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H. V. HOOPER

UNION CARBIDE

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

SOUTH CHARLESTON PLANT

July 5, 1974

Mr. Don R. Goodwin
Director, Emission Standards and Engineering
Office of Air Quality Planning and Standards
U.S. Environmental Protection Agency
Research Triangle Park, North Carolina 27711

Dear Mr. Goodwin:

Per your request of Union Carbide Corporation, dated May 30, 1974, data on the latexes containing vinyl chloride produced by Jennat Corporation is being supplied. Jennat Corporation is a wholly-owned subsidiary of Union Carbide Corporation operating latex plants at Torrance, California, Tucker, Georgia, And Somerset, New Jersey.

The 1974 planned production of latexes containing vinyl chloride is as follows:

(1)

Plant	Product	MM Gross Lbs.
Torrance, Calif.	Milt 31	4.0
Tucker, Georgia	UCAR-1000	6.0
Somerset, N. J.	UCAR-1000	3.0
Somerset, N. J.	UCAR-508	2.0
	Total	15.0

Our total 1974 Latex production of these three locations will be approximately 150 MM pounds, so the vinyl chloride types will be only 10% of the total.

(2) Product Vinyl Chloride Monomer Content

Product	Average Value	Standard Deviation
UCAR-508	60	± 40
UCAR-1000	300	± 130
Milt 31	600	± 160

Weighted averag bas d on pr duction volumes is approximately 400 ppm.

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(3) Solid Waste

Generally, these wastes are disposed of by an authorized commercial contractor to a land fill. Although our solid waste is in the order of 50 cubic yards per plant per month, the vinyl chloride containing portion of this is quite minor - probably only two yards or less. VCM and VCl polymer content has not been measured, but the VCM would probably be less than 1 ppm, and the VCl polymer 3-4%.

(4) Liquid Waste

This is in two categories.

(a) Water washes and rinses run 2M to 5M gallons per day per plant into a local municipal sewer for the total production output. VCM and VCl polymer content has not been measured, but we would expect no VCM and no appreciable VCL polymer in these streams. <0.1 ppm

(b) Scrap latex and cleanings in drums run 80 to 100 drums (4,000-5,000 gal.) per month per plant for the total production output. This waste is 50% total solids (50% water), and is disposed of by an authorized commercial contractor to a land fill. Since the VCl latexes are relatively scrap-free, the portion of this scrap in the total would be even less than 10% (estimate 5%). VCM and VCl polymer again have not been measured but would probably approximate the concentrations listed in Item (1).

The polymer content would vary with the product, but would range from 9 to 18%. The VCM content would average ~~400~~ ppm.
>1

(5) Material Balance

Indicates an over-all VCM efficiency of ~~94%~~. A typical blance is indicated below:

	Pounds
Input	
Vinyl Chloride Monomer	100.00
Output	
Product (PVC)	94.00
Product (VCM)	0.30
Heel returned in Truck (VCM)	1.50
Fugitive (VCM)	4.10
Waste (VCM & PVC)	0.05
Total Accounted	99.95

Attached is a report showing process details, plant layout, and other pertinent information.

If we can be of further service, please make your needs known.

Very truly yours,

R. N. Wheeler, Jr.

R. N. Wheeler, Jr.

RNWJr/ra

Attachment.

bc: Mr. G. J. Hanks, Jr., 511
Mr. H. V. Hooper, Jr.[redacted]
Dr. A. B. Steele, NYO-28
Mr. G. J. Triplett, NYO-46

VINYL CHLORIDE PROCESS AND EMISSION DATA IN LATEX MANUFACTURE

by

W. P. Miller
K. Volkers

June 20, 1974

Jennat Corporation, wholly owned subsidiary of Union Carbide Corporation currently utilizes vinyl chloride monomer in the production of latex products at plants in Somerset, New Jersey, Tucker, Georgia, and Torrance, California. All such products are relatively new and total production volume is small. The latexes produced are interpolymers containing less than 50% polymerized vinyl chloride. The attached data is a best estimate from a limited base of information and experience. The data supplied respond to the general request to Mr. R. N. Wheeler by Mr. Don R. Goodwin of May 30, 1974 (copy attached).

Process and Emission Data

Process Description (See Fig. 1):

1. Vinyl chloride monomer is received by tank truck and/or tank car and is pumped to underground storage tanks.

2. Vinyl chloride and other monomers are transferred from storage and metered into a monomer mix tank where they are mixed.

3. Warm water, catalysts and stabilizer solution are pumped to the reactor from mix tanks.

4. An initial monomer charge is added to the reactor and the reaction initiated.

5. At specified temperatures, continuous monomer and catalyst feeds are started and continued until all the monomers are fed.

6. A cook-out time is followed by addition of "post-add" catalyst and a further cook-out period to reduce residual monomer.

7. The product is partially cooled and transferred to a cooling tank.

8. The product is then transferred directly to storage or via an intermediate bl nding tank.

9. The product is pumped to tank trucks for d livery to custom rs.

A. Process Flow Sheet: Attached Figure 1 shows all major equipment and the amount of product produced.

B. Emissions: No known continuous emissions of vinyl chloride exist. All intermittent sources of emission are classified as fugitive emissions and discussed in Section D.

C. Control Devices - No vinyl chloride emission control devices are currently in service. The known fugitive emission sources defined in items 2, 3, 4, 5, 6 of Section D could possibly be collected and incinerated to reduce their concentration to 10 ppm. In the absence of any specific data on this subject,no further discussion of this possibility is indicated.

D. Fugitive Emissions - Known sources resulting from line or vessel blow down, reactor ventilation, storage and transfer operations within the plants are estimated and summarized below. Please refer to the simplified process flow sheet (Fig. 1).

Unknown sources of fugitive emissions; for example, from leaks through valve stems, pumps seals and miscellaneous sources, are believed to be of a similar order of magnitude as the previously estimated known sources.

E. Emission Control Procedures - Several process design features have been incorporated into the plants to eliminate or control emissions:

1) Storage and use of vinyl chloride in closed vessels designed to withstand the pressure of the fluid without venting during transfers.

2) Special mechanical seal design on transfer pumps to preclude leakage of vinyl chloride liquid or vapor in case of a primary seal failure.

These design features are very effective in controlling emissions.

A process design feature that could be used to further reduce losses due to hose disconnections when unloading tank car or tank trucks would be the use of dry break hose disconnects. These devices effectively eliminate the small pockets of trapp d liquid or vapor created by hose connections.

Known Fugitive Vinyl Chloride (VCM) Emissions from Latex Manufacturing

Points (See Fig. 1)	Description	Emission[b] Composition	Amount of VCM[a]: Lbs/Wet Lb. of Latex Produced	Amount of VCM[a]: Conc. ppm	Amount of VCM[a]: Lbs/Hr	Minutes Time Duration of Each Emission Period
1.	Disconnect vinyl chloride tank truck or tank car unloading	Pure VCM	1.6×10^{-6}	Pure (100%)	12	5
2.	Monomer mix tank blowdown between product changes	VCM containing mixture	1.5×10^{-4}	260,000	110	10
3.	Reactor blowdown between product changes or cleaning cycles	VCM containing mixture	1.6×10^{-5}	10,000	8	30
4.	Latex transfer to cooling tank on each batch	VCM containing mixture	1×10^{-6}	600	0.04	35
5.	Latex transfer to blending tank on each batch	VCM containing mixture	1×10^{-6}	600	0.04	35
6.	Lat x transfer to storage tank on each batch	VCM containing mixture	1×10^{-6}	600	0.04	35
7.	Tank truck loading on each shipment latex	VCM containing mixture	2×10^{-8}	10	0.0007	35

a. Points 1, 2 were estimated from line or tank sizes and operating procedures. Points 3, 4, 5, 6, and 7 were estimated from a minimum number of concentration measurements coupled with transferred amounts.

b. Complete composition of emission is unknown for VCM containing mixtures.

Control and Economic Data

A. Investment Cost

No specific emission control devices are present in the existing plants to control vinyl chloride emissions and therefore investment cost is zero.

Special emission control process design features listed above were incorporated into the original plant design and did not result in significant additional investment or installation costs.

General commitment for installation of suitable devices when and if needed has been obtained.

B. Operating and Maintenance Costs

The operating and maintenance costs are not affected by the process design features and operating procedures for vinyl chloride handling in this process.

Ambient Air Data A. Results of a minimum number of analyses are shown below and on the simplified plant layout (Fig. 2) attached. All analyses have been performed by the Union Carbide carbon adsorption tube method 38C-9Cl-R2. Weather conditions at the time of measurement are not known.

	Sample Points (See Fig. 2)	Ambient Air ppm VCM
a.	Fence line near monomer	< 1
b.	Monomer storage area during VCM unloading	~~4 to 400~~ <1 - 10
c.	Reactor area in Process Bldg.	< 1 ~~to 4~~ 1.5
d.	Product filtration area in Process Bldg.	< 1
e.	Product storage area	< 1
f.	Laboratory area	< 1
g.	Front of Office Bldg.	< 1

B. Information necessary to estimate ambient air concentrations for the fugitive emissions cited previously are shown in the attached table.

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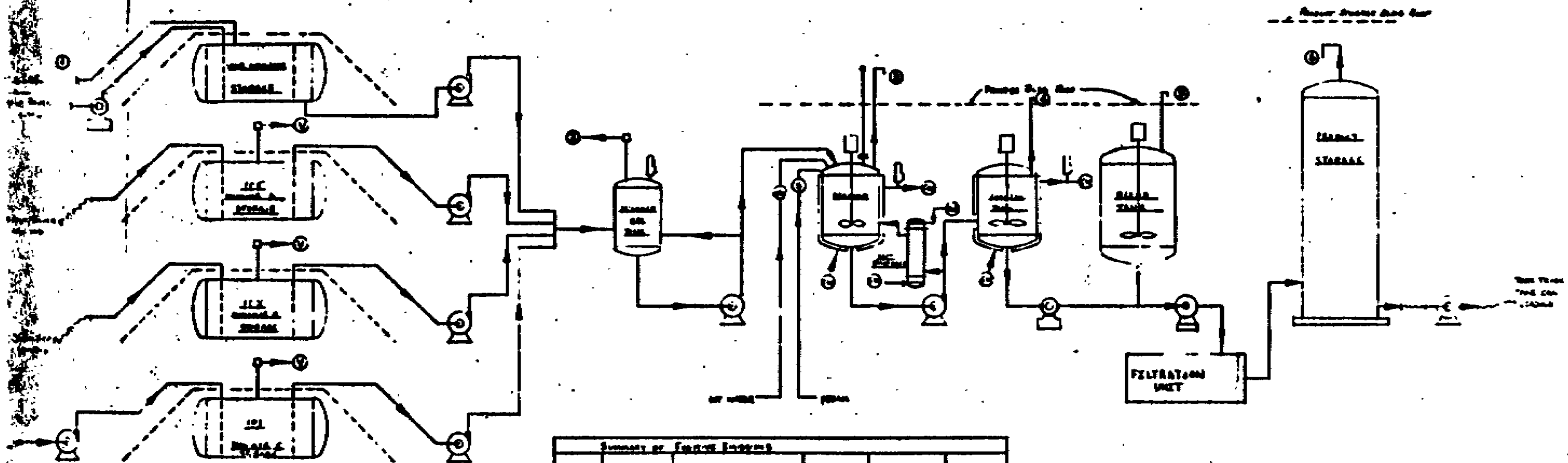
Information Necessary to Estimate Ambient Air Concentrations

SOURCE	STACK HEIGHT FEET	CONFIGURATION	DIAMETER IN.	GAS FLOW RATE CFM	TEMPERATURE °C	GAS[1] VELOCITY FT/SEC	COMPOSITION % VCl BY VOLUME	1975
Tank Truck, Tank Car Unloading Hose Disconnects	N.A.	Open	N.A.	N.A.	Ambient	N.A.	100	✓
Mix Tank Blowdown	15	Gooseneck	3	45	Ambient	15	26	0
Reactor Blowdown	30	Gooseneck	1	100	30	306	1	0
Cooling Tank Venting Incinerated	30	Gooseneck	2	10	60	7.6	.06	0
Blend Tank Venting	30	Gooseneck	2	550	80	418	.06	0
Storage Tank Venting	28	Gooseneck	2	10	30	7.6	.06	<3 ppm
Tank Truck Loading	12	Truck Vent	20	10	30	.08	.001	<3 ppm

1. Exit gas velocities to the atmosphere from vents.



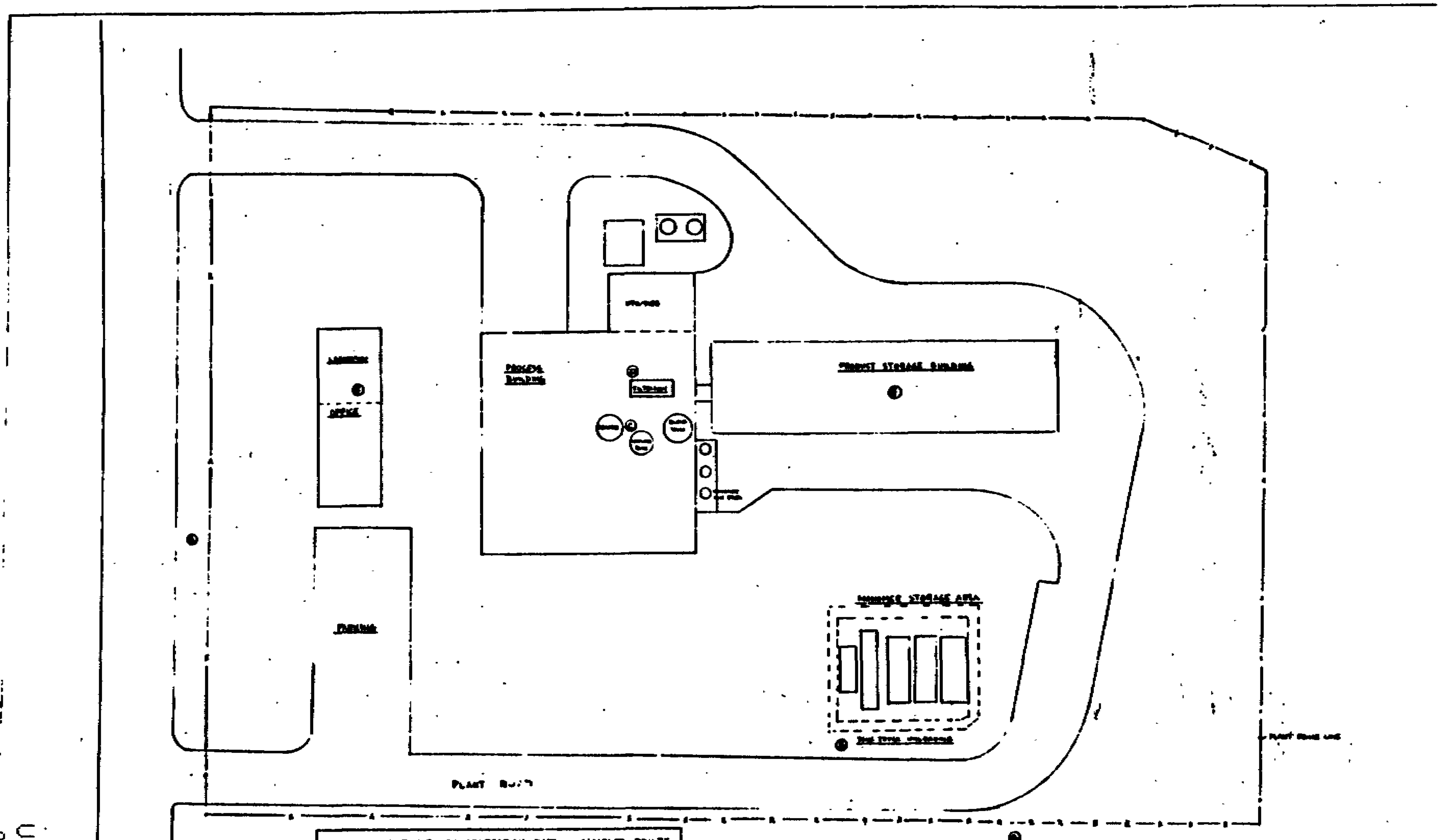
Source	Composition % VCl	[illegible]	[illegible]	[illegible]	[illegible]
1	100	.000005	100%	.12	5
2	26	.00015	250,000	114	10
3	1.0	[illegible]	10,000	8	30
4	0.06	.000001	600	.04	15
5	0.06	.000001	600	.04	15
6	0.06	.000001	600	.04	35
7	0.001	.0000001	10	.0007	60

PROCESS FLOW SHEET

LATEX PROCESS

VCl EMISSION DATA

Fig 1



AMBIENT AIR CONCENTRATION DATA - SAMPLED POINTS	
AREA	CONCENTRATION RANGE, PPM
Ⓐ FENCE LINE	< 1
Ⓑ [illegible] STORAGE [illegible]	6 - 600
Ⓒ REACTOR AREA	<1 - 6
Ⓓ FILTRATION AREA	<1 - 1
Ⓔ PRODUCT STORAGE	<1
Ⓕ LABORATORY AREA	<1
Ⓖ FRONT OF PLANT	<1

TYPICAL PLANT LAYOUT

LATEX PLANT

AMBIENT AIR SAMPLE DATA