Attachment for SPI Questionnaire
Letter Dated May 21, 1974

The following table shows the breakdown of losses for the Oklahoma City PVC plant for our present operation. The figures are based on weight percent of the incoming VCM feed rate, and are only approximate. Most of the data is subject to fluctuations of ± 50% and on some figures by as much as ± 300%. Overall it is the best data available.

The table shows that almost all the unaccountable losses are vapor and not solids losses.

Location	Solids or Vapor	Okla. City w/o	SPI Industry Typical w/o	VCM in Vent ppm	VCM in Vent #/100 #
VCM RR Car Unloading	Vapor	-	0.40	-	-
VCM Storage to Reactor	Vapor	-	0.50	-	-
Reactor Cleaning	Solids	0.10	0.10	-	-
Slurry Hold Tank	Solids	-	0.10	-	-
Centrifuge Water	Solids	0.00	0.20	-	-
Slurry Strainer	Solids	0.22	0.10	-	-
Recovery Venting	Vapor	-	3.75	-	-
Slurry Hold Tk Vent	Vapor	0.16	0.30	12,000	1.2
Dust Collector PVC	Solids	-	0.20	-	-
Dryer PVC Loss	Solids	0.01	0.20	-	-
Sifter Oversize	Solids	0.17	0.40	-	-
Dryer Exhaust	Vapor	0.81	0.30	1,200	0.12
Product Samples	Solids	0.01	0.20	-	-
Slurry Strainer Vent	Vapor	0.06	-	4,000	0.4
Lump Sum Unaccountable Losses		0.71	-	-	-
		2.25	6.75		

Gary R. Johnson
Research Engineer
Chemicals Research Division

SPI EPA QUESTIONNAIRE

PVC PLANT 1

Question #1 - 100# VCM ⟶ 96.7 lbs Resin Product
⟶ .1 lbs Lost from Reactor (PVC)
⟶ 2.9 lbs Lost from Dryer @ 300 ppm as VCM
⟶ 0.3 lbs Lost from Dryer as PVC

Question #

2 a)		Yes
2 b)	Range	0.0 - 1.3
	Average	1.0
3 a)	(1)(c)	No
	(2) 24 H TWA	Yes
	(3) 30 D TWA	Yes
	(4)	Guess
3 b)	(1)	No
	(2)	No
	(3)	No
	(4)	Guess
4 a)	(1) C	No
	(2) 24 H TWA	Yes
	(3) 30 D TWA	Yes
	(4)	Fairly Sure
4 b)	(1)	No
	(2)	No
	(3)	No
	(4)	Probably Not

6-4-7/

SPI EPA QUESTIONNAIRE

PVC PLANT 2

Question #1 - 100# VCM ——→ 98.15 lbs Resin Product and Accountable Resin
0.16 lbs Lost from Slurry Hold Tank @ 12000 ppm as VCM
0.01 lbs Lost from Dryer as PVC
0.81 lbs Lost from Dryer as VCM @ 1,200 ppm
.06 lbs Lost from Slurry Strainer Vent
.71 lbs Lost - Unaccountable
.10 lbs Lost from Reactor (PVC)

Question #

2 a)		Yes - Preliminary
2 b)	Range	0 - 3
	Average	<1
3 a)	(1)(c)	No
	(2) 24 H TWA	No
	(3) 30 D TWA	Yes
	(4)	Guess
3 b)	(1)	No
	(2)	No
	(3)	No
	(4)	Guess
4 a)	(1) C	No
	(2) 24 H TWA	Yes
	(3) 30 D TWA	Yes
	(4)	Fairly Sure
4 b)	(1)	No
	(2)	No
	(3)	No
	(4)	Probably Not

THE SOCIETY OF THE PLASTICS INDUSTRY, INC.

250 PARK AVENUE • NEW YORK, NEW YORK 10017 • 212/687-9675

May 21, 1974

TO: Members of EPA Committee and Other
Committees of the VC Monomer and PVC Resin Group

This communication is directed to those members who attended the May 20 EPA Committee meeting for response, and to the members of the other committees for their information. If your company was not represented at the May 20 meeting, please supply the requested information.

Time is critical -- so please respond before June 4, 1974.

Your cooperation in promptly supplying this information is greatly appreciated.

Cordially,

T. J. McGrath

TJM/cl

QUESTIONNAIRE ITEMS

1) Material balance - please fill in material balance flow sheet (enclosed) with your best estimate of losses to air, water and solid waste at each exit point. Show vent emissions both as #/100# and ppm concentration. Do not distribute unaccountable losses. List as a lump sum in lower left corner of sheet in place provided.

2) a) Have you made a perimeter survey of airborne VCM? _____

   b) If so, what is the range and average of results on the downwind vector? _____

3) Ambient air standards

   a) Could you comply with 1 ppm (v/v) maximum concentration on your most critical downwind vector:

      1) As a ceiling? _____

      2) As a 24 hour TWA? _____

      3) As a 30 day TWA? _____

      4) Degree of certainty a) guess _____

         b) dispersion calculations _____

         c) actual measurement _____

   b) Repeat for 60 parts per billion (v/v)

4) As of December 31, 1977, assuming realistic investments, could you comply with 1 ppm on your most critical downwind vector?

a) (1) (v/v) as a ceiling

(2) as a 24 hour TWA

(3) as a 30 day TWA

Degree of confidence: certain _____

fairly sure _____

b) Repeat for 60 ppb

Degree of confidence: certain _____

fairly sure _____

doubtful _____

probably not _____

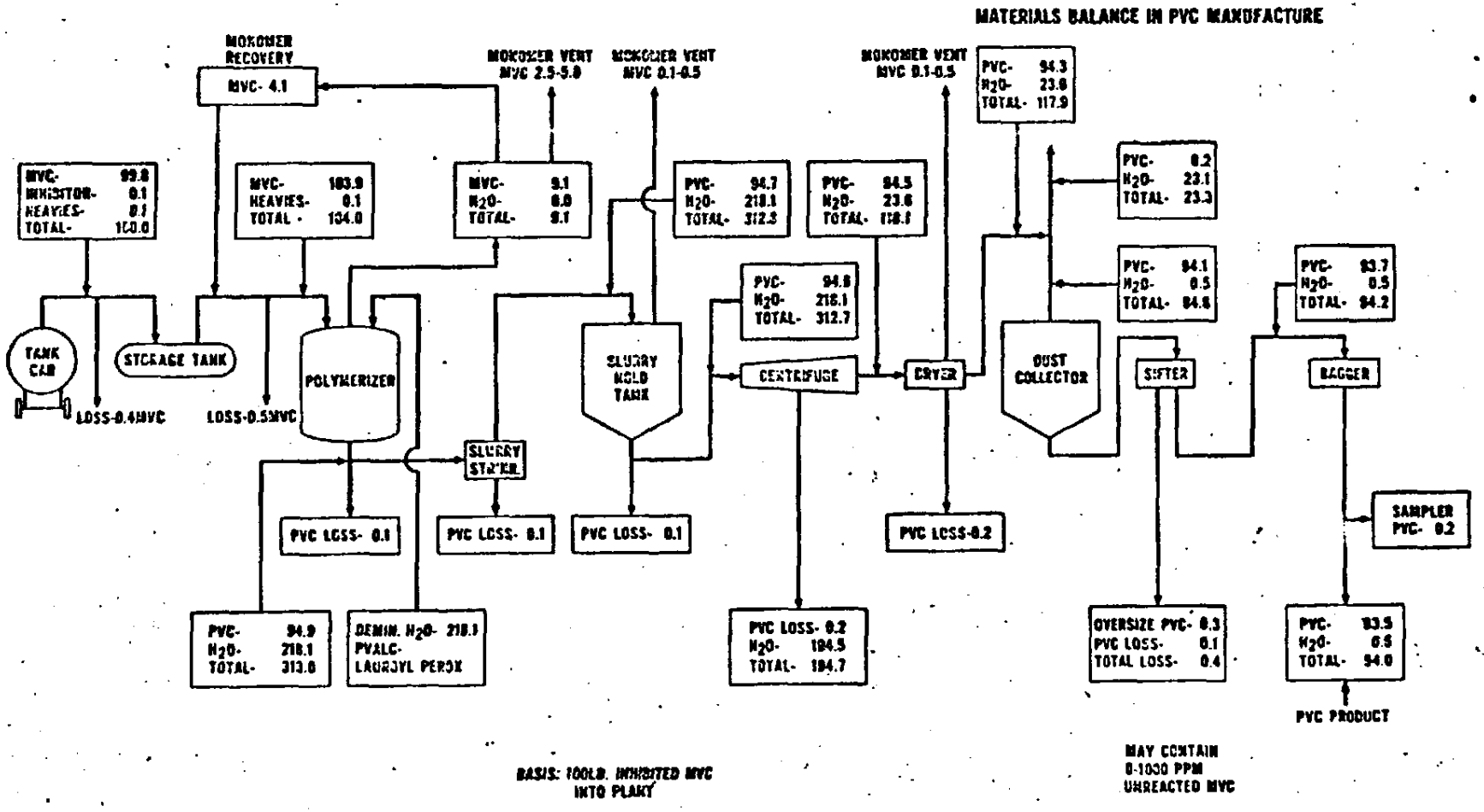
* * * *

OUTDOORS

PRELIMINARY ESTIMATE OF LOSSES

IN PVC SUSPENSION POLYMERIZATION
(TYPICAL PROCESS)

ENCLOSED IN BUILDINGS



Friday June 7 - 8 am

Olga Jordano, RWG secretary, phoned.

She had received word from the Society of the Plastics Industry that they plan to reconvene their meeting of June 5 on

Monday, June 10 - 9:30 am
Mayflower Hotel, Washington

She needs to inform Miss Jones of SPI, before 4 pm today, who from Conoco will attend this meeting.

She gave this information to RWG when he phoned in this morning from Greenbrier. He told her to pass the information on to you.

She has also informed KLS.

The SPI have reserved a block of rooms at the Mayflower for Sunday night arrival.

Please phone RWG secretary.

8:45 am

Marsha Joseph, KLS secretary, phoned. She has made reservations for you and Dr. Whetstone at the Mayflower Hotel, Sunday night, June 9.

EPA Bank ?

LNV - 203

J. Alix - 380

MF - 212

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WASHINGTON, D.C. 20460

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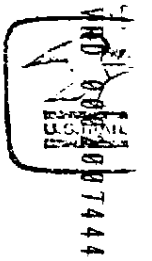


Environmental News

Arsht (202) 755-0496
O'Neill (202) 755-0344

FOR IMMEDIATE RELEASE FRIDAY, MAY 31, 1974

EPA REQUESTS VINYL CHLORIDE DATA FROM MANUFACTURERS

The Environmental Protection Agency has requested "process, emission and air quality data" from the 27 U.S. manufacturers of vinyl chloride, a gaseous chemical, and polyvinyl chloride, a plastic derived from the gas.

The information is being sought from 14 vinyl chloride and 35 polyvinyl chloride plants operated by these 27 companies.

EPA said in letters to the manufacturers dated May 30, 1974, that the Agency is "gathering information for possible use in the development of air pollution control standards for vinyl chloride in accordance with the Clean Air Act of 1970."

EPA is now taking atmospheric samples near polyvinyl chloride and vinyl chloride plants to determine amounts of the gas present in the ambient air. The monitoring data will be available to the public as soon as it has been processed and verified. At present, no Federal air pollution control standards exist for vinyl chloride.

The EPA request for information from the manufacturers covers three areas: (1) Identification of emission points in the manufacturing process and the amounts lost from those points. The identification of emission control procedures that have been or could be instituted and an evaluation of their effectiveness

(more)

are also being sought. (2) Cost and economic data, including the capital and operating costs for each emission control device or procedure. (3) Ambient air quality data which has been collected by the manufacturers near their plants.

EPA is requesting the information under the authority of Section 114 of the Clean Air Act, which enables the Agency to develop data needed for standard-setting pursuant to the Act.

Vinyl chloride has been implicated in 19 world-wide cases of a rare but fatal form of cancer, angiosarcoma of the liver, among workers engaged in the conversion of the chemical to polyvinyl chloride. Similar cancers also have been produced in experiments exposing rats and mice to vinyl chloride. In both cases, exposure to vinyl chloride gas occurred repeatedly over extended periods of time.

Today's action follows several steps already taken by EPA in an effort to protect the public from the potential adverse effects of vinyl chloride:

--February 14, 1974, Administrator Russell E. Train formed an internal task force to assess the overall environmental impact of the chemical.

--April 5, 1974, EPA notified the producers of all pesticides with aerosols containing vinyl chloride of the need to substitute another propellant.

--April 10, 1974, EPA Regional Administrators were asked to assess the extent to which vinyl chloride is escaping beyond the confines of the polyvinyl chloride production facilities in their regions.

--April 17, 1974, EPA released the brand names of 20 pesticides containing vinyl chloride.

--April 24, 1974, EPA suspended from sale and requested a recall of all pesticide aerosols for indoor use containing vinyl chloride.

Based on the April 5 notice and a follow-up of April 30, all of the manufacturers of pesticide aerosols containing vinyl chloride either have substituted or are now in the process of substituting an alternate propellant.

# # # #

VINYL CHLORIDE AND POLYVINYL CHLORIDE MANUFACTURERS CONTACTED BY EPA

AIR PRODUCTS AND CHEMICALS, INC.
AMERICAN CHEMICAL CORPORATION
BORDEN CHEMICAL, INC.
CONTINENTAL OIL COMPANY
DIAMOND SHAMROCK CHEMICAL COMPANY
ETHYL CORPORATION
FIRESTONE PLASTICS COMPANY
GENERAL TIRE AND RUBBER COMPANY
B.F. GOODRICH CHEMICAL COMPANY
GOODYEAR TIRE AND RUBBER COMPANY
GREAT AMERICAN CHEMICAL COMPANY
HOOKER CHEMICAL
KEYSOR-CENTURY CORPORATION
MONSANTO COMPANY
NATIONAL STARCH AND CHEMICAL CORPORATION
OLIN CORPORATION
THE PANTASOTE CO. OF NEW YORK, INC.
ROBINTECH, INC.
STAUFFER CHEMICAL COMPANY
TENNECO CHEMICALS, INC.
UNION CARBIDE CORPORATION
UNIROYAL INCORPORATED
ALLIED CHEMICAL CORPORATION
DOW CHEMICAL COMPANY
MONOCHEM, INC.
PPG INDUSTRIES, INC.
SHELL CHEMICAL COMPANY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

Dear

The Office of Air Quality Planning and Standards of EPA is in the process of gathering information for possible use in the development of national emission standards for vinyl chloride (VC) and polyvinyl chloride (PVC) plants in accordance with the Clean Air Act of 1970. This information will be obtained from a number of such plants for purposes of quantifying the emissions, ambient concentrations, and identifying control techniques presently being used to reduce emissions. We will need the following information from your company regarding your PVC plant located

Process and Emission Data

Please provide a brief description of the process to include all transfer and storage points. Include information on the manufacture of PVC through the formation of PVC pellets.

The following information should also be included.

A. Process flow sheet - Provide a simple process flow sheet showing all major equipment and the amount of product produced.

B. Emissions - On the process flow sheet indicate all continuous and intermittent sources of air emissions. Give the composition and amount of each emission expressed in terms of pounds per pound of product produced, concentration, and pounds per hour. If emission data are not available "best estimates" are to be prepared. The bases and assumptions used in preparing the emission estimates are to be discussed in detail.

C. Control Device - Emiss n control devices presently in use should be indicated on the process flow sheet. Show the amount and composition of process streams into and out of each control device. Provide a brief engineering description and significant operating and design parameters for each device. Provide a discussion of the control devices or techniques that could be applied to each source of emissions and the approximate emission reductions that would result from application of that technology.

D. Fugitive Emissions - Estimate by material balance (or other method) the total amount of vinyl chloride lost from leaks through valve stems, safety valves, pump seals and other miscellaneous sources. In addition, emissions resulting from line or vessel blow down, reactor ventilation, storage or transfer operations within the plant are to be estimated and summarized. The individual locations and amount of each emission in pounds per hour is to be specified.

E. Emission Control Procedures - If special maintenance procedures, process design features or plant operating procedures are used to control emissions describe the methods used and estimate their effectiveness. Discuss procedures that could be used or are planned to reduce emissions.

Control and Economic Data

For each of the control devices or emission control procedures currently in use or planned give the following information.

A. Investment Cost - Provide separately the total investment cost and the cost of installation (where applicable). Include a list of the equipment, the year of purchase, and whether the system was part of the original plant or was retrofitted.

B. Operating and Maintenance Cost - Provide estimates of the expected life of the control equipment and the annual operating and maintenance costs required. Operating costs should distinguish labor costs, capital charges, cost of utilities used, fuel costs, and costs of chemicals and other materials. Give amount and value of any material recovered, both annually and per unit of production.

Ambient Air Data

A. Provide the results of any ambient air sampling for vinyl chloride which you have done. Show layout of plant with location of major process areas, sampling points, and concentrations found.

Give the analytical and sampling method used and weather data during the sampling period.

B. Where possible for each source of emission provide the information that is necessary to estimate ambient air concentrations. This would include stack heights, configurations and diameters, the gas flow rates, temperature, and gas velocities to the atmosphere.

The Environmental Protection Agency has broad authority to secure any information deemed necessary for development of standards under the Federal Clean Air Act (42 U.S.C. section 1857, et. seq.). Section 114 of the Act (42 U.S.C. section 1857c-9) authorizes this agency to make inspections, conduct tests and require owners or operators of any emission source to submit information for the purpose of developing emission standards. This letter and the requests for information contained herein are being sent pursuant to section 114.

Any records or information obtained during an investigation shall be available to the public unless a satisfactory showing has been made to the Administrator that the release of the information obtained would divulge a trade secret. Information requested pursuant to section 114 cannot be withheld from EPA on the grounds that you consider it to be confidential.

If you believe that any of the information we are requesting would reveal a trade secret if divulged, you should clearly identify that information, and set forth reasons for your claim, including supportive data or legal authority. Your reasons and supportive data should be presented separately for each item of information. Unsupported statements that you consider certain information confidential will not be accepted. Emission data, however, will always be available to the public. Any information determined to constitute a trade secret will be covered by 18 U.S.C., section 1905. A copy of the Act is enclosed for your convenience.

Please provide all of the information requested in writing before June 14, 1974. In addition, we may be requesting that representatives of your company meet with the EPA to discuss the information requested in this letter and other matters concerning the vinyl chloride emission problem. EPA may also request additional information.

Please contact Mr. Leslie L. Evans at 919-688-8146, extension 295, if you have any questions regarding the specific information requested in this letter.

Sincerely yours,

Don R. Goodwin
Director
Emission Standards and
Engineering Division

Enclosure

NEW

FOLDER

820-23

SPI -- VCM/PVC

MAY 1973 through MAY 1974

Study of Vinyl Chloride

EPA Cancer Data Being Withheld

From News Dispatches

HOUSTON, May 25—Data from a study of the concentration here of a potentially cancer-causing chemical is being withheld because of possible criminal prosecution, according of federal officials.

As part of an Environmental Protection Agency study of vinyl chloride, air samples are being collected near chemical plants along the Houston Ship Channel to determine the concentration of the chemical in the atmosphere.

An EPA lawyer in the agency's Dallas regional office said Friday that the results of the Houston study would be withheld because the study "represents the investigation files of a law enforcement agency" and polluters releasing the gas could be subject to prosecution.

At least 12 deaths in the United States and elsewhere have been linked to vinyl chloride gas. It is suspected as a cause of a form of liver cancer, angiosarcoma.

The EPA attorney, Jim Collins, said the information was being withheld at the instruction of George Marcenthal of EPA headquarters in Washington.

The information would be released only after evaluation and possible legal disposition, Collins said.

The EPA vinyl chloride team is testing for the chemical at 10 plants around the country, including those in Houston. Dr. Glenn E. Schweitzer, head of the EPA team, said an estimated 200 million pounds of the gas escapes annually into the atmosphere in the United States.

Meanwhile, in Akron, the president of B.F. Goodrich's Chemicals Division raised the spectre of massive job losses in a critique of the proposed new Occupational Safety and Health Administration standards for worker exposure to vinyl chloride.

"The proposed standard of no detectable level of exposure does not appear to be possible with the current state of technology," Anton Vittone said, "And, if imposed, could displace not only the 6,500 vinyl chloride monomer and polyvinyl chloride production workers, but also hundreds of thousands of other employees in the companies which use PVC."

Vittone said about 100 scientists and others are working six to seven days a week in a multimillion-dollar effort to reduce employee exposure to vinyl chloride.

Five of the reported vinyl chloride deaths were among former employees of Goodrich's plant in Louisville. Two cases were reported among living employees there.

SPI

THE SOCIETY O. THE PLASTICS INDUSTRY, INC.

250 PARK AVENUE • NEW YORK, NEW YORK 10017 • 212/687-2675

IMPORTANT MEETING NOTICE

May 28, 1974

TO: Members of the VCM and PVC Producers Group

Dear Member:

Confirming our phone call of May 28, a very important committee meeting will be held Wednesday, June 5, 1974 at the Statler Hilton Hotel in Washington, D.C. (located at 16th and K Streets) starting at 8:30 a.m. in the Federal Room.

The purpose of the meeting is to establish an industry position regarding the proposed O.S.H.A. standard for VCM. In addition, we will begin preparations for the O.S.H.A. hearings which will start on June 25.

In view of the nature of this meeting, your representative should be senior management so that he can commit your company to the actions that will be taken.

You are also strongly urged to bring a technical representative and an attorney. Due to space limiations, we must restrict attendance to three per company.

Please call Laura Jones of SPI (212-687-2675) to advise who will represent your company. For hotel rooms Tuesday evening, you must make them directly with the Statler Hilton - call Mrs. Zyderfeld in reservations at (202) 393-1000. The hotel is holding a block of rooms in SPI's name up until May 31. Please make your reservations as soon as possible.

I look forward to seeing you on June 5. Should you have any questions, please let me know.

Cordially,

Thomas J. McGrath
General Manager

RLH:lj

May 24, 1974

Air Mail - Certified Mail

Hearing Clerk
Food and Drug Administration
Room 6-86
5600 Fishers Lane
Rockville, Maryland 20852

Dear Sir:

Mr. Jerome H. Heckman has indicated that information related to residual vinyl chloride monomer (VCM) in typical polyvinyl chloride (PVC) materials, including potable water pipe, should be sent to your attention per the request in the April 22, 1974 Federal Register, p. 14215. You will find enclosed in quintuplicate the following information:

Enclosure I.	Analysis of Polyvinyl Chloride (PVC) Resin for Residual Vinyl Chloride Monomer (VCM)
Enclosure II	Extractability of Vinyl Chloride Monomer in Polyvinyl Chloride Pipe
Enclosure III	Gas Chromatogram of VCM in Water
Enclosure IV	Gas Chromatogram - Water Blank
Table I	Residual VCM in PVC Pipe
Table II	Residual VCM in Flexible PVC Compound Pellets
Table III	Residual VCM in Miscellaneous PVC Items
Table IV	Water Extraction of Residual VCM in PVC Pipe

Summary

The samples of commercial PVC pipe analyzed by Enclosure I of the attached procedures generally contain zero to 90 parts per million (ppm) of residual VCM.

When the pipe is subjected to water extraction at 25°C or 50°C for 72 hours per Enclosure II of the attached procedures, less than 50 parts per billion (ppb) of VCM is normally found in the extract. The exceptions to the latter occurred when pipe was extracted for periods of 18 days and 3 years. These lengthy extractions under stagnant conditions are thought to be very unrealistic representations of normal piping system usage.

We believe the data submitted clearly show that PVC pipe can be used for potable water and not cause any problem related to extraction of the residual VCM.

The analysis of various other finished PVC items, including compound pellets used in extrusion of finished items, shows that in most cases there is either no detectable VCM present or very low levels. However, a value of 150 ppm in one compound pellet sample was found and is indicative of random scatter.

Determination of Residual VCM in PVC Materials

The intention was to examine a variety of fabricated products for residual VCM levels. A significant variable is the time lapse following fabrication, on the assumption that VCM will diffuse from the structure with time. Therefore, an effort was made to sample materials with a variety of elapsed times since production; emphasis was on VCM content as soon after production as possible to better assess the highest VCM levels that could possibly be encountered in product use.

Another variable is the amount of residual VCM in the PVC resin from which the object is made. Where possible, the resin was analyzed for VCM, although a certainty that a given resin sample corresponds to a subsequently produced section of product is clearly not possible.

The data presented in Table I indicate that PVC pipe may contain up to 100 ppm of VCM, with a general trend to lower levels of VCM with increasing time. The data do show some random scatter; it is believed that additional samples will show the scatter to be statistically expected.

The data found in Table II show that very low quantities of VCM are present in compound pellets with the exception of one value of 150 ppm. We have no explanation for the high value other than of random scatter in data.

In Table III, various miscellaneous items were analyzed for residual VCM. In all cases, less than one ppm of VCM was found.

Extractability of Residual VCM in PVC Pipe

Data are presented in Table IV related to extraction of residual VCM from PVC water pipe. The data, except for the last two samples, are derived from an extraction method (Enclosure II) essentially identical to that used by the National Sanitation Foundation (NSF). The only difference is that deionized water was used in the present test method; NSF uses water at pH 5 to facilitate the extraction of heavy metal ions which are of concern to NSF. For the current purpose, it was judged that the use of neutral, deionized water would not affect the extraction of VCM. The last two samples (Ref. No. 26 and 27) represent analyses of water which was contained in a two-foot length of two-inch diameter sealed pipe for the period indicated. Since the pipe had been set aside, neither the temperature nor the ratio of surface to water was controlled. The temperature probably varied from 5^{o} to 35^{o}C. It is believed that lengthy exposure of stagnant water in a piping system, as in these samples, is an unrealistic representation of exposure under practical circumstances. We plan to do additional work on this point.

Future Plans

Additional data will be collected regarding residual VCM in PVC pipe, compound pellets, and miscellaneous items, along with the continuing work related to extractability of residual VCM from PVC pipe. Since the method for determining residual VCM in PVC will probably be a required plant function, it is advisable to adapt the methods (Enclosures I and II) of detection to flame ionization. Flame ionization detection (FID) is potentially equally as sensitive as coulometry but requires more attention to chromatography since FID is not selective. Impurities which could come from the solvent and/or the resin must be separated chromatographically from the VCM before entering the detector. We have made good progress in adapting the method for FID but much more work must be completed before the method becomes routine.

Should you require additional information or believe a meeting would aid your evaluation of these data, please advise me.

Yours very truly,

lm
enc
Copy w/enc to:
Mr. Jerome H. Heckman
1150 17th Street N.W.
Washington, D.C. 20036

bcc w/enc: KLS WRS (EAS REL)

ENCLOSURE I

ANALYSIS OF POLYVINYL CHLORIDE (PVC) RESIN FOR RESIDUAL VINYL CHLORIDE MONOMER (VCM)

Various PVC resins have been analyzed for residual VCM by first dissolving the resin in tetrahydrofuran (THF) and then chromatographing the headspace gas for quantitative analysis of VCM present in the resin. Microcoulometry is used for detection because this detector is specific for the chlorinated species. Compounds other than halogenated materials will not be detected; consequently, separation of components via the chromatographic column is not nearly so critical as with other types of detection.

EXPERIMENTAL

Samples. The samples of resin are dissolved using 5 grams of resin in 50 milliliters of THF. This mixture must be stirred or shaken to dissolve the resin. Using either a roller-mixer or magnetic stirring, it can take up to two hours to complete solution. The mixture is dissolved in a 4-oz bottle equipped with a Teflon-lined septum cap. Before sampling, shake the solution vigorously and withdraw 5 milliliters of the headspace gas. When sampling, inject the same volume of air equal to the volume of headspace gas to be taken for injection. This prevents depletion of the headspace volume. The sample is injected into a chromatograph equipped with a Dohrmann model C-200 coulometer as a detector. The sample is converted to HCl in an oxidation furnace; the resultant HCl is then titrated in an Ag-AgCl coulometric cell.

Standards. Into a 4-oz bottle put 50 milliliters of THF. Close the bottle with a Teflon-backed septum cap. Inject one milliliter of VCM into the liquid and mix thoroughly. Let stand for 10 minutes and inject sample. Inject into the bottle a volume of air equal to the volume of headspace gas to be taken for the injection. This amount of VCM in 50 milliliters of THF is the equivalent of 280 ppm by weight of a 5-gram portion of PVC dissolved in 50 ml of THF, uncorrected for pressure and temperature. Standard temperature and pressure corrections should be made when actually running the standards. Various concentrations are prepared and a calibration graph plotted. This graph is then used when analyzing the samples to determine concentration.

Chromatographic Conditions. The column used is a 5' x 1/4" O.D. aluminum tube packed with 8 percent SE-30 (silicon oil from General Electric Company) on 80/100 mesh Chromosorb G (Johns-Manville). The column is not critical when using the coulometer for detection since the detector is specific for halogenated compounds. The sample is injected using a gas syringe. The oxidation furnace is maintained at 850°C with a flow rate of ~20 cc/min of oxygen. Load resistors are chosen dependent on sample concentration and sample size, varying from 50Ω to 300Ω. Carrier gas is helium at a flow rate of 35 cc/min.

DISCUSSION

The method as set forth above gives accurate, reproducible results. Linearity of response is maintained from one ppm to 18,000 ppm. Accuracy at the 100 ppm level or less is ± three percent at the 99% confidence level. At higher concentrations the deviation approximates ±10%. In theory the coulometer is straightforward and permits absolute determinations of concentration. However, in practice the detector requires considerable technique and careful control of operating parameters. Its major advantage is the fact that it is selective for only halogenated species, thus eliminating numerous possible interferences.

May 24, 1974

ENCLOSURE II

EXTRACTABILITY OF VINYL CHLORIDE MONOMER IN POLYVINYL CHLORIDE PIPE

Polyvinyl chloride (PVC) pipe can be safely used for potable water providing significant amounts of vinyl chloride monomer (VCM) are not extracted with water when treated at either room temperature (25 degrees Centigrade) or at elevated temperature (50 degrees Centigrade). Significant amounts are those in excess of 50 ppb. The tests are made under static conditions using an appropriate ratio of one thousand square inches of pipe to four thousand milliliters of water.

APPARATUS

Glass Syringes. Fifty-milliliter, glass syringes are used for preparation of standards and as equilibration chambers for sample preparation.

Sample Container. A 4-liter Mariotte bottle is used to hold the sample (PVC pipe) and the water. The bottle outlet is equipped with a short length of Latex tubing and a clamp. This provides a means for withdrawing a sample. A stopper is affixed with a short length of Saran tubing to permit degassing of the water as well as allowing for filling of the bottle completely with water.

Gas Chromatograph. The gas chromatograph (F&M Company Model 810 or equivalent) is equipped with a suitable column, a gas sampling valve and a specific detector, i.e., a microcoulometer. The specificity of the detector, in this case specific for halogenated materials, eliminates interference from other non-halogenated species which may be present. The instrument is operated using conditions adequate to separate VCM from the halogenated species with a sensitivity capable of detecting vinyl chloride when present in concentrations of 50 parts per billion or greater.

Gases. Helium is used as the carrier gas for transport of the sample through the column and into the microcoulometric detector. High-purity-grade helium is used with the appropriate regulator. Extra-dry-grade oxygen, with the appropriate regulator, is used as a supply to the combustion furnace of the microcoulometer.

PROCEDURE

Standardization. Forty milliliters of deionized water is added to a fifty-milliliter syringe equipped with a syringe valve. All of the air is expelled from the syringe and ten microliters of VCM is discharged into the center portion of the water. This is accomplished using a ten-microliter syringe, inserting it through the syringe valve and discharging the contents into the water. The syringe containing the

water is in an inverted position for this operation. The ten-microliter syringe is withdrawn after discharge of its contents, the valve closed and the water-VCM mixture shaken until the VCM bubble is dissolved. Ten milliliters of air is drawn into the syringe and the syringe is shaken vigorously for fifteen minutes. The air is injected into a one-milliliter, flow-through sample loop and injected into the chromatograph. The gas sampling loop is maintained at 50 degrees Centigrade. The peak area obtained is ratioed to the peak area obtained from the sample. A ten-microliter sample of VCM in 40 milliliters of water corresponds to 625 ppb VCM by weight using a calculated density for gaseous VCM of 2.49 mg/ml at 25°C and 740 Torr.

Sample Analysis. A sample of PVC pipe is cut so as to obtain approximately 1000 square inches of surface area. This material is placed in the 4-liter Mariotte bottle and the bottle filled with deionized water. Water is added one liter at a time. After each water addition the bottle is connected to house vacuum and agitated slightly until all visible air bubbles are removed. The second, one-liter portion of water is added and the same procedure followed. This is repeated after each water addition until the bottle is full to the lip of the bottle. A rubber stopper equipped with a short length of Saran tubing is forced into the neck of the bottle until water overflows through the tube. The tube is then stoppered with a microstopper. The volume of water is recorded as well as the surface area of the pipe. The bottle plus sample is immersed in a thermostated water bath and controlled at the temperature of choice. Samples can be taken at time intervals selected. A typical series of sampling times is zero, 24 hours, 48 hours, and 72 hours. When a sample is to be withdrawn, the bottle is removed from the water bath and a syringe equipped with a three-way valve is affixed to rubber tubing at the outlet. The microstopper is removed and 40 milliliters of water is drawn into the syringe. The syringe is withdrawn from the outlet and 10 milliliters of air is drawn into the syringe. The valve is closed and the syringe is shaken vigorously for 15 minutes. The syringe is then attached to the heated, one-milliliter, flow-through gas sampling valve and the air sample injected. The peak area obtained is ratioed to the peak area of the standard to determine the concentration of vinyl chloride.

Operating Conditions. The gas chromatograph is equipped with a column consisting of a 6-foot by 1/4-inch O.D. aluminum tube packed with SE-30 (silicon oil from General Electric Company) on 80/100 mesh Chromosorb G (Johns-Manville). The helium carrier gas rate is 45 milliliters per minute. The transfer line from the chromatographic column is maintained at 200°C and the column temperature is maintained at ambient. The furnace temperature of the combustion oven is 850°C with a 20-milliliter-per-minute flow of oxygen. The load resistor is maintained at 300 ohms for

the sample and 50 ohms for the standard. Under these conditions, 50 parts per billion of VCM gives a peak height consistently ten times the average noise level, and substantially better (up to 40 times noise) when the instrument is prepped for maximum performance.

May 24, 1974

ENCLOSURE III

GAS CHROMATOGRAM OF VCM IN WATER

INSTRUMENT

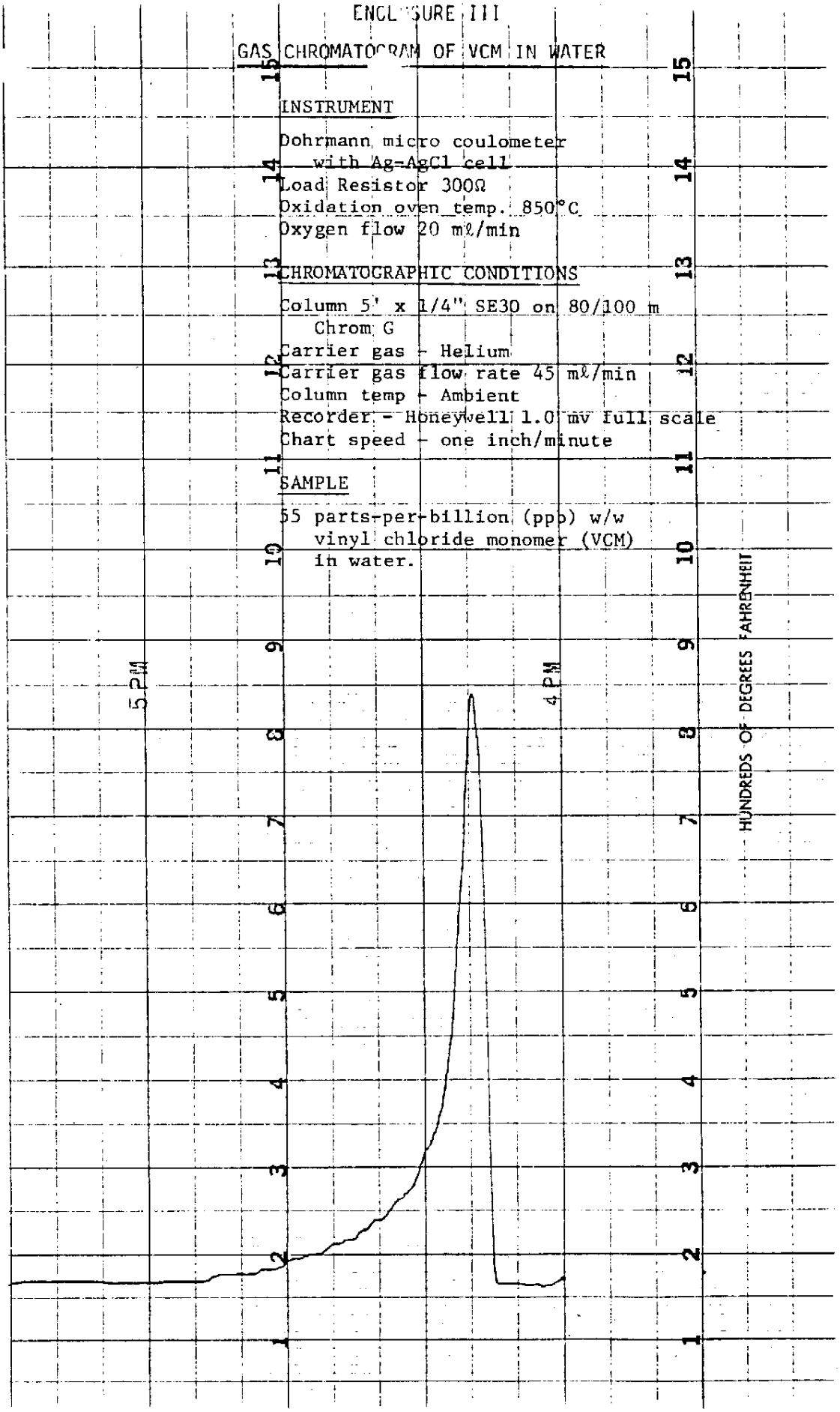
Dohrmann micro coulometer
with Ag-AgCl cell
Load Resistor 300Ω
Oxidation oven temp. 850°C
Oxygen flow 20 mℓ/min

CHROMATOGRAPHIC CONDITIONS

Column 5' x 1/4" SE30 on 80/100 m
Chrom G
Carrier gas - Helium
Carrier gas flow rate 45 mℓ/min
Column temp - Ambient
Recorder - Honeywell 1.0 mv full scale
Chart speed - one inch/minute

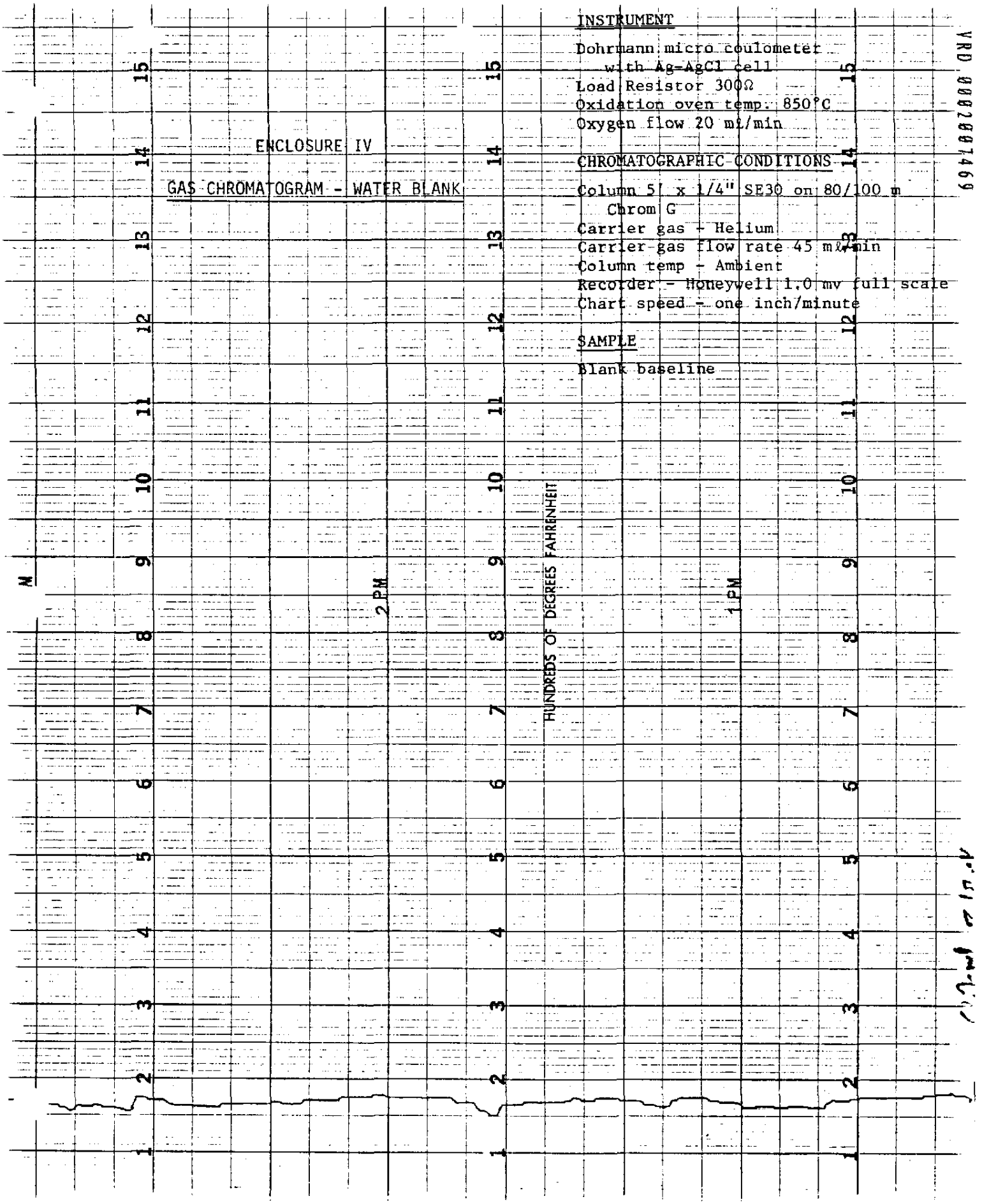
SAMPLE

55 parts-per-billion (ppb) w/w
vinyl chloride monomer (VCM)
in water.



ENCLOSURE IV

GAS CHROMATOGRAM - WATER BLANK



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Column temp - Ambient
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Chart speed - one inch/minute

SAMPLE

Blank baseline

VRD 0002001469

TABLE I

RESIDUAL VCM IN PVC PIPE

Sample* Reference	Estimated Time from Production Until Analysis	Estimate of VCM (ppm) in Resin Used in Fabrication	Residual VCM in Pipe (ppm)
1	7 days	120	67
2	5 "	150	15
3	5 "	530	18
4	4 months	-	91
5	5 "	-	<1
6	12 "	-	7
7	13 "	-	4
8	20 "	-	3
9	30 "	-	23
10	36 "	-	<1

*See attached Bibliography

TABLE II

RESIDUAL VCM IN FLEXIBLE PVC COMPOUND PELLETS

Sample* Reference	Estimated Time from Production Until Analysis	Estimate of VCM (ppm) in Resin Used in Fabrication	Residual VCM in Article (ppm)
11	7 days	5,000	54
11	7 "	2,500	150
12	<3 months	-	<1
13	<3 "	-	<1
14	3 days	7	<1
15	7 "	230	6

*See attached Bibliography

TABLE III

RESIDUAL VCM IN MISCELLANEOUS PVC ITEMS

Sample* Reference	Item and Estimated Time from Production Until Analysis	Estimate of VCM (ppm) in Resin Used in Fabrication	Residual VCM in Article (ppm)
16	Laboratory Tubing, 1/2-in. Unknown Production Date	-	<1
17	Electrical Cable Coating, 7 days	-	<1
18	Calendered Sheet, 0.010-in. Thickness, 3 days	1,400	<1
19	Calendered Sheet, 0.015-in. Thickness, 3 days	1,800	<1
20	Medical Tubing, 3 mm., 2-4 weeks	-	<1

*See attached Bibliography

TABLE IV

WATER EXTRACTION OF RESIDUAL VCM IN PVC PIPE

Sample* Reference	Estimated Time from Production Until Extraction	Extraction Temperature °C/Time	Extracted VCM (ppb)
21	9 months	25/72 hours	<50
		50/72 "	<50
22	<2 weeks	25/24 hours	<50
		25/48 "	<50
		25/72 "	<50
23	6 weeks	50/72 hours	<50
24	<4 weeks	25/15½ hours	<50
25	6 weeks	25/72 hours	<50
		25/432 "	370
26	10 weeks	-/10 weeks**	730
27	10 weeks	-/108 weeks**	1,560

*See attached Bibliography

**Temperature ranged from 5° to 35°C.

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Sample References

1. IOC, W. R. Sorenson to F. Kennedy, April 11, 1974, "VCM in Resin and Downstream Materials," item A-1.
2. Ref. 1, item A-2
3. Ref. 1, item A-3
4. *Notebook No. 1, W. R. Sorenson*, p. 141-1
5. Ref. 4, p. 141-6
6. Ref. 4, p. 141-5
7. Ref. 4, p. 141-4
8. Ref. 4, p. 141-3
9. Ref. 4, p. 141-2
10. Ref. 4, p. 141-1
11. Ref. 1, item B-1 ab, -1cd
12. Ref. 1, item B-2
13. Ref. 1, item B-3
14. IOC, W. R. Sorenson to F. Kennedy, April 17, 1974, "VCM in Resin and Downstream Materials II," items B-1, -2.
15. Ref. 14, items B-3, -4
16. Ref. 1, item B-3a
17. Ref. 4, p. 139-5
18. Ref. 14, items B-1, -2
19. Ref. 14, items B-3, -4
20. Ref. 1, item C-8

Sample References (Continued)

21. IOC, E. A. Setzkorn to F. Kennedy, "Analysis for VCM in PVC Pipe," June 29, 1973.

22. IOC, R. E. Laramy to F. Kennedy, "Analysis for VCM in PVC Pipe by Water Leaching," April 9, 1974, item 5.

23. Research Notebook L2923, pp. 126-130, Continental Oil Company.

24. Research Notebook L3190, pp. 164, 168, Continental Oil Company.

25. Research Notebook L2960, p. 152, Continental Oil Company.

26. Ref. 4, p. 141-6a

27. Ref. 4, p. 141-2a

associated with increased volume, improved production techniques and the performance of repetitive units (the learning curve concept) are realized.

Recovery of deferred production and other start-up costs is dependent on the number of aircraft ultimately sold and actual selling prices and production costs related to future transactions. Sales significantly under estimates or costs significantly over estimates could result in the realization of substantial losses on the program in future years. Realization of approximately $721,000 of the gross commercial aircraft inventories at December 31, 1974 is dependent on receipt of future firm orders.

Based on studies made by and on behalf of the Company, management believes there exists for this aircraft a market for over 250 units, including deliveries to date, with production and deliveries continuing at a normal rate to at least 1980. At December 31, 1974, 117 aircraft had been delivered under the program, and the backlog included 64 firm unfilled orders and options for 43 units.

During 1974, $251,000 of general and administrative expense and $33,000 of research and development expense were incurred and charged to inventories. Comparable amounts in 1973 were $238,000 and $42,000, respectively.

Title to certain inventories and contracts in progress is vested in the United States Government pursuant to contract provisions related to progress payments. Such amounts were $1,743,000 and $1,347,000 at December 31, 1974 and 1973, respectively.

[FR Doc.74-11804 Filed 5-23-74;8:45 am]

DEPARTMENT OF LABOR

Occupational Safety and Health Administration

[29 CFR Part 1910]

[Docket OSH-36]

VINYL CHLORIDE; OCCUPATIONAL EXPOSURE STANDARD

Hearing

On May 10, 1974, notice of proposed rulemaking with regard to a permanent standard for occupational exposure to vinyl chloride was published in the FEDERAL REGISTER (39 FR 16896). The notice provides an opportunity for public participation in the proceeding, by means of written submissions to be mailed to the given address, postmarked no later than June 10, 1974. The notice also permits interested persons to file objections to the proposed standard set out in the notice and request a hearing thereon. The objections must specify the provisions of the proposed standard to which objections are made, state the grounds for the objections, be accompanied by a summary of the evidence to be adduced at the requested hearing, and must be postmarked no later than June 10, 1974.

Informal contacts with Occupational Safety and Health Administration staff have disclosed widespread interest in the proceeding, a probability of requests for a hearing, and an alleged need for more time for the submission of written comments and the formulation of objections in accordance with the requirements of the notice.

Accordingly, it has been decided to waive the requirements for objections and request for a hearing thereon and instead to set for hearing the entire proposed standard, set forth in the May 10 notice. It is hoped that this decision will: (1) Eliminate the possible difficulty of formulating appropriate objections within the short period of time fixed in the notice; (2) permit full participation at the hearing, without limitation as to issues; and (3) expedite the proceeding, in view of the six-month provision in section 6(c) of the Williams-Steiger Occupational Safety and Health Act of 1970, and the expectation that a hearing would be requested and scheduled anyway.

Therefore, pursuant to sections 6(b), 6(c), and 8(c) of the Occupational Safety and Health Act of 1970 (84 Stat. 1593, 1596, 1599; 29 U.S.C. 655, 657), Secretary of Labor's Order No. 12-71 (36 FR 8754) and 29 CFR Part 1911, the notice of the proposed rulemaking on vinyl chloride published on May 10, 1974 at 39 FR 16896, is hereby amended in the following respects: (1) The part of the notice concerning the filing of objections and requests for hearing, in the third full paragraph of the middle column of page 16897 of the May 10 issue of the FEDERAL REGISTER, is withdrawn; and (2) in lieu thereof the following paragraphs are added:

Data, views, and arguments concerning the proposed standard will be received by an administrative law judge, to be appointed by the Chief Administrative Law Judge of the Department of Labor at an informal hearing to begin at 9:30 a.m. June 25, 1974 in the Departmental Auditorium on Constitution Avenue, between 12th & 14th Streets, NW., Washington, D.C.

The hearing shall be conducted in accordance with the rules of procedure in 29 CFR Part 1911. Any interested person desiring to participate at the hearing must file a notice of intention to appear with Ms. Joanne Goodell, Attn: Docket OSH-36, Occupational Safety and Health Administration, 1726 M Street, NW., Room 200, U.S. Department of Labor, Washington, D.C. 20210 no later than June 17, 1974. A notice must state the name and address of the person to appear, the capacity in which he will appear, and the approximate amount of time required for his presentation. In addition, to the extent practicable, the notice should contain a general statement of the position to be taken with respect to any provision of the proposed standard, and of the evidence to be adduced in support of the position.

In all other respects, the May 10, 1974 notice of proposed rulemaking remains unchanged.

Signed this 22d day of May 1974.

JOHN H. STENDER,
Assistant Secretary of Labor.

[FR Doc. 74-12188 Filed 5-23-74;11:15 am]

Vinyl Chloride Linked to Cancer

Chemical Hazard Kept Quiet

By Morton Mintz
Washington Post Staff Writer

For at least a year, chemical firms in the United States and Europe withheld significant scientific findings linking liver cancer to gas used to make one of the commonest plastics, the American Chemical Society's weekly news magazine reports today.

The gas is vinyl chloride, used to make the plastic polyvinyl chloride.

The trade association of the American chemical industry, the Manufacturing Chemists Association, joined in holding the findings in confidence, Chemical and Engineering News reports in its May 20 issue.

The Italian scientist who made the findings said that although preliminary, they were "predictive" of the fatal cancers recently recognized in several workers employed in converting the gas into polyvinyl chloride.

The scientist is Prof. Cesare Maltoni, director of the Instituto di Oncologia in Bologna. In a study initiated in September, 1971, by one of the European firms, Montedison, he discovered a rare form of cancer, angiosarcoma, in the livers of rats breathing vinyl chloride in a ratio of 250 parts per million (ppm).

That was in August, 1972. At that time, the permissible level for workers allowed by the Occupational Health and Safety Administration (OSHA) was 500 ppm, or twice as much.

In January, 1973, five months after Maltoni found the first rat angiosarcoma, a team of three U.S. chemical industry scientists visited him in Bologna to learn about his work.

The visit was preceded by months of negotiations with the European firms in addition to Motedison that had joined in sponsoring his studies: Imperial Chemical Industries, Solvay and Rhone-Progil.

But "U.S. chemical industry sources say they were bound by an agreement under which [the] four European firms controlled any release of animal test data obtained by Prof. Maltoni," Chemical and Engineering News says. It did not name any of the American firms.

A key second experiment at levels of 200, 150, and 100 ppm began about July 8, 1973, when Maltoni observed that tumors were continuing to occur in rats at 250 ppm, the trade magazine says.

The first public disclosure of his findings came on Feb. 15, 1974. This was 24 days after B.F. Goodrich Co. announced that since 1971 three workers at its polyvinyl plant in Louisville had died of angiosarcoma of the liver.

Since then, the total of confirmed victims of angiosarcoma at the Goodrich facility and at other polyvinyl chloride plants in the United States has increased to 13 and in other countries to six. Two of the American workers survive. All of the others have died.

On April 5, OSHA announced an emergency rule drastically lowering the permissible concentration of vinyl chloride from 500 ppm to 50 ppm. Workers engaged in manufacturing vinyl chloride and polyvinyl chloride number 6,500 in the United States and 26,000 elsewhere.

Even the 50 ppm level may be hazardous, Maltoni told a meeting of the New York Academy of Sciences and the American Cancer Society on May 10. He disclosed that in rats he had found one liver angiosarcoma at only 50 ppm, along with other types of tumors.

For some nine months, a House-Senate conference committee has had a bill before it that would require manufacturers to test new chemicals under rules laid down by the Environomental Protection Agency (EPA).

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The House bill would require pre-production testing of only those new chemicals that are listed as potentially dangerous, with results to be reported to the EPA 90 days before production is to begin.

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Withholding of vinyl chloride data hinted

European and U.S. chemical firms, together with the Manufacturing Chemists Association, a U.S. trade group, held in confidence for at least a year preliminary, albeit significant, scientific findings on vinyl chloride as an agent causing liver cancer in rats, C&EN learned early last week. U.S. chemical industry sources say they were bound by an agreement under which four European firms controlled any release of animal test data obtained by Prof. Cesare Maltoni, director, Istituto Di Oncologia, Bologna, Italy.

The first public disclosure of Prof. Maltoni's findings came on Feb. 15, 1974, in the U.S. The disclosure came after B. F. Goodrich's announcement on Jan. 22, 1974, of three deaths due to angiosarcoma of the liver since 1971, among workers at its polyvinyl chloride plant in Louisville, Ky. Subsequently, the number of confirmed cases of angiosarcoma at the BFG plant, at other U.S. PVC plants, and at plants abroad has risen steadily to a total of 19, including 13 U.S. cases. 17 of the workers have died of the liver cancer; two U.S. workers are still living. The U.S. deaths date back to 1961.

Prof. Maltoni's animal data have been a key to much of the regulatory actions taken by the Occupational Safety and Health Administration. In February, the lowest dose level of vinyl chloride in the Italian scientist's study at which liver angiosarcoma developed was 250 p.p.m. Guided, in part, by these findings, OSHA on April 5 set an emergency rule that lowered the permissible OSHA worker exposure level to 50 p.p.m. from the previous ceiling of 500 p.p.m.

Since then, additional animal data have appeared. At a May 10-11 meeting of the New York Academy of Sciences and American Cancer Society, Prof. Maltoni disclosed that he had found one liver angiosarcoma in his rats at 50 p.p.m., together with several other types of tumors. At higher levels of exposure there were more tumors of various types, including liver angiosarcomas, as he reported earlier (C&EN, Feb. 25, page 16).

On April 16, MCA announced that preliminary findings on mice in its own study under way at Industrial Bio-Test Laboratories tended to confirm the Maltoni data then available publicly. And as presented by MCA before the May 10-11 meeting, the data show that under conditions of exposure of seven hours per day, five days per week, for eight months, liver angiosarcomas develop as follows: 2500 p.p.m., 28 liver angiosarcomas; 200 p.p.m., 11; and 50 p.p.m., two. MCA's study also showed other types of tumors. Tests also have just begun at dose levels of 25, 10, and 5 p.p.m.

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Subsequently, the liver angiosarcomas in four U.S. deaths of workers have been judged by OSHA to be "histologically indistinguishable" from the angiosarcoma tumors Prof. Maltoni has found. And he believes that his experiments were "predictive" of what was subsequently recognized in man.

Much remains to be answered in the way the release of the Maltoni data has been handled. There are allegations, unfounded from all that C&EN can learn, that word of early results was passed to U.S. and Italian government officials. A major question mark concerns what was said by MCA to the National Institute for Occupational Safety and Health in July 1973 and earlier. As the trade association testified before OSHA on Feb. 15, 1974, "MCA's first direct contact with NIOSH specifically on vinyl chloride led to a conference between an industry delegation, including a European representative, and Dr. Marcus Key [NIOSH director] and staff on July 17, 1973, at which time the MCA program was presented in some detail, and study protocols, industry statistics, and selected items from the scientific literature were provided." MCA has shed

EPA QUESTIONS FOR SPI (SOCIETY OF PLASTICS INDUSTRY)

1. list of top 50-100 PVC products by sales volume
2. list of top 50-100 PVC products by volume of plastic in product
3. amounts of unreacted monomer in above products
4. list of PVC compounding plants by name, location, # employees, polymer used, products line, quantities produced
5. list of PVC fabrication plants by name, location, # empolyees, polymer used, fabrication methods utilized, quantities produced
6. levels of VCM in plants in 4. and 5. by plant area and detection method utilized
7. levels of VCM beyond the plants and detection method(s) used
8. levels of VCM in water effluents
9. decomposition products from various incineration conditions for PVC and quantities of PVC involved
10. amounts of VC leaching out of landfills and total amount PVC buried to date
11. toxicity of PVC resin and products
12. epidemiology studies of workers
13. population within square mile of plants
14. substitutes for VC and PVC
15. Future PVC markets
    New products
    New workers for old products
16. Additives used in PVC products

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In January 1973 a team of three U.S. chemical industry scientists visited Prof. Maltoni in Bologna to learn of his results and to see his slides. Some months of negotiations with the European company group preceded this visit. The group is made up of Montedison, which first approached Prof. Maltoni to do the study, Imperial Chemical Industries, Solvay, and Rhône-Progil. All four were supporting the work at the time of the visit, U.S. sources say.

Subsequently, the liver angiosarcomas in four U.S. deaths of workers have been judged by OSHA to be "histologically indistinguishable" from the angiosarcoma tumors Prof. Maltoni has found. And he believes that his experiments were "predictive" of what was subsequently recognized in man.

Much remains to be answered in the way the release of the Maltoni data has been handled. There are allegations, unfounded from all that C&EN can learn, that word of early results was passed to U.S. and Italian government officials. A major question mark concerns what was said by MCA to the National Institute for Occupational Safety and Health in July 1973 and earlier. As the trade association testified before OSHA on Feb. 15, 1974, "MCA's first direct contact with NIOSH specifically on vinyl chloride led to a conference between an industry delegation, including a European representative, and Dr. Marcus Key [NIOSH director] and staff on July 17, 1973, at which time the MCA program was presented in some detail, and study protocols, industry statistics, and selected items from the scientific literature were provided." MCA has shed

EPA QUESTIONS FOR SPI (SOCIETY OF PLASTICS INDUSTRY)

1. list of top 50-100 PVC products by sales volume
2. list of top 50-100 PVC products by volume of plastic in product
3. amounts of unreacted monomer in above products
4. list of PVC compounding plants by name, location, # employees, polymer used, products line, quantities produced
5. list of PVC fabrication plants by name, location, # empolyees, polymer used, fabrication methods utilized, quantities produced
6. levels of VCM in plants in 4. and 5. by plant area and detection method utilized
7. levels of VCM beyond the plants and detection method(s) used
8. levels of VCM in water effluents
9. decomposition products from various incineration conditions for PVC and quantities of PVC involved
10. amounts of VC leaching out of landfills and total amount PVC buried to date
11. toxicity of PVC resin and products
12. epidemiology studies of workers
13. population within square mile of plants
14. substitutes for VC and PVC
15. Future PVC markets
    New products
    New workers for old products
16. Additives used in PVC products

K. L. Schurter

F. Kennedy

May 17, 1974

Questionnaire on Vinyl Chloride Exposure

The attached questionnaires were mailed to Thomas J. McGrath, The Society of the Plastics Industry, on May 17, 1974. Plant identification is as follows:

Vinyl Chloride Plant 1	-- Lake Charles VCM Plant
PVC Plant 1	-- Aberdeen Plant
PVC Plant 2	-- Oklahoma City Plant

Flynt Kennedy

lm
enc
cc w/enc:
R. D. Gamblin - L.C. VCM
E. M. Smith - Aberdeen
Plant Manager - Oklahoma City
J. D. Burns

May 17, 1974

Mr. Thomas J. McGrath
Director of Packaging Services
The Society of the Plastics Industry, Inc.
250 Park Avenue
New York, New York 10017

Dear Mr. McGrath:

Please find enclosed three completed forms for Conoco Chemicals manufacturing facilities for PVC and vinyl chloride monomer.

Yours very truly,

lm
enc

bcc: KLS

SPI

THE SOCIETY OF THE PLASTICS INDUSTRY, INC.

250 PARK AVENUE • NEW YORK, NEW YORK 10017 • 212/687-2675

QUESTIONNAIRE ON VINYL CHLORIDE EXPOSURE

VINYL CHLORIDE PLANT 1

Exposure Levels:

1. Odor of vinyl chloride monomer present throughout much of the day. Not Applicable
   From years _____ to _____.

2. Odor of VCM present occasionally during the work day.
   From years 1968 to 1974.

3. Odor of VCM a rare event in any work day.
   From years Not applicable to _____.

4. Have there been process or processing changes introduced which have resulted in an increased escape of VCM.
   List years when these occurred.
   1969.

5. Have there been process or processing changes introduced which have resulted in a reduction in the escape of VCM.
   List years when these occurred.
   1970, 1972, 1973, 1974.

6. Do you have environmental measurements prior to 1970?
   Yes _____ No X.

Personnel Exposure Data:

1. When did the plant start to work with VCM?
   Give year 1968.

2. How many employees are working with VCM?
   Give number 81.

3. How many employees are still working for you who once worked with VCM but do not do so now?
   Give number 0.

4. Of the persons identified in 2 and 3 above give the number who have been exposed for the following time intervals.

More than 1 and up to 10 years	81
10 and up to 15 years	-
15 and up to 20 years	-
20 and up to 25 years	-
25 years and more	-

5. Of the persons identified in 2 and 3 above give the number falling within each latent period given below and considering only employees with more than one years service. A latent period is the time lapse from first exposure to the present date.

More than 1 and up to 10 years	81
10 and up to 15 years	-
15 and up to 20 years	-
20 and up to 25 years	-
25 years and more	-

Data From Current Examination Programs

1. Give the number of persons who have been examined since January, 1974. 99.

2. Were liver profile studies made?
   Yes X No _____.

3. Did the studies include at least bilirubin, SGOT, LDH and alkaline phosphatase?
   Yes X No _____.

4. How many of those examined showed an abnormality in:

one test	0
two tests	0
three or more tests	0

5. Have you had any cases of angiosarcoma?
   Yes _____ No X.

6. Was this determination made by your own survey?
   Yes X No _____.

7. What per cent of the total exposed population was covered in the survey? 100%.

8. Were retired personnel included?
Yes X No _____.

9. Were persons who had left your employ and gone to work elsewhere included?
Yes X No _____.

10. Did you review causes of death of those who died while still employed by you?
Yes X No _____.

11. Did your plant participate in the Tabershaw-Cooper epidemiologic survey?
Yes X No _____.

May 3, 1974

SPI

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QUESTIONNAIRE ON VINYL CHLORIDE EXPOSURE

PVC PLANT 1

Exposure Levels:

1. Odor of vinyl chloride monomer present throughout much of the day. Not Applicable
   From years _____ to _____.

2. Odor of VCM present occasionally during the work day.
   From years 1963 to 1974.

3. Odor of VCM a rare event in any work day.
   From years April 1974 to present.

4. Have there been process or processing changes introduced which have resulted in an increased escape of VCM.
   List years when these occurred.
   None.

5. Have there been process or processing changes introduced which have resulted in a reduction in the escape of VCM.
   List years when these occurred.
   See attachment.

6. Do you have environmental measurements prior to 1970?
   Yes _____ No X.

Personnel Exposure Data:

1. When did the plant start to work with VCM?
   Give year 1963.

2. How many employees are working with VCM?
   Give number 84.

3. How many employees are still working for you who once worked with VCM but do not do so now?
   Give number 22.

4. Of the persons identified in 2 and 3 above give the number who have been exposed for the following time intervals.

Exposure Levels:

5. Have there been process or processing changes introduced which have resulted in a reduction in the escape of VCM.

(1) Blowdown tanks, 1966
(2) Distillation system, 1970
(3) Recovery to a greater vacuum, 1970
(4) Quit making co-polymer in 1971
(5) Better filtering system for finish products, 1970
(6) Quit making plastisol resin, 1972
(7) Quit making high absorption resins, 1972
(8) Lids on compound blenders kept closed
(9) Air mover to vent tanks in 1971

More than 1 and up to 10 years	78
10 and up to 15 years	-
15 and up to 20 years	-
20 and up to 25 years	-
25 years and more	-

5. Of the persons identified in 2 and 3 above give the number falling within each latent period given below and considering only employees with more than one years service. A latent period is the time lapse from first exposure to the present date.

More than 1 and up to 10 years	78
10 and up to 15 years	-
15 and up to 20 years	-
20 and up to 25 years	-
25 years and more	-

Data From Current Examination Programs

1. Give the number of persons who have been examined since January, 1974. 339.

2. Were liver profile studies made?
   Yes X No _____.

3. Did the studies include at least bilirubin, SGOT, LDH and alkaline phosphatase?
   Yes X No _____.

4. How many of those examined showed an abnormality in:

one test	36
two tests	5
three or more tests	2

5. Have you had any cases of angiosarcoma?
   Yes _____ No X.

6. Was this determination made by your own survey?
   Yes X No _____.

7. What per cent of the total exposed population was covered in the survey? est. 50%.

8. Were retired personnel included?
Yes X No _____.

9. Were persons who had left your employ and gone to work elsewhere included?
Yes X No _____.

10. Did you review causes of death of those who died while still employed by you?
Yes X No _____.

11. Did your plant participate in the Tabershaw-Cooper epidemiologic survey?
Yes X No _____.

May 3, 1974

THE SOCIETY OF THE PLASTICS INDUSTRY, INC.

250 PARK AVENUE • NEW YORK, NEW YORK 10017 • 212/687-2675

QUESTIONNAIRE ON VINYL CHLORIDE EXPOSURE

PVC PLANT 2

Exposure Levels:

1. Odor of vinyl chloride monomer present throughout much of the day. From years Not applicable to _____.

2. Odor of VCM present occasionally during the work day. From years 1971 to present.

3. Odor of VCM a rare event in any work day. From years not applicable to _____.

4. Have there been process or processing changes introduced which have resulted in an increased escape of VCM. List years when these occurred. No.

5. Have there been process or processing changes introduced which have resulted in a reduction in the escape of VCM. List years when these occurred. 1973, 1974.

6. Do you have environmental measurements prior to 1970? Yes _____ No X.

Personnel Exposure Data:

1. When did the plant start to work with VCM? Give year 1971.

2. How many employees are working with VCM? Give number 47.

3. How many employees are still working for you who once worked with VCM but do not do so now? Give number 1.

4. Of the persons identified in 2 and 3 above give the number who have been exposed for the following time intervals.

More than 1 and up to 10 years	46
10 and up to 15 years	1
15 and up to 20 years	-
20 and up to 25 years	-
25 years and more	-

5. Of the persons identified in 2 and 3 above give the number falling within each latent period given below and considering only employees with more than one years service. A latent period is the time lapse from first exposure to the present date.

More than 1 and up to 10 years	46
10 and up to 15 years	1
15 and up to 20 years	-
20 and up to 25 years	-
25 years and more	-

Data From Current Examination Programs

1. Give the number of persons who have been examined since January, 1974. 4. (remainder scheduled)

2. Were liver profile studies made?
   Yes X No _____.

3. Did the studies include at least bilirubin, SGOT, LDH and alkaline phosphatase?
   Yes X No _____.

4. How many of those examined showed an abnormality in:
   one test _____)
   two tests _____) no results yet
   three or more tests _____)

5. Have you had any cases of angiosarcoma?
   Yes _____ No X.

6. Was this determination made by your own survey?
   Yes X No _____.

7. What per cent of the total exposed population was covered in the survey? 100%.

8. Were retired personnel included? not applicable
Yes _____ No _____.

9. Were persons who had left your employ and gone to work elsewhere included?
Yes _____ No X.

10. Did you review causes of death of those who died while still employed by you? not applicable
Yes _____ No _____.

11. Did your plant participate in the Tabershaw-Cooper epidemiologic survey?
Yes X No _____.

May 3, 1974