



ESCAMBIA PLANT
INTEROFFICE MEMORANDUM

To: Distribution

Date: 14 March 1974

From: R. W. Wolfe

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R. E. Jones

E. A. Ray

Re: Trip Report to Calvert City -
VCM Monitoring

W. Wilde

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Introduction:

The Air Products and Chemicals, Inc. Plant at Calvert City was visited on 12 March 1974 to compare vinyl chloride analytical procedures and calibration procedures used at the Calvert City lab and the Escambia lab.

Summary:

1. Century Organic Vapor Analyses

- a) Calibration Gas Standard - The calibration gas of VCl in the air is prepared differently by the two labs. The calibration gas at Calvert City is prepared in two stages. First, vinyl chloride is added into an evacuated cylinder and then pressured to 400 psig with air. The concentration of vinyl chloride is then determined by a VPC procedure. Secondly, the gas mixture is then metered into a gas mixing valve along with air to give a final gas blend containing 100-300 ppm vinyl chloride in air. The exact composition is again determined by a VPC procedure.

The calibration gas at the Escambia plant is prepared by adding vinyl chloride to a gas bag and diluting the vinyl chloride with air. The composition of the final gas blend is then determined by a VPC procedure identical to the Calvert City procedure.

- b) Century Calibration - The calibration procedure for the Century Organic Vapor Analyzer is different between the two labs. The Calvert City lab uses a calibration curve which relates vinyl chloride concentration to the Century meter reading. The Escambia lab calibrates the Century meter to read vinyl chloride concentration directly according to the method written in the instruction manual.

2. Residual VCM in Resins

Both the Calvert City method and the Escambia method are identical except for the glassware used to prepare samples for analysis.

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Calvert City lab uses a 4 oz. jar and the Escambia lab uses a 30 ml vial. The only concern is the large vapor space present using the 4 oz. jar may result in greater vinyl chloride loss from the tetrahydrofuran solvent.

3. Vinyl Chloride Adsorption - Personnel Monitors

- a) The Calvert City adsorption procedure and the Escambia adsorption procedure are basically the same; however, Calvert City lab uses a larger adsorption tube and obtains a greater sample volume of gas. The portable vacuum pumps are charged for 24 hours at Calvert City and only 2 shifts per day are sampled. This allows for a 24-hour recharging period which enables better sample rate control and a longer sampling period.

The Escambia plant initially sampled once each shift which allows only 16-hour recharging period. This results in poorer sample rate control and smaller gas volumes sampled. Charging was extended to 24 hours on 3/11.

- b) The analytical procedures differ only with respect to calculation. The Calvert City procedure uses a calibration curve prepared from weighed standards of vinyl chloride in carbon disulfide ranging from 0-500 ppm.

The Escambia procedure uses an internal standard calculation. The main differences in these two types of calculations are: (1) The use of calibration curves requires exact repeatability of the sample injected which is difficult using only 2 ul samples. Sample size repeatability is not necessary when using the internal standard calculation. (2) The calibration curve procedure may lead to high results due to the adsorption of carbon disulfide by the carbon. Since this type of calculation is based on concentration of vinyl chloride in the supernatant carbon disulfide solution. The assumption is, however, that the concentration of vinyl chloride in the adsorbed carbon disulfide is the same as in the supernatant carbon disulfide. The internal standard calculation eliminates both of these potential problems since the vinyl chloride is determined on a weight basis as compared to the weight of the internal standard.

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Conclusions:

1. Century Organic Vapor Analyzer

- a) The calibration gas blends for the Century organic vapor analyzer as prepared by both labs should be satisfactory. Both methods give a vinyl chloride-air mixture which is ultimately analyzed by same VPC procedure to determine the exact vinyl chloride concentration.

The use of purchased certified vinyl chloride-air gas standards by both labs will reduce potential inconsistencies between the two labs.

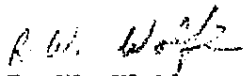
- b) Both the vinyl chloride calibration curve relating vinyl chloride vs Century meter reading and the direct calibration procedure should be satisfactory. The only advantage of the calibration curve would be to show the linearity of the meter.

2. Residual VCM in Resins

The residual monomer analyses should be standardized as to the size of sample preparation bottles used. I feel that the vapor space should be kept at a minimum to minimize monomer losses from the tetrahydrofuran solution.

Vinyl Chloride Adsorption - Personnel Monitoring

The vinyl chloride adsorption test should be standardized as to which analytical procedure is used. The analytical procedure used at Calvert City allows for much faster analyses; however, I feel that it may introduce more errors. The internal standard procedure eliminates any sample volume error and any error associated with the adsorption of carbon disulfide by the carbon.


R. W. Wolfe

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6. Ray
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6 THE WALL STREET JOURNAL, Wednesday, March 13, 1974

Vinyl Chloride Exposure Should Be Cut To Unmeasurable Levels, Officials Urge

By a WALL STREET JOURNAL Staff Reporter

WASHINGTON — Over the objections of industry, federal scientists are recommending that worker exposure to vinyl chloride be reduced to amounts too small to be measured in order to avert possible liver cancer.

Federal standards currently limit exposure to vinyl chloride to 500 parts per million in the atmosphere, and industry experts have urged that the limit be set at 50 parts per million.

However, scientists at the National Institute for Occupational Safety and Health are unable "to describe a safe exposure level," Dr. Marcus Key, the institute's director, advised the Labor Department. Therefore, he added, "We rejected the concept of a threshold limit for vinyl chloride gas in the atmosphere."

Instead, the institute is recommending that when an employee is exposed to any measurable concentration of vinyl chloride gas, he should wear an air-supplied respirator.

In addition, the proposal calls for a control plan to reduce air-borne levels of vinyl chloride to amounts that can't be detected by certain recommended procedures, as well as an air-sampling procedure and a system of full body protective clothing for workers in regulated areas.

In a memo to the department's Occupational Safety and Health Administration, Dr. Key said nine cases of angiosarcoma, a rare type of liver cancer, have been discovered among workers exposed to vinyl chloride for periods of 12 years and longer. Some 6,500 employees at 37 plants operated by 23 U.S. manufacturers are potentially involved.

The problem came to public attention in January when a division of B. F. Goodrich Co. said four workers at its Louisville, Ky.,

plant, which converts vinyl chloride and polyvinyl chloride, had died from the rare liver cancer.

Dr. Key's institute, an arm of the Department of Health Education and Welfare, makes scientific recommendations on worker exposure to hazardous substances. However, actual standards are set by the Labor Department's Occupational Safety and Health Administration, or OSHA.

The department hasn't decided whether to issue an emergency standard for vinyl chloride exposure, an OSHA spokesman said yesterday. Dr. Key is proposing "expedited" procedures to formulate a permanent standard. Under such procedures, the department might, for example, skip the usual step of appointing an advisory committee to make recommendations. Expedited standard setting might take up to four or five months.

Any decision to avoid a more immediate emergency standard would distress labor groups. The AFL-CIO's industrial union department had sought such a standard, which would impose engineering and workplace practices to reduce vinyl chloride exposures while a permanent standard is being prepared. Without such rules, there isn't any protection for workers while the standard-making process moves forward, said Sheldon Samuels, the industrial union department's safety and health director.

"Nothing is happening in the plants" to improve protection of workers because concerns are awaiting issuance of federal standards, Mr. Samuels asserted. Some concerns have asserted they are reducing exposures and improving procedures without federal directives.

Dr. Key's recommendation covers companies that convert vinyl chloride, a colorless gas, into polyvinyl chloride, a widely used solid plastic material.

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