INTERDIVISION ONLY

December 5, 1974

J. R. Wenke
Masland Plant

Re: Air Sampling for Vinyl Chloride Concentrations

Air sampling to determine Vinyl Chloride concentrations was carried out at the Masland Plant on October 31 and November 1, 1974 in accordance with the new Federal Standard. Air samples were collected using a Willson Personal Sampler and charcoal tubes at the rate of 0.5 liters of air per minute. A laboratory flow meter was used to pre-set the Willson Personal Sampler. Operator samples were taken with the charcoal tubes positioned close to the breathing zone.

Samples were analyzed by the Analytical Laboratory at the Mishawaka Plant using gas chromatography. Desorbing of the air samples was accomplished using carbon disulfide (CS_2). The concentrations of Vinyl Chloride are shown on the attached table.

L. J. Grecco
Manager, Technical Services

cc: L. F. Dieringer - Oxford
R. W. Mallory - "
L. J. Primeau - Mishawaka
J. R. Sellers - "

js

URL 02547

L. J. Grecco
12/5/74

MASLAND PLANT

Sample	Location	Compound	Plant	Employee	VCM (PPM)
1.	#4 Banbury Mixer	9530	1	F. Brackin	0.56
2.	#5 Banbury Mixer	1240 S-3	1	L. C. Butts	0.30
3.	#1 Banbury Mixer	9949K	1	S. Potts	0.55
4.	Under Silo - (Open Door)	VR-22	1	Static Test	29.40
5.	#1 Calender - Warming Mill (340°F)	9949A	1	J. Oszajca	0.00
6.	#1 Banbury - Drop Mill (320°F)	9949A	1	E. Fox	0.00
7.	#2 Calender - Warming Mill (320°F)	8754	1	S. Becker	0.00
8.	#2 Banbury Drop Mill (320°F)	8754	1	E. Williams	0.10
9.	Hopper Car Operator - Part Time in Silo	VR-22	1	R. Bielawski	1.90
10.	Resin Storage Area	VR-22	2	Static Test	0.00
11.	Lab Millroom Operator	Various	1	S. Adams	0.00
12.	Void - Test Blank	-	-	-	-
13.	#5 Banbury Drop Mill	3527	1	J. Novak	0.20
14.	#5 Calender Warming Mill	3527	1	D. Tucci	0.20
15.	#4 Calender Warming Mill	2509	1	S. Radomicki	0.10

Sample	Location	Compound	Plant	Employee	VCM-(PPM)
16.	#4 Calender Drop Mill	2509	1	W. McDowell	0.00
17.	#4 Calender Warming Mill	2509	1	L. Grecco	0.00
18.	Expanding Oven Operator	-	1	T. Longo	0.00
19.	Expanding Oven Helper	-	1	J. Keris	0.00
20.	Mixer 2064	-	2	W. Boese	0.00
21.	Mixer 2064	-	2	J. Sietz	0.00

Notes:
1. No. 1 & 4 Banbury mixers are borderline. Time weighted 8 hrs. average should put us below limit of 0.5 PPM. Air movement in this area should be studied.
2. Silo area must be classed as a regulated area. Exhausting should be studied. Operators in this area should be provided with face respirators.
3. These areas will be discussed in detail during next visit.

INTERDIVISION ONLY

April 29, 1975

RECEIVED
MAY 2 1975
MEDICAL DEPARTMENT

J. R. Wenke
Masland Plant

Re: Air Sampling for Vinyl Chloride Concentrations

Air sampling to determine Vinyl Chloride concentrations was carried out at the Masland Plant on April 7-9, 1975 in accordance with the new Federal Standard. Air samples were collected by Masland personnel using a Willson Personnal Air Sampler and charcoal tubes at the rate of 0.5 liters of air per minute. A laboratory flow meter was used to pre-set the pump. Operator samples were taken with the charcoal tube positioned close to the breathing zone.

Samples were analyzed by the Analytical Laboratory at the Mishawaka Plant using gas chromatography. Desorbing of the air samples was accomplished using carbon disulfide. The concentrations of Vinyl Chloride are shown on the attached table.

An analysis of the results obtained shows Banburys 1, 4 and 5 should be reported to OSHA as regulated areas of employee exposure. The employees in these areas should be notified that we are above the Federal Standard and masks should be provided. Air movement around the PVC discharge chute should be considered. The silo should be posted as a hazardous area and the door should be always open to eliminate a build-up. An exhaust fan should be installed in the silo.

Under separate cover we are sending to Mr. P. Reeves a pump, charging unit and a supply of tubes for additional testing. We recommend samples of one hour duration be taken at Banburys 1, 4 and 5. Forward samples to my attention immediately after they are taken.

A "fact sheet" on the Vinyl Chloride is attached.

J. J. Grecco
Manager, Technical Services

cc: L. F. Dieringer - Oxford - E-G-1
R. W. Mallory - " D-2-2
P. Reeves - Masland
L. J. Primeau - Mishawaka
J. R. Sellers - "

js

URL 02549

URL 02550

L. J. Grecco
4/29/75

MASLAND PLANT

SAMPLE	DATE	LOCATION	COMPOUND	EMPLOYEE	VCM (PPM)
1.	4/7/75	#1 Banbury	1056	E. Williams	1.67 ✓
2.	4/7/75	#4 Banbury	8683-53	M. Landing	1.66 ✓
3.	4/7/75	#5 Banbury	5450-X3	L. Jennings	3.24 ✓
4.	4/8/75	#1 Drop Mill	DC-5010	J. Scott	0.17
5.	4/7/75	#4 Drop Mill	8683-53	V. Radomicki	0.00
6.	4/8/75	#5 Drop Mill	5250-X3	S. Becker	0.24
7.	4/7/75	Silo	VR-22	Static Test	46.20 ✓
8.	4/9/75	#2Banbury	CLAD, Duran Slabs	L. C. Butts	0.13

INTERDIVISION ONLY

~~DCF~~
~~WDH~~
LFD

April 29, 1975

RECEIVED
MAY 2 1975
MEDICAL DEPARTMENT

J. R. Wenke
Masland Plant

Re: Air Sampling for Vinyl Chloride Concentrations

Air sampling to determine Vinyl Chloride concentrations was carried out at the Masland Plant on April 7-9, 1975 in accordance with the new Federal Standard. Air samples were collected by Masland personnel using a Willson Personnal Air Sampler and charcoal tubes at the rate of 0.5 liters of air per minute. A laboratory flow meter was used to pre-set the pump. Operator samples were taken with the charcoal tube positioned close to the breathing zone.

Samples were analyzed by the Analytical Laboratory at the Mishawaka Plant using gas chromatography. Desorbing of the air samples was accomplished using carbon disulfide. The concentrations of Vinyl Chloride are shown on the attached table.

URL 02551

An analysis of the results obtained shows Banburys 1, 4 and 5 should be reported to OSHA as regulated areas of employee exposure. The employees in these areas should be notified that we are above the Federal Standard and masks should be provided. Air movement around the PVC discharge chute should be considered. The silo should be posted as a hazardous area and the door should be always open to eliminate a build-up. An exhaust fan should be installed in the silo.

Under separate cover we are sending to Mr. P. Reeves a pump, charging unit and a supply of tubes for additional testing. We recommend samples of one hour duration be taken at Banburys 1, 4 and 5. Forward samples to my attention immediately after they are taken.

A "fact sheet" on the Vinyl Chloride is attached.

J. J. Grecco
Manager, Technical Services

cc: L. F. Dieringer - Oxford - E-G-1
R. W. Mallory - " D-2-2
P. Reeves - Masland
L. J. Primeau - Mishawaka
J. R. Sellers - "

js

URL 02552

L. J. Grecco
4/29/75

MASLAND PLANT

SAMPLE	DATE	LOCATION	COMPOUND	EMPLOYEE	VCM (PPM)
1.	4/7/75	#1 Banbury	1056	E. Williams	1.67
2.	4/7/75	#4 Banbury	8683-53	M. Landing	1.66
3.	4/7/75	#5 Banbury	5450-X3	L. Jennings	3.24
4.	4/8/75	#1 Drop Mill	DC-5010	J. Scott	0.17
5.	4/7/75	#4 Drop Mill	8683-53	V. Radomicki	0.00
6.	4/8/75	#5 Drop Mill	5250-X3	S. Becker	0.24
7.	4/7/75	Silo	VR-22	Static Test	46.20
8.	4/9/75	#2Banbury	CLAD, Duran Slabs	L. C. Butts	0.13

INTERDIVISION ONLY

May 16, 1975

RECEIVED
MAY 19 1975
MEDICAL
DEPARTMENT

J. R. Wenke
Masland Plant

Re: Air Sampling for Vinyl Chloride Concentrations

Air samplings to determine Viny Chloride concentrations were taken at the Masland Plant on May 5 and 7 by Masland personnel. The sample tubes were sent to the Mishawaka Plant and analyzed in the analytical laboratory by gas chromotography.

The longer sampling time at the banburys still shows an excessive amount of vinyl chloride. Static samples taken around the PVC drop area show this to be a problem. Continued testing is required.

Under separate cover we will send additional tubes and another Willson pump to Mr. Reeves. He will return the present pump for calibration. We hope to also have a continuous monitor in the next 4-6 weeks and will plan to completely study this problem at your plant.

R. J. Grecco

R. J. Grecco
Mishawaka Plant

cc: L. F. Dieringer - Oxford E-G-1
R. W. Mallory - " D-2-2
P. Reeves - Masland
L. J.Primeau
J. R. Sellers

attach - 1

js

[redacted]

L. J. Grecco
5/16/75

URL 02554

MASLAND PLANT

AMPLE	DATE	LOCATION	COMPOUND	EMPLOYEE	VCM (PPM)
1	5/5/75	#4 Banbury	8647-FR	S. Potts	3.00
1A	5/7/75	"	2980-S	Static	0.57
1B	5/7/75	"	"	"	0.25
1C	5/7/75	"	"	"	1.36
1D	5/7/75	"	"	"	0.08
4	5/5/75	#5 Banbury	5350 X 3	G. Guenther	3.84
4A	5/5/75	"	"	Static	0.76
4B	5/5/75	"	"	"	0.10
4C	5/7/75	"	5890 X 3	"	4.09
4D	5/7/75	"	"	"	1.17
5	5/7/75	A Silo	VR-22	Static	21.07
6	5/7/75	#4 Banbury	4669 V 3	V. Hoffman	1.51
6A	5/7/75	"	7748-53	Static	2.04
7	5/7/75	A Silo	VR-22	Static	16.77

[redacted]

INTERDIVISION ONLY

Larry Dieringer - Oxford "E-G-I

RECEIVED
AUG 5 1975
MEDICAL
DEPARTMENT

June 10, 1975

E
JCM

J. R. Wenke
Masland Plant

Re: Air Sampling for Vinyl Chloride Concentrations

Air sampling to determine Vinyl Chloride concentrations was carried out at the Masland Plant on June 2, 1975 in accordance with the new Federal Standard.

The purpose of the testing was to evaluate Tenneco PVC resin in the banbury mixing area as compound to Marvinol PVC which Masland has been using. Alternate samplings were taken with each of the resins.

The results clearly indicate the Tenneco PVC has a lower residual Vinyl Chloride content. Samples were collected by P. Reeve of Masland and were sent to the Mishawaka Analytical Laboratory for analysis by gas chromotography. The results are shown on the attached table.

L. J. Gfecco
Manager, Technical Services

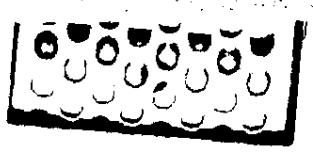
cc: L. F. Dieringer - Oxford - E-G-I
R. W. Mallory " D-2-2
P. Reeve Masland
L. J. Primeau Mishawaka
J. R. Sellers "

J.R.S JUN 10 1975

URL 02555

SAMPLE #	RESIN TYPE		LOCATION		
2	Marvinol		Banbury Throat	URL 02556	0.90
3	Marvinol		PVC Chute		0.13
4	Marvinol	#1	Banbury Operator (S. Potts)		2.27
6	Marvinol		Platform Beneath Banbury		0.68
7	Tenneco		Banbury Operator (S. Potts)	✓	0.09
8	Tenneco		Banbury Throat		0.07
9	Tenneco		PVC Chute		0.05
10	Tenneco		Platform Beneath Banbury		0.05
11	Uniroyal	#2	Banbury Operator (E. Williams)	✓	0.45
12	Uniroyal		Banbury Throat		0.45
14	Uniroyal		PVC Chute		0.07
15	Tenneco		Banbury Operator (E. Williams)	✓	0.05
16	Tenneco		Banbury Throat		0.07

Note: Testing based on 4.4 Liter Samples



INTERDIVISION ONLY

July 3, 1975

J. R. Wenke
Masland Plant

Re: Air Sampling for Vinyl Chloride Concentrations

Air sampling to determine Vinyl Chloride concentrations was carried out at the Masland Plant on June 25, 1975 in accordance with the new Federal Standard.

The purpose of the testing was to re-evaluate Tenneco PVC resin in the banbury mixing areas. The results again show very low amounts of Vinyl Choride in both the banbury and silo areas.

Samples were collected by P. Reeve of Masland and were sent to the Mishawaka Plant Analytical Laboratory for analysis by gas chromotography. The results are shown on the attached table.

L. J. Grecco
Manager, Technical Services

cc: L. F. Dieringer - Oxford - E-G-1
R. W. Mallory - Oxford - D-2-2
P. Reeve - Masland
L. J. Primeau - Mishawaka
J. R. Sellers - Mishawaka

J.R.S JUL 3 1975

URL 02557

URL 02558

7/3/75

MASLAND PLANT

SAMPLE NO.	LOCATION	COMPOUND	VINYL CHLORIDE (PPM)
1.	#1 Banbury Op. (Potts)	1495-S	0.15
2.	#1 Banbury Mouth	1495-S	0.08
3.	#1 Banbury Platform	1495-S	0.04
4.	#4 Banbury Op. (C. Fox)	2950-53	0.07
5.	#4 Banbury Mouth	2950-53	0.02
6.	#4 Banbury Platform	2950-53	0.03
7.	#5 Banbury Op. (Goenther)	5750-X3	0.05
8.	#5 Banbury Mouth	5750-X3	0.04
5.	#5 Banbury Platform	5750-X3	0.04
10.	Silo		0.22
11.	#1 Banbury Op. (Potts)	1056-SH	0.04
12.	#1 Banbury Mouth	1056-SH	0.03
13.	#1 Banbury Platform	1056-SH	0.04
14.	#4 Banbury Op. (Landing)	7516-53	0
15.	#4 Banbury Mouth	7516-53	0.03
16.	#4 Banbury Platform	7516-53	0.08
17.	#5 Banbury Op. (Guenther)	5750-X3	0.05
18.	#5 Banbury Mouth	5750-X3	0.04
19.	#5 Banbury Platform	5750-X3	0.04
	Silo		0.09

FORM 18

UNIROYAL CHEMICAL
Division of UNIROYAL, Inc.

May 21, 1974

LFM
RJD
FEL
RLK
JJT
BRT
CHK

To: Dr. W. D. Harris, Oxford

From: A. C. Werner

Subject: MARVINOL® PVC Resins

The attached list covers the MARVINOL PVC resins currently in our line.

The VC levels are preliminary data obtained from (1)(2)(3)(4) & (5). The diffusion of VC from the particle under lab storage conditions eventually results in VC levels below the detectable level (less than .5 ppm) in all three resin types.

The 170 ppm figure for MARVINOL 22 dropped to 15 ppm in 14 days. Additional aged VC data are being obtained on lab samples and we intend to follow a truckload of resin from its manufacture to the customer also (6).

Ref. (1) FEL to JIS, 5/6/74
(2) FEL, 5/8/74
(3) FEL to JIS, 4/29/74
(4) FEL to JIS, 4/11/74
(5) FEL to ACW, 5/16/74
(6) ACW to LFM, 5/20/74

ACW:dmb

attach.

FOR20099

URL 02560

MARVINOL PVC RESINS

TYPE	PARTICLE SIZE (micron)	VC Level(1)
Plastisol (Emulsion)		
Polymerize from outside in		
Marvinol 5051	.2 - 2, (with	10, 10, 8
" 53	some agglomerates to	23, 18, 45
" 56 (a 6% acetate copolymer)	25 microns)	
Plastisol Blending (Emulsion)		
MARVINOL 10	.2 - 200 (very porous structure with all particles actually agglomerates of small particles)	35, 60, 95
General Purpose & Plastisol Blending (Suspension)		
Catalysts inside, polymerize inside out		
MARVINOL 22	50 - 400 (particles	277, 512, 102, 170
" 23	all appear as "pop corn")	
" 24	50 - 200 (particles appear translucent)	
" 19	30 - 150 (particles appear translucent)	

(1) Please see discussion

ACW- 5/21/74

URL 02561

MISHAWAKA PLANT

VINYL CHLORIDE SAMPLING

DATA TABLE

SAMPLE DESIGNATION	DATE TAKEN	LOCATION	VINYL ROSIN IN USE	P.P.M. V.C.M.
#18	5/23/74	CF-6 Banbury	VR-22 & 24	0.0
19	5/23/74	KoKneader - Exit	VR-23	0.0
20	5/23/74	KoKneader - Blender	VR-23	38.0
21	5/23/74	CF-8 Banbury	VR-22 & 24	1.4
22	5/23/74	CF-8 Calander	VR-22	2.2
23	5/23/74	CF-6 Calander	VR-22	1.5
24	5/24/74	Hopper Car	VR-22	0.5
25	5/24/74	Under Silo (Inside)	VR-22	12.5
26	5/24/74	KoKneader - Mix Area	VR-22	0.2
27	5/24/74	Ensolite Banbury #2	VR-23	0.0
28	5/24/74	Seald Bin Bldg. 120	VR-24	1.3
29	5/24/74	Ensolite Banbury #4	VR-23	0.0
30	5/24/74	KoKneader - Mix Area	VR-24	0.0
31	5/28/74	CF-6 Banbury	VR-22 & 24	2.3
32	5/28/74	CF-8 Banbury	VR-22	1.4
33	5/28/74	KoKneader - Blender	VR-23	23.3
34	5/28/74	CF-8 Calander	VR-22	1.5
35	5/30/74	Hopper Car	VR-22	2.6
36	5/28/74	CF-6 Calander	VR-22	0.3
37	5/30/74	Under Silo (Inside)	VR-22	25.8
38	5/30/74	Bag Storage Bldg. 120	VR 24	13.0

Notes:

1. Sampling - 0.5 liters/minute for 20 minutes using a Willson-Caselim Pump with Mishawaka fabricated 5 inch charcoal tubes.
2. CF - Designated Coated Fabrics
3. All samples were taken with pump and sample tubes attached to operator in breathing zone area except samples #25 and 37, which were static samples.

URL 02562

August 8, 1975

STOUGHTON PLANT

LOCATION/OPERATION	DATE	TYPE TEST	COMPOUND	VCM (ppm)	REMARKS
Master Batch Mixer	6/17/74	Operator		).0	VR53, Ethyl 255
	11/19/74	"		).0	VR53
	1/30/75	"		0.02	VR53, Geon 124
	"	"		0.09	Pliovic W02, Geon 124
Primary Mixer	6/17/74	"	4426	0.0	VR53, 5051
	"	"	9754	0.0	VR53
	1/30/75	"		0.10	5051, VR10, Pliovic, Geon 124
	"			0.02	5051, Pliovic, Geon 124
Three Roll Mill	6/17/74		4426	0.0	VR53, 5051
	"	"	4426, 9754	0.0	VR53, 5051
	11/19/74	"	3411	0.0	
	3/27/75	Static	FM 3132	0.20	
PVC Storage Area Main Floor	6/17/74	Static		0.0	VR10, FR53, 5051, UC vinyl dispersion Ethyl EH219
	11/19/74	"		0.0	VR10, VR53
	12/6/74	"		0.0	5051
	3/27/74	"		0.17	Scrap
Basement Storage Area	6/17/74	Static		2.0	VR23, UC Vinyl Dispersion, Pliovic W02, Ethyl 218, 255 (VR23 unloaded from trailer in morning6/17/74)
	11/19/74	Static		0.0	Various
	12/6/74	"		0.10	"

URL 02563

LOCATION/OPERATION	DATE	TYPE TEST	COMPOUND	VCM (ppm)	REMARKS
Trailer truck prior to unloading	6/17/74	Static		106.0	VR23, VR53
	6/18/74	"		4.0	VR5051
	11/19/74	"		0.0	UC Vinyl dispersion OYJV 5870
	12/6/74	"		1.40	VR5051 (Truck #1)
	"	"		0.74	VR5051 (Thirty minute purge)
	"	"		18.00	VR5051 (Truck #2)
	"	"		6.00	VR5051 (after three minute purge with pedesta fan)
Unloading Trailer Truck	6/17/74	Operator		3.0	VR23, VR53
	6/18/74	"		0.0	VR5051
	11/19/74	"		0.16	VR53
	"	"		0.0	UC OYJV 5870
	12/6/74	"		0.02	VR5051 (Truck #1)
	"	"		0.32	VR5051 (Truck #2)
Ink Room	6/17/74	"		0.0	VR23 (Slip solution)
	11/19/74	"	379-91D	0.0	Slip solution
	1/30/75	"		0.08	VR23 (Slip solution)
	"	"		0.14	(Urethane Coating)
	3/27/75	Static		0.0	Slip solution

Note: No detectable vinyl chloride concentration detected at coating, printing and embossing.

URL 02564

August 8, 1975

PORT CLINTON

LOCATION/OPERATION	DATE	TYPE TEST	COMPOUND	VCM (ppm)	REMARKS
Enclosed area under North Silo	7/18/74	Static		0.80	VR22 (minimal Employee exposure)
	12/11/74	"		0.14	VR22 " " "
	"	"		0.16	VR22 " " "
Banbury Tower during transfer	7/18/74	Static		2.3	VR22 (minimal employee exposure)
	12/11/74	"		0.11	VR22 " " "
Banbury Operator	7/18/74	Operator		0.0	
	12/11/74	"		0.0	
Banbury Drop Mill	7/18/74	Operator	95201 WBMK 40995	0.0	VR22
	12/11/74	"	65211-EE 40763	0.0	VR22
Compounding Room	7/18/74	Operator		0.0	VR10, VR53 (Slip solution)
	12/11/74	"		0.14	
Receiving Warehouse	7/18/74	Static		0.0	
	12/11/74	"		0.11	VR5051, VR5056

Note: No detectable vinyl chloride concentrations at calendering printing and coating operations.

August 8, 1975

URL 02565

CHICAGO PLANT

LOCATION/OPERATION	DATE	TYPE TEST	COMPOUND	VCM (ppm)	REMARKS
Warehouse	11/12/74	Operator		0.28	VR24
	"	Static		0.14	VR24 (above pallet)
	4/24/75	"		0.15	VR23 (" "
	"	"		0.15	VR23 (floor level)
	"	"		0.10	VR24 (above pallet)
	"	"		0.48	VR24 (near fan)
	4/30/75	Static		0.94	VR23
	"	"		1.57	VR24
	"	Operator		2.00	VR23 & 24
	5/13/75	Static		0.09	Northwest
	"	"		0.10	South
Trailer Truck	5/13/75	Static		2.10	
Unloading Trailer	5/13/75	Operator		0.08	
Banbury Operator	11/12/74	Operator		0	
	5/13/75	"		0.04	

Note: No detectable vinyl chloride concentrations found at other operations.

WARSAW, WASHINGTON

No detectable vinyl chloride concentrations found at operations involving using PVC.

L. J. Grecco
May 28, 1975

cc: L. F. Dieringer - Oxford - E-G-1
R. W. Mallory " D-2-2
R. P. Braun E. L. Loeffler
C. R. Brown G. W. Oueilette
P. P. D'Eletto L. J. Primeau
D. L. Frey R. L. Schmitt
M. E. Haskell R. H. Schiffer

J. R. Sellers

Re: Mishawaka Plant - Vinyl Chloride Monomer -
Air Sampling and Operator Exposure

Air sampling of environment and storage areas and operator monitoring has been conducted at the Mishawaka Plant for the past year. During the course of this testing we did find several areas which would have been in violation of the Federal Standard, which became effective on January 1, 1975. With the cooperation of our engineering, safety and production groups, the major problems have been resolved with the addition of ventilation in the silo areas, hopper car unloading area and the Ko Kneader mixing area. The purging of trailer trucks for 30 minutes before unloading has proven to be effective and will be continued. Our warehouse and storage areas have varied from time to time and some static tests taken on the skids do exceed the 0.5 PPM standard, operator exposure in these areas will be below the standard on a time weighted average. Some additional air movement will be considered after we have conducted additional tests with the continuous monitor we have requested.

Building 24 (half floor) cannot be used as a storage area for PVC resin due to inadequate ventilation. Mr. R. H. Schiffer has been advised. Signs will have to be posted on each of our silos and in each of our storage areas. This will be coordinated by the writer with the responsible production and safety representatives.

The attached tables will show the air sampling results since the previous report. The effectiveness of our programs can be seen in the areas discussed above.

A training program is being outlined and will be completed by June 15, 1975. In accordance with the Federal Standard, any employee exposed to Vinyl Chloride will have to be instructed in the potential danger of Vinyl Chloride and our programs to reduce the amount of exposure and continued testing. This program will be coordinated by the writer with the respective production organizations in the plant and in our division.

Attach - 3

URL 02567

L. J. Grecco
May 28, 1975

MISHAWAKA PLANT

VINYL CHLORIDE TESTING

LOCATION/OPERATION	DATE	TYPE TEST	PVC USED	VCM (PPM)	REMARKS
Ko Kneader Mixing	5/23/74	Operator	VR-23	3.80	
	5/28/74	"	"	2.33	
	7/10/74	"	"	0.61	Wall Exhaust Fan Used
	9/6/74	"	"	0.61	
	10/28/74	"	"	0.68	
	4/1/75	"	"	0.04	Hopper Exhaust Installed
	4/29/75	"	"	0.00	
Silos - PVC Storage	5/24/74	Static	VR-22	1.25	
	5/30/74	"	"	2.50	
	7/7/74	"	"	7.10	
	7/8/74	"	VR-23	4.57	
	4/14/75	"	VR-22	0.59	Exhaust Fans Installed
	4/15/75	"	VR-23	0.45	

MISHAWAKA PLANT - VINYL CHLORIDE TESTING

URL 02568

LOCATION/OPERATION		DATE	TYPE TEST	PVC USED	VCM (PPM)	REMARKS
Coated Fabrics -	CF-6 Banbury	5/23/74	Operator	VR-22,24	0.00	
		6/7/74	"	"	0.45	
		7/9/74	"	"	0.00	
		8/19/74	"	"	0.00	
	CF-8 Banbury	5/23/74	"	"	0.14	
		6/11/74	"	"	0.30	
		8/16/74	"	"	0.17	
	CF-6 Calender	5/23/74	"	"	0.15	
		6/7/74	"	"	0.10	
		7/9/74	"	"	0.00	
		8/19/74	"	"	0.00	
	CF-8 Calender	5/23/74	"	"	0.22	
		8/16/74	"	"	0.17	
Bldg. Unloading	PVC Bags	6/7/74	Operator	VR-24	0.40	
		7/9/74	"	"	0.00	
		8/21/74	"	"	0.28	
Hobart Mixer		6/10/74	"	"	0.08	
ENSOLITE Laminator		8/29/74	"	VR-22	0.00	

MISHAWAKA PLANT - VINYL CHLORIDE TESTING

LOCATION/OPERATION	DATE	TYPE TEST	PVC USED	VCM (PPM)	REMARKS
ENSOLITE Oven	9/16/74	Operator	VR-22	0.00	
CE-II Embosser	9/20/74	"	VR-22 & 24	0.07	
Bldg. 53 Comet Machine	10/17/74	"	VR-22	0.00	
Bldg. 61-3 Storage	4/23/75	Static	VR-23	0.61	
	4/23/75	"	VR-22	0.27	
Bldg. 80 Unloading PVC	4/29/75	Operator	VR-22	0.08	Above Hopper Car
	4/29/75	"	"	0.00	Ground Level

INTERDIVISION ONLY

December 5, 1974

R. E. Cunniff
Stoughton Plant

Re: Air Sampling For Vinyl Chloride Concentrations

Air sampling to determine Vinyl Chloride concentrations was carried out at the Stoughton Plant on November 19, 1974 in accordance with the new Federal Standard. Air samples were collected using a Willson Personal Sampler and charcoal tubes at the rate of 0.5 liters of air per minute. A laboratory flow meter was used to pre-set the Willson Personal Sampler. Operator samples were taken with the charcoal tubes positioned close to the breathing zone.

Samples were analyzed by the Analytical Laboratory at the Mishawaka Plant using gas chromatography. Desorbing of the air samples was accomplished using carbon disulfide (CS_2). The concentrations of Vinyl Chloride are shown on the attached table.

L. J. Grecco
Manager, Technical Services

cc: L. F. Dieringer - Oxford
R. W. Mallory - "
L. J. Primeau - Mishawaka
J. R. Sellers - Mishawaka

js

URL 02571

L. J. Grecco
12/5/74

STOUGHTON PLANT

Sample	Location	Compound	Employee	VCM (PPM)
1.	Master Batch Mixer	VR-53	Walter Wick	0.00
2.	PVC Resin Storage	VR-53, VR-10	Static Test	0.00
3.	Primary Mixer	BAK OYJV	Samuel Wulff	0.00
4.	Three Roll Mill	3411	Melvin Lund	0.00
5.	CII - Coater Operator	3150	Warren Thompson	0.00
6.	Basement Coffee Machine	-	Environment	0.00
7.	Unloading Trailer Truck	Marvinol 53	Welmer James	0.16
8.	H.E.A.F. Filter Room		Environment	0.00
9.	Lab Vacuum Former (Comet Machine)	-	Shirley Turison	0.00
10.	CII - Coater Tandem Operator		Dan Book	0.00
11.	Lab Embosser		Lab Operator	0.00
12.	Basement Storage Area	Various	Environment	0.00
13.	B-8 Print Machine	3010-09 + 372-90A	Del Helverson	0.00
14.	Ink Room	372-91D	Charles Henderson	0.00
15.	E16 Embosser	-	Jerry Duerst	0.00
16.	Finished Product Warehouse	Various	Environment	0.00
17.	C-1 Coater Operator	E-1912B	Arthur Thompson	0.00

CORRECTED COPY

STOUGHTON PLANT

URL 02572

Sample	Location	Compound	Employee	VCM (PPM)
18.	C1 Coater - Tandem Operator	E1912-B	John May	0.00
19.	Inside Trailer Truck (Union Carbide)	OYJV 5870	Environment	0.00
20.	Unloading Trailer Truck (Union Carbide)	OYJV 5870	Jerry Greene	0.00
21.	C-7 Coater Operator	7299	Ingvald Bruheim	0.00
22.	C-7 Coater - Tandem Operator	7299	Obert Hanson	0.00
23.	Aisle by Cafeteria	-	Gray Shaw	0.00

Notes: Closed trailer truck shows concentration of Vinyl Chloride greater than limit. Truck should be opened 15 minutes prior to unloading.

INTERDIVISION ONLY

January 13, 1975

RECEIVED
JAN 16 1975
MEDICAL
DEPARTMENT

R. E. Cunniff
Stoughton Plant

Re: Air Sampling for Vinyl Chloride Concentrations

Air sampling to determine Vinyl Chloride concentrations was carried out at the Stoughton Plant on December 6, 1974 in accordance with the new Federal Standard.

Samples were analyzed by the Analytical Laboratory at the Mishawaka Plant using gas chromatography. The concentrations of Vinyl Chloride are shown on the attached tables. One of the tables represents employee testing and static tests in storage areas of the plant. The second table represents static tests taken inside the trucks as received. These values will vary but will normally be above the 1 PPM exposure level. It is important to open the truck doors and allow the truck to air out for 20-30 minutes prior to unloading to minimize operator exposure.

L. J. Grecco
Manager, Technical Services

cc: L. F. Dieringer - Oxford
R. W. Mallory "
L. J. Primeau - Mishawaka
J. R. Sellers "

Js

STOUGHTON PLANT

SAMPLE LOCATIONS	EMPLOYEE	VCM (PPM)
Unloading Truck #1 Marvinol 5051 - 800 bags	Ron Fosdal	0.02
Upper Resin Storage Area Marvinol 5051	Static Test	0.00
Basement Storage Area	Static Test	0.10
Unloading Truck #2 Marvinol VR53 - 800 bags	Lloyd Lea	0.32

URL 02575

L. J. Grecco
1/13/75

STOUGHTON PLANT

SAMPLE LOCATIONS	TYPE TEST	VCM (PPM)
Inside Truck #1 - 800 bags Marvinol 5051	Static	1.40
Inside front of truck #1 - After 30 minute purge	Static	0.78
Inside Truck #2 - 800 bags Marvinol 5051	Static	18.00
Inside front of truck #2 - After 3 minute purge with pedestal fan	Static	6.00

L. F. Dieringer
Oxford E-G-1

INTERDIVISION ONLY

UNIROYAL

February 26, 1975

R. E. Cunniff
Stoughton Plant

Re: Air Sampling for Vinyl Chloride and Solvent Concentrations

Air samples were taken at the Stoughton Plant on January 30, 1975 and submitted to Mishawaka for analysis. Vinyl Chloride was determined on all samples and solvent concentrations were determined on the ink room samples only.

There are no problems at the Stoughton Plant with Vinyl Chloride or solvents in the areas tested.

L. J. Grecco
Manager, Technical Services

cc: L. F. Dieringer - Oxford
R. W. Mallory - "
L. J. Primeau - Mishawaka
J. R. Sellers - "

js

STOUGHTON PLANT URL 02577

SAMPLE LOCATIONS	OPERATOR	COMPOUND	VCM	P.P.M. MEK	THF	ACETONE
1. Millroom Master Batch	J. Wolff	Geon 124 VR-53 (Italy) SBO_3 Whiting	0.02			
2. Millroom Master Batch	J. Wolff	Pliovic WO-2 SBO_3 Geon 124 Whiting	0.09			
3. Primary Mixer	W. Wick	5051 VR-10 Pliovic Geon 124	0.10			
4. Primary Mixer	W. Wick	5051 Geon 124 Pliovic	0.02			
5. Ink Room (Slip Finish)	C. Henderson	MEK, THF Stabilizer VR-23	0.08	46.3	21.1	12.0
6. Ink Room (Urethane Coating)	C. Henderson	MEK A-895 Resin Roylair	0.14	40.3	-	46.2

INTERDIVISION ONLY

ORIGINAL

April 30, 1975

RECEIVED
MAY 3 1975
MEDICAL
DEPARTMENT

R. E. Cunniff
Stoughton Plant

Re: Air Sampling for Vinyl Chloride and Solvent Concentrations

Air samples were taken at the Stoughton Plant on March 27 and April 2, 1975 and submitted to Mishawaka for analysis. Vinyl Chloride was determined on all samples and solvent concentrations were determined on the ink room samples only.

There are no problems at the Stoughton Plant with Vinyl Chloride in the areas tested. Solvent concentrations are high in the ink room and during clean-up operations. Exhausts over drums and covers are recommended.

L. J. Grecco
Manager, Technical Services

cc: L. F. Dieringer - Oxford - E-G-1
R. W. Mallory - " " D 2-2
L. J. Primeau - Mishawaka
J. R. Sellers - "

js

URL 02578

URL 02579

STOUGHTON PLANT

SAMPLE LOCATIONS	OPERATOR	COMPOUND	P.P.M. VCM	TOLUENE	MEK	THF	ACETONE
1. Millroom - Tub Storage	Static	FL-02049.1 Geon 128	0.25				
2. Millroom - Tub Storage	Static	FL-03412 Geon 128	0.15				
3. Millroom - 3 Roll Mill	Static	FM-3132	0.20				
4. Millroom - Resin Storage Area	Static	Scrap	0.17				
5. Aisle Between C-9 & C-11	Static	-	0.10				
6. Ink Room North	Static	VYHH & Solvents	0.00	4	186	8	94
7. Ink Room	Static	Mixing Slip	0.00	-	2720	890	2500
8. P-8 3rd Head	Static		0.00	9	236	12	122

Note: Solvent concentrations are above standard. Exhausting is required.

Handling Vinyl Chloride Emergencies

The MCA CHEMTREC Program described here will simplify the reporting of accidents involving VCM, and aid in establishing liaison with the accident scene and the shipper.

D.L. Dowell
B.F. Goodrich Chemical Co.
Cleveland, Ohio

An article in this manual by R.D. Kogler entitled "Vinyl Chloride Tank Car Incident" presents a step-by-step description of a train wreck which occurred on September 11, 1969 in Glendora, Miss. There were 157 cars in this train, eight of which were loaded with vinyl chloride monomer. Of the eight VCM cars involved, five remained full and intact after all the fires were extinguished. Due to some erroneous information, and the actions of a few civil authorities, approximately 30,000 people were evacuated from their homes unnecessarily. This incident caused a lot of adverse publicity to those companies involved in the production and consumption of vinyl chloride monomer.

Upon request of Uniroyal, part owner of Monochem, a meeting was called by the Manufacturing Chemists' Association Safety and Fire Protection Committee, on October 27, 1969, in the MCA office in Washington, D.C. The purpose of this meeting was to:

1. Accumulate authoritative information on the combustion products of vinyl chloride monomer.
2. Review the current chemical safety data sheet and consider the possible need of a revised publication.
3. Discuss various aspects of the recent accident, and the adverse publicity which ensued.
4. Consider possible means of preventing a recurrence.

Task groups formed

Nineteen people, representing 11 companies who produce and/or consume vinyl chloride, attended this meeting under chairmanship of Mr. S.M. MacCutcheon of Dow Chemical. Mr. Jack R. Little from Monochem gave a detailed description of the Glendora, Mississippi, derailment, explosion, fire, and evacuation of people. Three ad hoc task groups were appointed to function under the MCA Safety and Fire Protection Committee to evaluate and make recommendations for overall vinyl chloride monomer transportation safety. Task Group A was assigned the project of accumulating information on vinyl chloride transporation accidents that had occurred in the past six years. Task Group B was assigned the development of recommendations for emergency procedures in the event of vinyl chloride transportation accidents, whether or not fire is involved. At a later date Task Group B was requested to make the necessary revisions on Chemical Data Sheet SD-56, and Cargo Information Card, CIC-80, and MCA Chem Card CC-46. Task Group C was assigned the problem of defining the combustion products from vinyl chloride monomer. The objectives of this group were:

1. Determine the amount of phosgene that may be produced when VCM is burned under known conditions.
2. Define total combustion products from VCM.
3. Develop a mathematical model to simulate the burning of a tank car of VCM and define the concentration of various combustion products at a given distance from the fire.
4. Make recommendations as to field testing methods for measuring concentration of toxic combustion products.

Task Group A completed its project on April 22, 1970 and published a list of case histories of transportation accidents involving vinyl chloride in the past six years. Task Group C presented its final report on January 14, 1970 with conclusions as follows:

"Phosgene is a very minor combustion product from VCM. Very small quantities of phosgene (20- to 40 ppm) can be produced when VCM is burning under very specific conditions which involves premixing VCM with oxygen. Without premixing, no detectable amount of phosgene is produced. The detection of phosgene in the presence of gross quantities of HCl produced from the burning of VCM is an extremely difficult analytical test.

"When VCM is burned in the presence of air, an almost quantitative yield of HCl is obtained. The only other combustion products of any consequence are carbon monoxide, carbon dioxide, and water. Under diffusion conditions, the combustión of VCM produces a very sooty flame. Approximately 10% of the available

carbon is converted to carbon black."

Task Group C also developed a computer program and calculated a profile of combustion product concentrations at ground level at various distances from a VCM fire. Ten wind speeds from 2- to 35 mi./hr. were used. The turbulence of the air also was taken into account. The program selects, at each of three atmospheric conditions, the maximum ground level concentration of the pollutants, and the resulting wind speed at which this concentration took place. Using this wind speed, the program calculated a profile of pollutant concentration, at various distances, to a maximum of 20,000 ft. from the fire. The results obtained from this program show that the burning of a single tank car of VCM (200,000 lb.) under the most unfavorable conditions of atmosphere and wind, will produce a ground level concentration of HCl, up to distances of 10,000 ft, of about 5 ppm.

However, even at low concentrations, HCl will act as an unmistakable warning, and slightly higher levels will drive people away from the vicinity. In the immediate vicinity of a VCM fire toxic levels of phosgene may be present, but since no person can remain in the vicinity of a VCM fire, and since the low levels of phosgene are readily hydrolized or dissipated by the updraft of the flame, injury from phosgene is extremely unlikely.

From the data collected, it appears that carbon monoxide should not be cause for concern in the vicinity of burning vinyl chloride. Insufficient oxygen and large quantities of HCl seem to be the chief hazards. If there is any question of the presence of phosgene, a Drager tube equipped with a zinc scrubber tube, can be used. A report was presented on combustion products from vinyl chloride monomer at the Industrial Hygiene Association Meeting on May 14, 1970, in Detroit, Mich. This information will be published in a future issue of the *American Industrial Hygiene Association Journal* in an article authored by L.B. Crider, and M.M. O'mara of B.F. Goodrich Chemical, and Roger Daniel of Dow Chemical Co.

Safety in handling VCM

Task Group B took the available information from Task Groups A and C and proceeded to design guidelines for personnel handling vinyl chloride monomer tank car emergencies. Their recommendations have been submitted to the Safety and Fire Protection Committee of MCA for review. Recommendations are as follows:

1. Personnel attending the accident scene – Shipper's representatives are only advisors, but should emphasize proper procedures for expediting clearing of the scene.

2. Take an emergency kit. The following items are considered essential:

a. Explosion meter.
b. Self-contained air supply.
c. Wood plugs and wood mallet (see Bureau of Explosives Bulletin #22).
d. Data Sheet SD-56 and pencils.
e. Camera and film.
f. Flashlight (Bureau of Mines approved).
g. Rubber gloves.
h. Slicker suit.
i. Rubber overshoes.
j. Safety line (braided stainless, plastic covered and harness.
k. Goggles.
l. Safety hat.
m. O rings.
o. 10 in. adjustable wrench.
p. Screwdriver.
q. Ground continuity meter.

It is recommended to take along a back-up man and to avoid wearing woolen or nylon clothing.

3. Leaks of vinyl chloride:

a. Controllable leaks

1. Small holes – drive a wooden plug.

2. Larger holes – use neoprene patch, bonded or chained to the tank. Special rigs should be left to the judgment of the man at scene.

3. Jagged holes are very difficult to close.

4. Ansul Purple K will extinguish a vinyl chloride fire but re-ignition often occurs. Use around valve if it appears that a leak can be subsequently controlled.

b. Uncontrollable leaks – no fire

1. Isolate the area.

2. Remove sources of ignition.

3. Control spread of vapors by water spray or fog system.

c. Uncontrollable leaks – fire

1. Evacuate and isolate the immediate area.

2. Keep adjacent cars cool if possible with monitor nozzles.

3. Keep unofficial personnel away.

4. Treat a non-burning tank car in the vicinity of a fire as if it were about to rupture.

5. If vinyl chloride reaches a sewer, evacuate the area and flush the sewers with copious amounts of water from the fire hoses.

4. Spilled vinyl chloride:

a. Spilled vinyl chloride should not be deliverately ignited.

5. Recovery or removal of vinyl chloride from a tank car:

a. Depending upon circumstances and the extent of car damage, vinyl chloride may be recoverable.

1. If the car condition permits, transfer the contents to empty cars using inert gas.

2. If a car is ruptured, attempt to use a pump with a flooded suction.

3. If pumping is impractical, use water or oil to float out the remainder of the vinyl chloride.

4. Fill the empty tank with water or nitrogen.

5. If a vinyl-ice mixture forms, keep a water stream on the tank until it dissipates.

6. Handling of vinyl chloride in a damaged car can be influenced by weather conditions.

a. At low temperatures, since vaporization is reduced, patch the tank, if possible, so it can be moved.

Task Group B, with the aid of staff members from the Manufacturing Chemists' Association, developed information for use by CHEMTREC on vinyl chloride monomer emergencies. This includes a list of manufacturers of vinyl chloride, their addresses, telephone numbers, and names of personnel that may be contacted and their home telephone numbers. Upon receipt of request from the shipper, the nearest qualified man will go to the scene of an accident as an advisor. We, who are producers and consumers of vinyl chloride monomer, have unanimously agreed that we have to work together if we are going to continue shipping monomer via railways.

Control of VCM in marine emergencies

About mid-year 1970, Task Group B was requested to continue its studies and make recommendations for handling vinyl chloride accidents in maritime transportation. They have completed their recommendations and they will be submitted this month. Their recommendations for control of marine emergencies are as follows:

1. Safety equipment – safety equipment at the dock, other than normal types of safety equipment, should include:
   a. Self-contained breathing equipment (at least two units with two spare bottles).
   b. Explosion meter.
   c. Ground continuity meter.
   d. Water with an appropriate number of nozzles.
   e. Dry chemical fire extinguishers.
   f. MCA Data Sheet SD-56 and Chemcard CIC #80
2. Types of emergencies:
   a. General – activate the alarm.
   b. Controllable leaks – no fire:
      1. Isolate the leak and source.
      2. Eliminate ignition sources.
      3. Control spread of vapors by water-fog.
      4. Attempt to repair the leak using adequate safety protection procedures.
   c. An uncontrollable leak, ruptures, – no fire:
      1. Isolate the area.
      2. Remove all sources of ignition.
      3. Use water spray to prevent accumulation of liquid and dissipate the vapor cloud. It is not recommended that ship's fire water supply be hooked into the city water supply.
   d. Uncontrollable leaks – fire:
      1. Isolate the area.
      2. Evacuate the area except for emergency personnel.
      3. Use water-fog on fire and fumes (don't extinguish fire unless leak can be controlled).
      4. Use copious amounts of water to keep adjacent areas cool.
      5. Treat adjacent tanks as if they were about to rupture.
      6. Make provisions to minimize the mixing of air with vinyl chloride vapor in confined spaces and the burning tanks or lines (use water, nitrogen, or other inert gases).
   e. Exposure
      1. Remove exposed persons to fresh air.
      2. Apply artificial respiration or oxygen if the person is not breathing.
      3. Call a physician.
      4. Remove contaminated clothing and thaw frosted parts of the body with water.
      5. If exposed to gas from the fire, administer oxygen if breathing is difficult.
3. Spilled vinyl chloride – vinyl chloride spills should not be deliberately ignited.
4. Recovery or removal of vinyl chloride:
   a. Depending upon the circumstances and the extent of tank damage, vinyl chloride may be recovered, but provisions must be made to keep air out of the tanks.
      1. If the tank conditions permit, transfer the contents to an empty tank or back to the shore.
      2. If the tank cannot be patched and it does not have a deep well pump, or the deep well pump cannot be used, sparge hot inert gas into the bottom of the tank to vaporize the vinyl chloride.
      3. Fill empty tank with water or inert gas.

Work is proceeding on the development of a revised edition of the MCA Chemical Safety Data Sheet SD-56. This new edition will contain the emergency recommendations developed by Task Group B. It is hoped the revised data sheet will be published in 1971.

We who produce or purchase vinyl chloride believe that the MCA CHEMTREC Program will be advantageous in that:

1. It will simplify reporting and receiving accident information involving vinyl chloride cars.
2. It will give immediate response to the caller regarding the immediate hazards of vinyl chloride monomer.
3. It will also aid in establishing liaison with both the accident scene and the shipper. #

DOWELL, D. L.

UNION CARBIDE

PLANT LABORATORY

JUL 05 1974
R. N. WHEELER, JR.

UNION CARBIDE CORPORATION
CHEMICALS AND PLASTICS
SOUTH CHARLESTON PLANT
P.O.BOX 8004
SOUTH CHARLESTON, W.VA. 25303

VINYL CHLORIDE MONOMER THRESHOLD

ODOR CONCENTRATION IN AIR

The Odor Panelists have been screened for proficiency by the Arthur D. Little, Inc., Co. and have an average of 10 years experience in odor detections and evaluations. These screening test results are on file in the South Charleston Plant Laboratory.

Mr. Griffith, the chairman and moderator of the testing program is a graduate chemist and a member of the American Society for Testing and Materials E-18 Committee. This committee was founded in 1960 to promote knowledge, stimulate research, state principles and develop recommended practices in all areas of sensory evaluation of materials and products. Fields of interest currently represented include air pollution, clothing and textiles, metals and appliances, beverages and liquors, manufactured food products, flavors and fragrances, agricultural commodities, naval stores, tobacco, chemicals, paints and varnishes, paper and plastics, telephone, railroads, petroleum and allied products, laboratory equipment, packaging materials and pharmaceuticals. He is currently co-chairman of a Task Group to develop a recommended practice for odor of chemicals. Mr. Griffith represents the Kanawha Valley Union Carbide Locations on this committee.

M. A. Aitken
Director of Laboratories

MAA/jjh

UNION CARBIDE

PLANT LABORATORY

UNION CARBIDE CORPORATION CHEMICALS AND PLASTICS

SOUTH CHARLESTON PLANT
P.O.BOX 8004
SOUTH CHARLESTON, W.VA. 25303

REFERENCES

1. SDE-56 Vinyl Chloride
Issued 1972 Page 6, Paragraph 3.1.2.
Manufacturing Chemists Association
Threshold Odor 260 ppm

2. Industrial Hygiene and Toxicology
Patty, F. A. and Associates
Interscience Publishers 1962
Volume 2 Page 1304
4100 ppm lowest level VCM odor can be detected.

3. Basic Principles of Sensory Evaluation
STP 433
American Society for Testing and Materials

4. Manual on Sensory Testing Methods
STP 434
American Society for Testing and Materials

5. Correlation of Subjective-Objective Methods
in the Study of Odors and Taste
STP 440
American Society for Testing and Materials

UNION CARBIDE

PLANT LABORATORY

JUL 05 1974
R. N. WHEELER, JR.

UNION CARBIDE CORPORATION
CHEMICALS AND PLASTICS
SOUTH CHARLESTON PLANT
P.O.BOX 8004
SOUTH CHARLESTON, W.VA. 25303

VINYL CHLORIDE MONOMER THRESHOLD

ODOR CONCENTRATION IN AIR

SUMMARY As the result of some discrepancies existing in the literature 1,2, for the Threshold Odor Level of vinyl chloride monomer in air, a study was initiated by the South Charleston Plant Odor Panel to determine the lowest detectable odor level of VCM in air. These data are tabulated in Table I.

DISCUSSION A series of six samples of vinyl chloride monomer and a blank were presented to the odor panel for determination of the Threshold Odor Level. The samples were prepared in increasing concentration over odorless distilled water in 250-ml Erlenmeyer flasks with stainless steel caps and submitted to a panel of seven people with instructions to record the first detectable odor. Each panelist tested the samples individually, so that there was no collusion among panelists.

A sample of the VCM vapor was then taken and analyzed by an AID Gas Chromatograph Model 511, hydrogen flame detector equipped with an 8 ft. column packed with Poropak Q 50-80 mesh. These data were corrected for the water vapor pressure and calculated to normal gas volume conditions, 0°C and 760 mm mercury. The tests and analytical data were duplicated.

CONCLUSION Individuals vary greatly as to the minimum concentration which is barely detectable. Our most sensitive odor panelists barely detected an odor of VCM at 1200 ppm. Normal odor detection level of VCM is at 2000 ppm. The normal detection level of VCM for the average untrained person is probably higher than 2000 ppm. An explanation as to why discrepancies have existed in the Threshold Odor Level is the fact that VCM is now a much purer commercial product than it was years ago and the odor detected was probably due to some impurity rather than VCM.

M. E. Griffith 7-3-74
Chairman
South Charleston Plant
Odor Panel