concerns and resolving the issues is a priority item with plant management and Houston staff. We have ordered relevant scientific papers not in our files to

place in an accessible location at the plant. It is anticipated this should be completed in early August with additions made as papers are received.

Dr. Drumwright is actively pursuing the issue of medical screening for brain tumors.

Q. Based on the potential inaccuracies of death certificates, how can epidemiological studies be accurate?

A. Many epidemiological studies are based on mortality (death rate) from a disease. This is done for several reasons, but in general, deaths are well defined, consistently recorded, and the records are typically available. In many cases, mortality studies are the only feasible type of study to do, especially for chronic diseases with long latency periods, such as cancer.

However, the cause of death on death certificates is indicative of a judgment on primary cause of death and may or may not list complicating factors at the time of death, such as brain tumors. This may result in an underestimation of a particular cause, or an overestimation, such as a brain tumor that was due to a lung cancer metastasizing (spreading) to the brain.

The result of any epidemiological study must be viewed with caution based on these potential problems, and efforts made to be as thorough and accurate as possible when reviewing records.

Q. We don't care about studies with thousands of workers. Why don't you study us?

A. A study of only the VCM plant, or even the VCM plant and our PVC plants, would involve a very small population and the results would probably not be conclusive. Studies done to determine the relationship of a disease or cause of death must have an adequate sample size to assure that any differences, or excess, seen in death rates or disease rates, are not random occurrences, but are truly different from what the normal, or unexposed population would have.

The reason for this is explained by two fundamental statistical concepts that define the needed sample size (population studied) and power of the study, which is the probability of detecting a real difference in disease rates. The smaller the population studied, the less chance you have of detecting truly different disease or death rates.

(more)

Q. What do we know about EDC/TARS exposure effects?

A. Quite a lot is known about EDC short and long term exposure effects. Detailed information is available to you through your plants hazard communication program and the Material Safety Data Sheets (MSDS). A summary follows.

EDC is a central nervous system depressant and causes damage to the liver and kidneys. Short-term exposure to high concentrations of EDC is characterized by anesthetic effects as well as by headaches, dizziness, nausea and vomiting, weakness, trembling and stomach cramps. Severe exposure causes coma and death from respiratory and circulatory failure. Animal studies, mostly in mice and rats, have established carcinogenic effects in rodents. EDC may be absorbed through the lungs, skin and gastrointestinal tract with resulting liver and kidney damage.

Q. Can EDC and TARS be carried home on my clothes?

A. Yes, under some conditions. Avoid contact with EDC by wearing protective gear and remove soiled clothing that is contaminated with ethylene dichloride (EDC). EDC is volatile at room temperatures and will evaporate rapidly. EDC does not remain in the air for very long. There is, however, a higher potential for significant amounts of EDC to remain in impregnable surfaces such as shoe leather. That is why only certain types of composition shoe soles are permitted for plant workers. EDC has a very distinct odor at low levels. Many people smell it at 3 ppm or less. Its odor is a good warning property. Contaminated clothing should be properly stored until cleaned or destroyed, which will depend on the situation. Shoes with contaminated uppers should always be destroyed.

The danger with "TARS" is very similar although TARS are heavier in nature and may evaporate more slowly. The potential for TARS contaminated clothing to cause chemical burns or slowly release vapors into a storage area is even greater than that for EDC. Contaminated clothing should be professionally cleaned or destroyed, depending on the situation.

Q. Can't one molecule of a carcinogen cause cancer?

A. This question cannot be answered with a simple yes or no. There is much scientific debate over what level or dose of exposure to a carcinogen will result in cancer. Most toxic chemicals have a threshold level below which no effects are known to occur, or their effects are reversible. This is based on our knowledge of how the body "handles" the chemical and the way the toxic effect occurs.

However, we do not know as much about the way carcinogens cause cancer, and cannot say for sure if a threshold exists, or if one exposure can cause cancer.

There is clear evidence that the potential for cancer to occur is reduced when overall exposure is reduced.

Q. A film shown in 1972 said glioblastomas were a result of VCM exposure. Has this changed?

A. We cannot find the film mentioned in the employee meeting. Before 1974, there was little, if any, information available regarding the chronic human health effects of vinyl chloride. Even in the 1974-76 period, when VCM became strictly regulated, the information available was mostly about the incidence of liver cancers, specifically angiosarcomas.

Brain tumors, or glioblastomas, have been found in various studies of vinyl chloride exposed workers. The evidence showing the relationship between VCM and these tumors is conflicting.

Q. Haven't more than 100 angiosarcomas been found in workers exposed to PVC and VCM?

A. There is a worldwide angiosarcoma register kept. On this register there are currently 138 cases that have been reported. Thirty-eight of those are from the United States. Conoco Chemicals and Vista had none to report.

Q. What about HCl and chlorine effects?

A. Detailed information regarding the health effects of these chemicals can be found in your plant's hazard communication program.

In summary, both of these chemicals are severe irritants to the eyes, skin, and upper respiratory tract. Irreversible tissue damage can occur as a result of short exposure to high concentrations. The strong irritant properties serve as a good warning and, in general, prevent long-term exposures. Many people can detect the odor of chlorine and HCl at levels below 0.5 ppm.

Long-term or repeated exposure to chlorine and HCl may cause corrosion of the teeth, chronic irritation of the skin, and chronic lung damage.

Q. Are EDC releases and exposures reported to OSHA?

A. No. There is no specific requirement to report EDC releases or exposures to OSHA. The VCM standard requires reporting "emergency exposures", under certain conditions, to OSHA but there is no such rule for EDC.

If five or more people are hospitalized as a result of EDC exposures during an emergency, a report to OSHA is required.

Q. Why don't you document high EDC exposures like you do VCM exposures?

A. We do not document EDC exposures exceeding
(more)

the permissible exposure limit with a letter to the employee as we do for VCM. However, it is routine for the plant to investigate over-exposures and emergency releases for all chemicals, including EDC. EDC exposure records are maintained in the same manner /CM exposure records.

As a result of the company's investigations, information is developed and kept regarding those people that had high exposure during any emergency.

Q. Do studies look at the total number of employees exposed or total number of employees at the plant?

A. Each study is done differently. However, in general epidemiological studies attempt to look at exposed populations and not all employees at a plant site using that chemical. The vinyl chloride studies that are available have looked at various plant populations and generally attempted to include only exposed or potentially exposed workers.

Q. Do the chemicals here, VCM and EDC, have a cumulative effect?

A. VCM and EDC are metabolized by the body and eliminated through various routes. They are not known to accumulate in body tissues the way lead does, and exert effects as a result of remaining in the body.

Q. Since Ross & Fogleman are the reason this meeting will there be a study of their work habits?

A. If we decide to do further studies of the LCVCM plant employees, this may be a part of the study. At this time that decision hasn't been made.

We do know that in the early 70's, the exposures at the plant due to general work practices were higher than they are today.

Q. Are two brain tumors in a short-time in a small group like ours indicative of a problem?

A. We don't believe so, especially not when they are of different types. Also, both are found in the general population and are a "common type".

Q. Would the problem Dan Ross had show-up on the van chest X-Ray?

A. No.

Q. Did Dan Ross' cancer spread from another site?

A. Medical information available to us does not indicate any spreading.

Q. Can different people get different cancers from the same exposure to the same chemical due to individual differences?

A. Yes. Every individual has a distinct biochemical make-up. These individual biochemical differences can result in different responses to toxic chemicals or other stresses. Individual susceptibility can also vary due to such things as genetics, race, diet and age.

Q. Did Mr. Fogleman have any apparent signs/symptoms from the van exam?

A. Several health problems were noted in the last exam, but were believed to be unrelated to his brain tumor. However, it is believed that his cancer was a rapidly growing one which developed since the last van exam.

Q. Is Vista looking at any other tests besides Cat Scans?

A. Yes. However, there are no known direct screening methods to detect brain tumors. There are tests available that measure central nervous system dysfunction which may indirectly indicate a brain tumor. We are evaluating the usefulness of the available tests.

Q. Are there brain tumors at Oklahoma City and Aberdeen?

A. One has been seen at Aberdeen in the past. This tumor did not originate in the brain but spread from another site. This tumor occurred prior to 1984.

Q. What about the causes of death among children of employees? Will you look at those?

A. We will look at all data presented to us if appropriate releases are also provided for these family members.

Q. What are the types of cancer Ross & Fogleman had?

A. According to the information available to us Ross' cancer was Glioblastoma Multiforme (astrocytoma) and Fogleman's was Adenocarcinoma (metastatic).

Q. Will you get more info on Ross & Fogleman?

A. We hope to, but this depends on the employees' wishes and approval.

Q. Why isn't a Cat Scan part of a routine physical for us?

A. The Cat Scan is not a routine screening test. It is a very specific diagnostic test ordered after consultation with the appropriate physician and based on symptoms and medical findings.

(more)

Q. What are possible signs and symptoms of a brain tumor?

A. The location of the tumor within the central nervous system) and its biologic behavior determine the way the patient's signs and symptoms are presented.

When a tumor grows slowly in a "silent" area of the brain, it may first cause a headache, nausea, vomiting, alteration in personality or changes in the level of consciousness due to increased intracranial pressure.

A tumor within the speech or motor areas may cause general weakness, or dysphasia, long before other signs or symptoms are present.

Q. When used as a follow-up to signs and symptoms, can Cat Scans always detect tumors?

A. CT scanning provides the ability to visualize the central nervous system and possibly the early diagnosis of tumors. The addition of IV or IT contrast material has increased the detection of hidden tumors.

Tissue diagnosis of intracranial tumors is required before beginning therapy. Despite the increased sensitivity of current imaging techniques, many diseases - including tumors - may not be detected by this method.

Q. Does cigarette smoking cause brain tumors?

A. There is no confirmed link between cigarette smoking and primary brain tumors. However, cigarette smoking is well known to contribute to lung cancer which can frequently spread to the brain. Also, cigarette smokers in general have a higher susceptibility to many diseases.

Q. Why do Vista blood results use higher normals for comparison?

A. Ranges used for comparison are guidelines only, and vary between laboratories due to different instruments, methods, etc. It's important to remember that the normal ranges developed and reported by any laboratory are scientifically developed and reviewed by independent accrediting organizations. Also the normal ranges are based on data from different populations and regional differences may be seen.

Q. Why do the van testing results take so long to get?

A. Vista's medical department is notified immediately of any significant abnormalities found in the test results. Dr. Drumwright then notifies employees.

The full report is generally provided to the employee at the time of the hands-on portion of the exam.

However, if an individual wants his prior to that time, he or she can be provided with the report when it is first available from Health Examinetics. This is usually a 4-6 week time-frame.

TO: Tom Grumbles

FROM: J. R. Drumwright, M. D.

DATE: April 19, 1990

Interoffice
Communication

SUBJECT: 8 (C) ALLEGATION - LCVCM - 1989

VISTA

The following summary is provided for the 8 (c) file for the alleged brain tumor problems at Vista's VCM plant in Westlake, La.

R. A. Conrad, Plant Manager, drafted a letter to VCM Plant employees on September 1, 1989 in which he outlined the criteria for "company sponsored medical screening for brain tumors". (Basically any LCVCM employee who had worked in the vinyl industry for at least 10 years was "eligible".)

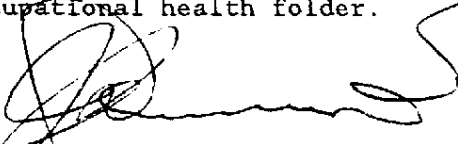
A three month period (9/8/89-12/8/89) was identified for those who were eligible and elected to have the neurological evaluation/examination performed.

A total of eleven LCVCM employees elected to have the examination with Dr. Gerald R. Litel, Neurosurgeon, Lake Charles, La. at a cost of \$300.00 per individual (total cost: \$3300.00).

Because of medical history data presented to Dr. Litel, three employees underwent additional tests, e.g. Cat Scan, MRI studies. Costs connected with these additional procedures were handled by the individual's group health insurance plan.

Conclusion: No evidence of any active intercranial injury or disease process was detected for any of the eleven employees who elected to have the additional medical/neurosurgical evaluation.

Dr. Litel reviewed his findings and recommendations with each of the eleven employees, provided copies of his report for each to Vista Medical for review and filing in the respective employee's occupational health folder.



J. R. Drumwright, M. D.

jr

cc: JRD/LCVCM 8 (c) File

VVV 000002968