Inter-organization Correspondence

B.F.Goodrich

TO	FIELD POINT OR AKRON DEPARTMENT & BLDG. NO.	DATE YOUR LETTER
E. B. Katzenmeyer, Jr. R. A. Kelley	Akron	
FROM	**FIELD POINT OR AKRON DEPARTMENT & BLDG. NO.**	**DATE THIS LETTER**
H. Waltemate		November 25, 197

SUBJECT

PEDRICKTOWN INDUSTRIAL HYGIENE SURVEY

→ NIOSH used 8/74 VC survey

DEC 0 1 1975

Attached for your information is the Industrial Hygiene Survey of the Pedricktown plant. It should be noted that this survey was conducted August 5-9, 1974. There have been numerous changes since that date.

A similar survey was also conducted at Avon Lake General Chemical. We have not received any report to date.

H. Waltemate

/kats
enclosure

cc: J. L. Nelson - E. W. Harrington
R. L. Toole - J. A. Klupar
T. B. Johnson

26198001

BFG46774

DPOK

INDUSTRIAL HYGIENE SURVEY
OF

B.F. Goodrich Chemical Company
Polyvinyl Chloride Operations
Pedricktown, New Jersey

SURVEY DATE
August 5-9, 1974

SURVEY CONDUCTED BY
Robert Curtis
James Jones
Cheryl Rea
Preston Rea

REPORT WRITTEN BY
James Jones

DATE OF REPORT
Oct. 1975

26196002

Environmental Investigations Branch
Division of Field Studies and Clinical Investigations
National Institute for Occupational Safety and Health
Cincinnati, Ohio

BFG46775

Place Visited:	**B.F. Goodrich Chemical Company** **P.O. Box 400** **Pedricktown, New Jersey 08067**
Date of Visit:	**August 5-9, 1974**
Persons Making Visit:	**Robert Curtis** **James Jones** **Cheryl Rae** **Preston Rae**
Persons Contacted:	**A.R. Weber, Plant Manager** **J.A. Klupar** **C.P. Hess**
Purpose of Visit:	**To conduct an industrial hygiene survey of vinyl chloride polymerization operations.**

INTRODUCTION

The National Institute for Occupational Safety and Health (NIOSH) has underway an industry-wide survey of the vinyl chloride (VC) industry. As part of this study industrial hygiene surveys are being conducted to determine "typical" VC exposures at plants using each of the four production processes for making polyvinyl chloride (PVC).

There are only four plants in the country using the bulk, or mass, process. Because of this and the fact that B.F. Goodrich (BFG) had offered their assistance in the VC investigations, it was decided to conduct an industrial hygiene survey at the Pedricktown plant. On August 5, 1974, an initial meeting and a plant tour were attended by Robert Curtis, James Jones, Cheryl Rae and Preston Rae. Sampling was then conducted August 5-9, 1974.

During this visit approximately 210 air samples were taken for evaluation of VC exposures. In addition, samples were taken to evaluate exposure to PVC dust. Noise measurements were also made in selected areas.

DESCRIPTION OF THE FACILITY

The Pedricktown plant is entirely a PVC production facility. Milling and calendaring of PVC is also done here. VC is currently used in two separate processes to make PVC: the mass process and the suspension process.

The plant began operations in March, 1970. Processes are computer controlled to minimize necessary labor requirements. The work force consists of 260 people, 50 of whom actually work in the PVC polymerization areas. All BFG employees are salaried and there is no union. All maintenance and cleaning operations are contracted to Allied Maintenance Company whose workers are members of Local 68 of the International Union of Operating Engineers. These employees are assigned full time to BFG and work under the direction of BFG lead technicians.

MEDICAL, INDUSTRIAL HYGIENE, AND SAFETY PROGRAMS

This facility has an in-plant dispensary with a registered nurse on duty Monday through Friday during the day shift. All lead technicians have first aid training. In addition, Dr. Charles Norton of Woodstown, N.J. visits once a week. Dr. Boyer visits once a week for the Allied Maintenance employees. Emergency arrangements have been made with the Salem, N.J. hospitals.

Pre-employment physicals are required. These include a general physical examination, audiometry and SMA-12 blood tests. The SMA-12's are repeated every 6 months.

The Safety Department consists of a safety engineer and an assistant. Hard hat safety glasses, respirator and safety shoe programs are in operation. In

addition, workers are supplied work clothes and are required to change work clothes each day. Daily showers are mandatory for workers in the polymerization areas. Workers are required to wear fresh air supplied respirators when entering vessels for cleaning or when performing other jobs, such as cleaning filters, that have a high potential for VC exposure.

Industrial hygiene monitoring is carried out by laboratory personnel. A charcoal tube absorption method is used to collect personal samples. An automatic sequential sampling system has been installed in each polymerization building.

This sample system consists of a Bendix total hydrocarbon analyzer with six sampling points. Analysis time for each point is two minutes, so each point is sampled every twelve minutes. These sample results are fed into a computer, which stores peak values for each point and calculates shift averages. It also actuates a visual alarm in the production areas whenever levels go over 25 ppm. In addition one person, per shift, spends full time on VC leak detection using a Century Organic Vapor Analyzer. When a high VC level is shown by the automatic sampler, he determines the cause of the high reading and sees that it is corrected.

DESCRIPTION OF THE PROCESSES

Mass Resin Process

The mass process is a relatively new process in the United States. The process is licensed from a french company, Pechiney-St. Govain, and the major equipment is made in France. VC and catalyst are fed to a pre-polymerization reactor where polymer seeds are produced in slurry form. The slurry is then transferred to other reactors where the polymerization is continued to produce a free flowing powder. Only one pre-polymerization reactor is used to feed all the main polymerization reactors. When polymerization has been completed, unreacted monomer is removed from the reactor by vacuum. The off gas is compressed and the vinyl chloride condensed and then recycled to the process. The granular polymer is then conveyed with air to a series of screens and grinders where the product is ground and classified before being transferred to storage, compounding or to bagging.

Suspension Resin Process

The suspension process is the most widely used process in the United States. About eighty-five percent of all PVC resin is produced by this process. VC emulsifiers and catalysts are metered into stirred autoclaves where PVC is produced by a free radical aqueous polymerization reaction. After the reaction reaches a predetermined completion, the unreacted VC is stripped from the PVC-water slurry, condensed and then recycled to the process. The stripped PVC-water slurry is then pumped to blending tanks where batches from several autoclaves are blended for product uniformity. From the blend tanks, the PVC-water slurry is pumped to a dewatering centrifuge where approximately 90% of the water is removed. The PVC resin wet cake is conveyed from

the centrifuge to a flash dryer where essentially all the remaining water is removed. The dry PVC resin is then screened and air conveyed to storage, compounding or bagging.

INSPECTION OF PLANT

Potential Health Hazards

Potential health hazards observed during this survey were as follows:

1) Respiratory exposure to VC
2) Respiratory exposure to PVC dust in bagging operations
3) High noise exposures in various production areas

SURVEY PROCEDURES

General

Air samples were collected in the plant for evaluating exposure to VC and PVC dust. A noise survey was also conducted. The following paragraphs describe the methods used to collect and analyze the air samples and take noise measurements.

Vinyl Chloride

Both personal and general area samples for VC were collected in the PVC production areas using charcoal adsorption tubes. Area samples were collected in control rooms or at operator's desks. Personal samples were collected on workers only when they left the control room. The samples were taken with Sipin SP-1 pumps at a flow rate of approximately 50 milliliters per minute for a maximum of 20 minutes. Standard SKC charcoal tubes were used. Some samples, collected on the same person on the same day, were combined for analysis in order to reduce the number of analyses. At the end of each day, all samples collected that day were packed in dry ice to prevent loss of sample. At the end of the week of sampling, these samples were shipped to the NIOSH laboratory in Salt Lake City, Utah. There, the samples were desorbed with carbon disulfide and analyzed by gas chromatography according to the procedure outlined in NIOSH Physical and Chemical Analysis Method No. 127 and the May 31, 1974 Vinyl Chloride supplement to this method.

Polyvinyl Chloride Dust

Personal samples for airborne PVC dust were collected in the bagging areas. These were total dust gravimetric samples taken for approximately 4 hours at a flow rate of 2 liters per minute.

All samples were collected on 37 millimeter diameter Mine Safety Appliance (MSA) PVC membrane filters with a 5 um pore size. Three piece millipore filter cassettes were used with only the small plug removed (leaving a 4 mm

diameter opening). A MSA Model G portable air sampling pump was used to pull air through the filter. All filters were tared and re-weighed on the 20 milligram "A" scale of a Cahn Gram Electrobalance.

Noise

In addition to air sampling, noise measurements were made in production areas. A General Radio Type 1565-A sound level meter calibrated with a Type 1562-A calibrator was used for all measurements. The meter response was set on the slow position and measurements made on the "A" weighting network.

RESULTS AND DISCUSSION

Vinyl Chloride Samples

Mass Resin Area

Results of each sample are given in Table 1 and are summarized in Table 3. The lowest personal VC concentration observed was none detected (ND) and the highest was 71.4 parts per million (ppm). Mean personal VC concentrations for the various job classifications ranged from ND to 6.4 ppm.

Area concentrations found in the control room varied from ND to 3.8 ppm with a mean of 1.0 ppm.

The workmen spend a majority of their time, when not in the process areas, in the control room. Therefore a time weighted average (TWA) exposure has been estimated for each job category based on the percentage of time spent in the control room. These TWA's ranged from ND to 4.2 ppm. The highest exposure job category was the serviceman, who cleans reactors, filters, etc.

Suspension Resin Area

Results of each samples are given in Table 2 and are summarized in Table 4. The personal VC concentrations ranged from ND to 245 ppm. The mean concentrations for job types ranged from 0.2 ppm to 28.2 ppm.

Area concentrations found in the control room varied from ND to 96.5 ppm with a mean of 14.5 ppm.

Again TWA's were calculated and ranged from 0.2 ppm to 22.7 ppm. The high concentrations were due to several process malfunctions that occurred during the survey.

Polyvinyl Chloride Dust Samples

Results of the personal PVC dust samples are presented in Table 5. Dust samples were taken only in the bagging operations since this was the only operation involving the dried resin. Local exhaust ventilation was present at each bagging station and seemed to be effective although the area did have a coating of white resin dust. The baggers wore cartridge respirators.

while performing bagging operations. Dust concentrations ranged from 0.38 mg/m^3 to 2.59 mg/m^3. The baggers spent an average of 6 hours per day bagging so TWA dust concentrations ranged from 0.29mg/m^3 to 1.94 mg/m^3.

Noise Measurements

Mass Resin Area

Noise levels in the process ranged from 85 dBA to 94 dBA. The noise level in the control room was 71 dBA. Levels above 90 dBA were predominantly on the first level around the polys and compressors.

Suspension Resin Area

Noise levels in the suspension resin poly building ranged from 88 dBA to 93 dBA. The noise level in the control room was 76 dBA. Essentially the whole building, except for the control room, had noise levels of 90 dBA or above.

Noise levels at the bagging stations were quite high. Levels ranged from 106 dBA at the local exhaust ducts to 92 dBA at the loading pallets. A level of 100 dBA was found at the operator's ear position while inserting and removing bags from the bag filler nozzle.

CONCLUSIONS AND RECOMMENDATIONS

Although differences in VC concentrations were noted for the mass and suspension resin areas, the difference seemed to be more related to attitudes of supervisory personnel than actual differences in the two processes. Lead technicians in the mass resin area indicated genuine concern about controlling VC exposure and relayed this concern to the other workers, while in the suspension resin area there seemed to be much less concern about high VC levels. This difference in concern for VC exposure can be exemplified by the following: in the mass resin area, fresh air masks were hung in a readily available location and were cleaned after each usage. In the suspension resin area the first time the VC alarm went off during our survey, the men had to hunt through a storage cabinet to find the air masks. In the mass resin area, as soon as a VC alarm went off, a man was dispatched to find the cause and then the cause was remedied as soon as possible. In the suspension area, the men would push a button that would turn off the alarm. If the alarm continued to come back on several times, a man would finally go to determine the cause. Increased worker education on the necessity for controlling VC emmissions is needed. Therefore it is difficult to account for higher VC exposures in the suspension resin area by process differences alone.

In both areas the VC concentrations for the most part would not meet the present OSHA standard of 1 ppm TWA. However they were generally below the 50 ppm standard in effect at the time of the survey. Higher levels are in part caused by plant VC emmisions being drawn back into the buildings by the ventilation systems. This occurred even though the intakes were well removed from the building. Changes were underway at the time of the survey that would eliminate or at least minimize this problem. These changes consisted primarily of higher stacks for exhausting contaminated air. All

emission sources were to be vented to common points to facilitate the later addition of VC removal equipment to exhaust vents. With these changes, better maintenance and closer leak surveillance, VC levels should be lowered to near the OSHA standard.

TABLE 1

MASS RESIN AREA VINYL CHLORIDE SAMPLE RESULTS

	Date	Shift	Location or Job Title	No. of Tubes Combined	V.C. Concentration ppm
1.	8-5-74	4-12	Control Room	2	3.8
2.	8-5-74	4-12	Control Room	2	3.6
3.	8-6-74	4-12	Control Room	1	ND
4.	8-6-74	4-12	Control Room	1	0.9
5.	8-6 74	4-12	Control Room	1	ND
6.	8-6-74	4-12	Control Room	1	2.0
7.	8-6-74	4-12	Control Room	1	1.7
8.	8-7-74	8-4	Control Room	2	1.8
9.	8-7-74	8-4	Control Room	2	1.8
10.	8-8-74	8-4	Control Room	1	ND
11.	8-8-74	8-4	Control Room	1	ND
12.	8-9-74	12-8	Control Room	1	ND
13.	8-9-74	12-8	Control Room	1	ND
14.	8-9-74	12-8	Control Room	1	ND
15.	8-9-74	12-8	Control Room	1	ND
16.	8-5-74	4-12	Lead Technician	1	2.2
17.	8-5-74	4-12	Lead Technician	1	ND
18.	8-6-74	4-12	Lead Technician	1	7.3
19.	8-6-74	4-12	Lead Technician	1	4.0
20.	8-6-74	4-12	Lead Technician	1	19.9
21.	8-6-74	4-12	Lead Technician	1	ND

TABLE 1 (CONT'D)

	Date	Shift	Location or Job Title	No. of Tubes Combined	V.C. Concentraction ppm
22.	8-6-74	4-12	Lead Technician	1	ND
23.	8-6-74	4-12	Lead Technician	1	ND
24.	8-7-74	8-4	Lead Technician	1	4.2
25.	8-7-74	8-4	Lead Technician	1	2.1
26.	8-7-74	8-4	Lead Technician	1	ND
27.	8-8-74	8-4	Lead Technician	1	2.5
28.	8-8-74	8-4	Lead Technician	1	22.6
29.	8-8-74	8-4	Lead Technician	1	4.9
30.	8-8-74	8-4	Lead Technician	1	ND
31.	8-8-74	8-4	Lead Technician	1	14.8
32.	8-9-74	12-8	Lead Technician	1	ND
33.	8-9-74	12-8	Lead Technician	1	ND
34.	8-9-74	12-8	Lead Technician	1	ND
35.	8-5-74	4-12	Operating Technician	2	6.3
36.	8-5-74	4-12	Operating Technician	2	9.3
37.	8-6-74	4-12	Operating Technician	1	2.8
38.	8-6-74	4-12	Operating Technician	1	7.6
39.	8-6-74	4-12	Operating Technician	1	7.0
40.	8-6-74	4-12	Operating Technician	1	3.0
41.	8-7-74	8-4	Operating Technician	1	ND
42.	8-7-74	8-4	Operating Technician	1	2.9

TABLE 1 (CONT'D)

	Date	Shift	Location or Job Title	No. of Tubes Combined	V.C. Concentraction ppm
43.	8-7-74	8-4	Operating Technician	1	2.8
44.	8-7-74	8-4	Operating Technician	1	3.4
45.	8-8-74	8-4	Operating Technician.	1	ND
46.	8-8-74	8-4	Operating Technician	1	13.7
47.	8-8-74	8-4	Operating Technician	1	ND
48.	8-8-74	8-4	Operating Technician	1	1.5
49.	8-9-74	12-8	Operating Technician	1	ND
50.	8-9-74	12-8	Operating Technician	1	ND
51.	8-9-74	12-8	Operating Technician	1	1.6
52.	8-5-74	4-12	Serviceman	1	2.9
53.	8-5-74	4-12	Serviceman	2	2.7
54.	8-5-74	4-12	Serviceman	1	20.7
55.	8-5-74	4-12	Serviceman	1	2.0
56.	8-5-74	4-12	Serviceman	2	13.4
57.	8-6-74	4-12	Serviceman	1	1.8
58.	8-6-74	4-12	Serviceman	1	1.5
59.	8-6-74	4-12	Serviceman	1	2.0
60.	8-6-74	4-12	Serviceman	1	4.7
61.	8-6-74	4-12	Serviceman	1	0.9
62.	8-6-74	4-12	Serviceman	1	ND
63.	8-6-74	4-12	Serviceman	1	2.3
64.	8-7-74	8-4	Serviceman	2	2.2

TABLE 1 (CONT'D)

	Date	Shift	Location or Job Title	No. of Tubes Combined	V.C. Concentraction ppm
65.	8-7-74	8-4	Serviceman	2	5.1
66.	8-7-74	8-4	Serviceman	1	1.8
67.	8-7-74	8-4	Serviceman	1	4.4
68.	8-4-74	8-4	Serviceman	1	5.3
69.	8-7-74	8-4	Serviceman	1	11.1
70.	8-8-74	8-4	Serviceman	1	14.3
71.	8-8-74	8-4	Serviceman	1	ND
72.	8-8-74	8-4	Serviceman	1	11.7
73.	8-8-74	8-4	Serviceman	1	71.4
74.	8-8-74	8-4	Serviceman	1	10.9
75.	8-8-74	8-4	Serviceman	1	1.4
76.	8-8-74	8-4	Serviceman	1	ND
77.	8-9-74	12-8	Serviceman	1	ND
78.	8-9-74	12-8	Serviceman	1	ND
79.	8-9-74	12-8	Serviceman	1	5.9
80.	8-9-74	12-8	Serviceman	1	ND
81.	8-9-74	12-8	Serviceman	1	ND
82.	8-9-74	12-8	Serviceman	1	ND
83.	8-9-74	12-8	Serviceman	1	3.1
84.	8-8-74	8-4	Bagger	2	ND
85.	8-8-74	8-4	Bagger	2	ND

TABLE 2

SUSPENSION RESIN AREA VINYL CHLORIDE SAMPLE RESULTS

	Date	Shift	Location or Job Title	No. of Tubes Combined	V.C. Concentrations ppm
1.	8-5-74	4-12	Office	2	8.3
2.	8-5-74	4-12	Office	1	8.2
3.	8-6-74	4-12	Office	1	43.0
4.	8-6-74	4-12	Office	1	23.8
5.	8-6-74	4-12	Office	1	8.7
6.	8-6-74	4-12	Office	1	96.5
7.	8-6-74	4-12	Office	1	50.6
8.	8-7-74	8-4	Office	2	ND
9.	8-7-74	8-4	Office	2	2.2
10.	8-7-74	8-4	Office	1	4.1
11.	8-8-74	8-4	Office	1	2.6
12.	8-8-74	8-4	Office	1	4.1
13.	8-8-74	8-4	Office	1	1.8
14.	8-8-74	8-4	Office	1	6.4
15.	8-9-74	12-8	Office	1	ND
16.	8-9-74	12-8	Office	1	ND
17.	8-9-74	12-8	Office	1	ND
18.	8-9-74	12-8	Office	1	ND
19.	8-5-74	4-12	Pearl Technician	1	8.0
20.	8-5-74	4-12	Pearl Technician	2	4.7
21.	8-5-74	4-12	Pearl Technician	1	2.3

TABLE 2 (CONT'D)

	Date	Shift	Location or Job Title	No. of Tubes Combined	V.C. Concentrations ppm
22.	8-6-74	4-12	Pearl Technician	1	11.5
23.	8-6-74	4-12	Pearl Technician	1	30.6
24.	8-6-74	4-12	Pearl Technician	1	18.6
25.	8-6-74	4-12	Pearl Technician	1	36.8
26.	8-7-74	8-4	Pearl Technician	1	245.0
27.	8-7-74	8-4	Pearl Technician	1	8.0
28.	8-7-74	8-4	Pearl Technician	2	6.6
29.	8-7-74	8-4	Pearl Technician	1	ND
30.	8-7-74	8-4	Pearl Technician	1	3.1
31.	8-7-74	8-4	Pearl Technician	2	1.0
32.	8-8-74	8-4	Pearl Technician	1	4.7
33.	8-8-74	8-4	Pearl Technician	1	7.6
34.	8-8-74	8-4	Pearl Technician	1	22.4
35.	8-9-74	12-8	Pearl Technician	1	1.7
36.	8-9-74	12-8	Pearl Technician	1	ND
37.	8-9-74	12-8	Pearl Technician	1	54.5
38.	8-9-74	12-8	Pearl Technician	1	ND
39.	8-9-74	12-8	Pearl Trainee	1	ND
40.	8-9-74	12-8	Pearl Trainee	1	6.2
41.	8-9-74	12-8	Pearl Trainee	1	191.0
42.	8-9-74	12-8	Pearl Trainee	1	ND
43.	8-5-74	4-12	Paste Technician	1	8.7
44.	8-5-74	4-12	Paste Technician	1	3.1

TABLE 2 (CONT'D)

	Date	Shift	Location or Job Title	No. of Tubes Combined	V.C. Concentrations ppm
45.	8-5-74	4-12	Paste Technician	2	23.8
46.	8-6-74	4-12	Paste Technician	1	37.9
47.	8-6-74	4-12	Paste Technician	1	51.4
48.	8-6-74	4-12	Paste Technician	1	80.0
49.	8-7-74	8-4	Paste Technician	1	1.6
50.	8-7-74	8-4	Paste Technician	2	3.8
51.	8-7-74	8-4	Paste Technician	1	4.7
52.	8-8-74	8-4	Paste Technician	1	3.4
53.	8-8-74	8-4	Paste Technician	1	8.4
54.	8-8-74	8-4	Paste Technician	1	8.3
55.	8-9-74	12-8	Paste Technician	1	1.8
56.	8-9-74	12-8	Paste Technician	1	28.1
57.	8-9-74	12-8	Paste Technician	1	158.8
58.	8-9-74	12-8	Paste Technician	1	27.6
59.	8-5-74	4-12	Rover Technician	2	11.5
60.	8-5-74	4-12	Rover Technician	1	6.0
61.	8-5-74	4-12	Rover Technician	1	10.7
62.	8-5-74	4-12	Rover Technician	1	25.8
63.	8-6-74	4-12	Rover Technician	1	8.1
64.	8-6-74	4-12	Rover Technician	1	14.5
65.	8-6-74	4-12	Rover Technician	1	22.9
66.	8-7-74	8-4	Rover Technician	4	1.9
67.	8-8-74	8-4	Rover Technician	1	2.2

TABLE 2 (CONT'D)

	Date	Shift	Location or Job Title	No. of Tubes Combined	V.C. Concentrations ppm
68.	8-8-74	8-4	Rover Technician	1	8.9
69.	8-8-74	8-4	Rover Technician	1	ND
70.	8-9-74	12-8	Rover Technician	1	2.5
71.	8-9-74	12-8	Rover Technician	1	46.7
72.	8-9-74	12-8	Rover Technician	1	5.0
73.	8-5-74	4-12	Utility Man	2	7.2
74.	8-5-74	4-12	Utility Man	2	3.2
75.	8-6-74	4-12	Utility Man	1	ND
76.	8-6-74	4-12	Utility Man	1	23.6
77.	8-6-74	4-12	Utility Man	1	16.0
78.	8-8-74	8-4	Utility Man	1	6.9
79.	8-8-74	8-4	Utility Man	1	16.9
80.	8-8-74	8-4	Utility Man	1	ND
81.	8-8-74	8-4	Utility Man	1	ND
82.	8-7-74	8-4	Bagger	2	ND
83.	8-7-74	8-4	Bagger	1	ND
84.	8-7-74	8-4	Bagger	2	ND
85.	8-7-74	8-4	Bagger	1	ND
86.	8-7-74	8-4	Bagger	2	ND
87.	8-7-74	8-4	Bagger	1	ND
88.	8-8-74	8-4	Bagger	2	0.6
89.	8-8-74	8-4	Bagger	2	0.7

TABLE 2 (CONT'D)

	Date	Shift	Location or Job Title	No. of Tubes Combined	V.C. Concentrations ppm
90.	8-8-74	8-4	Bagger	2	0.9
91.	8-8-74	8-4	Bagger	2	ND

TABLE 3

MASS RESIN AREA MEAN VINYL CHLORIDE SAMPLING SUMMARY

Location or Job Title	Mean Concentration ppm	Standard Deviation	Range Low High	Percent of Time Out of Control Room	8hr. TWA ppm
Office	1.0	1.4	ND-3.8		
Lead Technician	4.4	7.0	ND-22.6	75	3.6
Operating Technician	3.6	3.9	ND-13.7	50	2.3
Serviceman	6.4	12.9	ND-71.4	60	4.2
Bagger	ND	-	-	100	ND

TABLE 4

SUSPENSION RESIN AREA MEAN VINYL CHLORIDE CONCENTRATIONS

Location or Job Title	Mean Concentration ppm	Standard Deviation	Range Low High	Percent of Time Out of Control Room	8hr. TW ppm
Office	14.5	25.3	ND-96.5		
Pearl Technician	27.7	60.7	ND-245.0	60	22.4
Paste Technician	28.2	41.1	1.6-158.8	60	22.7
Rover Technician	11.9	12.6	ND-46.7	90	12.2
Utilityman	8.2	8.7	ND-23.6	75	9.8
Bagger	0.2	0.4	ND-0.9	100	0.2

TABLE 5

SUSPENSION RESIN AREA POLYVINYL CHLORIDE DUST CONCENTRATIONS

10 mg/m³ is ACGIH TLV

Date	Shift	Job Title	Concentration mg/m³
8-7-74	8-4	Bagger	0.69
8-7-74	8-4	Bagger	0.72
8-7-74	8-4	Bagger	2.50
8-8-74	8-4	Bagger	1.02
8-8-74	8-4	Bagger	0.70
8-9-74	12-8	Bagger	0.38
8-9-74	12-8	Bagger	1.06
8-9-74	12-8	Bagger	0.57

Report of Visit to the Pedricktown Plant

July 19-20, 1972

This visit to the Pedricktown Plant was intended, primarily, as a continuation of the interplant program for evaluation of ambient vinyl chloride concentrations in PVC polymerizer areas. Data have already been obtained in this program for the Henry, Illinois and Louisville, Kentucky Plants.

Atmospheric lead dust, in compounding areas, was also evaluated during the visit. A serious industrial hygiene hazard was identified by these measurements.

Noise measurements were performed throughout the Plant.

I. Recommendations:

A. Improve handling techniques and exhaust ventilation facilities in the compounding area of Building 541 to reduce the atmospheric dust concentrations of airborne lead pigments.

B. Make certain that all personnel working in the compounding area, who may be assigned to the handling of lead pigments, are receiving preemployment, preassignment, and annual lead examinations.

C. Undertake an active noise abatement program in those areas of the Plant where hazardous noise sources exist.

D. In areas where noise abatement steps are unsuccessful, make certain that an effective personnel hearing conservation program is operating. Provisions of The B. F. Goodrich Company Medical Bulletin No. 34 should be followed in this regard.

II. Results and Discussion:

A. Vinyl Chloride.

General atmosphere samples were collected on the second floor charging area of Building 513 to evaluate atmospheric concentrations of vinyl chloride. Samples were collected over a two day period and at various times of day. Results of the survey are shown in Table I.

Air samples were obtained by use of 1 cc gas syringes and samples were immediately analyzed by gas chromatography (AID portable gas chromatograph; Model 511). The chromatograph was equipped with a flame ionization detector and a chromasorb W-HP column containing 3% GC-Grade SE30 as the stationary phase. A permeation tube system was used for calibration.

All samples were less than the recommended maximum allowable concentration of 200 ppm. Only one group of samples (7/19/72; 9:30 p.m.) showed any significant quantities of vinyl chloride and the highest sample in the group (110 ppm) was still considerably less than permitted maximum.

Personnel exposure to vinyl chloride concentrations of these levels presents no inhalation health hazard.

B. Lead.

Several atmospheric dust samples were obtained in the compounding area of Building 541. Samples were collected on No. 41 Whatman filter paper using Staplex high volume samplers. The filter papers were ashed and lead analyses performed by atomic absorption. Data are presented in Table II.

Of the six sites sampled, four exceeded the recommended maximum allowable concentration of 0.15 milligrams per cubic meter of air (mg/m^3).

Personnel exposure to atmospheric lead concentrations of the magnitude shown by these samples provides a serious and significant risk of lead intoxication. Immediate steps should be taken to control airborne dust in this area.

Further air sampling should be undertaken following completion of the necessary engineering and/or maintenance steps to reduce airborne dust concentrations.

c. Noise.

Results of the noise measurements performed throughout the Plant are presented in Table III.

In the Compound Building, a high noise source was identified at the 6" mill operator's station. This noise was associated with the drive or gear mechanism for the mill. Maintenance attention should be directed to this unit.

The second floor, paste side, of Building 513, continues as a noise hazardous area. This area was previously identified in the November 1970 Plant visit report. It is presumed that the compressors, operating in this area, are contributing significantly to the overall noise problem of the area. Unless noise from these units can be controlled, the area must be regarded as a noise hazardous area for personnel.

In the Drier Building, the bag compactor at the bagging station, is a high noise source (108 dbA). This noise can be readily controlled by the use of a muffler or, by venting to outside the building.

The entire ground floor of the Mass Resin Building is a noise hazardous area. If engineering efforts at noise reduction are unsuccessful in this area, personnel working routinely in the area, should be placed on a hearing conservation program.

R. W. Modrell

R. W. Modrell

8/8/72

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TABLE I

Atmospheric Vinyl Chloride Concentrations

Sample Description	Vinyl Chloride Concentration, ppm
Wednesday, 7/19/72; 11:20 a.m.	
North Area	
East	< 1.
Middle	6.
West	4.
Center Area	
East	6.
Middle	4.
West	8.
South Area	
East	27.
Middle	19.
West	6.
Wednesday, 7/19/72; 3:30 p.m.	
North Area	
East	4.
Middle	6.
West	6.
Center Area	
East	4.
Middle	4.
West	4.
South Area	
East	2.
Middle	4.
West	6.
Wednesday, 7/19/72; 9:30 p.m.	
North Area	
East	96.
Middle	19.
West	55.
Center Area	
East	78.
Middle	29.
South Area	
Middle	110.
West	78.

TABLE I contd.

Thursday, 7/20/72; 10:00 a.m.

North Area	
East	16.
Middle	4.
West	8.
Center Area	
East	12.
Middle	8.
West	12.
South Area	
East	12.
Middle	20.
West	20.

Thursday, 7/20/72; 4:00 p.m.

Mass Poly Building	
Bottom of Prepoly (Charging VCl).	9.
First level of Prepoly.	6.
Second level of Prepoly	12.
Third level of Prepoly.	15.
Near vinyl pumps (outside).	6.
Tank Farm	
Near vinyl pumps.	< 1. (N.D.)
Under vinyl storage sphere.	23.

TABLE II

Airborne Lead Concentrations in Building 541

Sample Description	Sample Parameters: Time, Minutes	Sample Parameters: Volume, m^3	Airborne Lead Concentration, mg/m^3
1. First floor. Central area; between 6" and 9" lines and between mills and Farrels.	18.	7.6	0.56
2. Operator's side, 9" mill.	17.	10.1	0.04
3. Operator's side, 6" mill.	16.	8.2	0.32
4. Third Floor; scale area. Sampler on switch box at 9" Henshel loading hopper.	16.	9.5	0.09
5. Third floor; scale area. Sampler on cabinet near 6" Henshel loading hopper.	15.	7.6	0.35
6. First floor. Weigh Booth. Sampler at weighman's head level at Face of booth. (Weighing Scotch Laddie 810)	16.	8.6	0.28

TABLE III

Plant Noise Levels

Location	Noise, dbA
Compounding Building.	
9" Mill Operator.	88.
6" Mill Operator.	94.
Automatic Bagger	88-89
9" Gaylord Station	88-89
6" Bagger Station	89-90
Poly Building (Bldg. 513; 2nd Floor)	
Paste Side	90-92
Near Compressor	92-94
Pearl Side	88-90
Drier Building (First Floor)	
Bagger Station (tailings)	86
Under Storage Bins	89
First Stage Venturi	90
Operator's Desk	87
Bagger Station	
Normal	85-86
Compactor operating	108
Warehouse Bagging Area	80-82
Air peaks (intermittent and brief)	95
Mass Resin (Bldg. 512)	
Reactor 8300, first floor. Near cooling water valve.	105.
Reactor 8100, first floor.	95.
Between reactors 8100 and 8200.	91.-92.
Near compressors.	92.
Top of reactor 8200; southend.	88-89
Office.	69-70
Latex Building (Bldg. 502).	
First floor, Pieco.	80.
First Floor, Operator's Desk.	75.
Second Floor, Pieco.	80.
Third Floor, Heat-up (Normally unoccupied).	90-93
Fourth Floor.	87-89
Fourth Floor Office.	74

TO	FIELD POINT OR DEPT. & BLDG. NO.	DATE YOUR LETTER
C. J. Nosal	Pedricktown	HWD/EBR/file
FROM	**FIELD POINT OR DEPT. & BLDG. NO.**	**DATE THIS LETTER**
T. S. Bialke	Akron, D/0020, B/5-H	6/8/82

SUBJECT

PEDRICKTOWN INDUSTRIAL HYGIENE SURVEY - APRIL 13-15, 1982

During the period April 13 to April 15, an industrial hygiene survey at the Pedricktown Chemical Plant was conducted. This report contains the findings and recommendations of that survey.

The Plant's efforts to reduce lead exposures in the compound operation appear to be excellent. However, to ensure compliance, personnel monitoring is needed to document the reduced exposures. The Plant can reduce its vinyl chloride monitoring frequency by utilizing the VCM-AN scheduling program available through the Cleveland Personnel Monitoring system computer. Three plant safety procedures, Hearing Protection, Respirators and Lead Handling need to be up-dated to reflect current practices.

I fould all levels of Pedricktown production and management to be co-operative and interested in maintaining a healthful work environment. I wish to thank C. McCann and J. Kiel for their help during my survey.

T. S. Bialke

T. S. Bialke

v

cc: G. A. Kaswell
J. A. Kiel/C. E. McCann
E. C. Martinelli/H. Waltemate/R. A. Krueger
W. C. Becker/W. C. Holbrook
R. C. Kaminski/J. F. Malone
M. R. Aquino/R. A. Trafas/R. E. Pasquali
W. C. Niederst/S. G. Esakov/K. Greene

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Findings	Comments/Discussion	Responsibility	Exp.Date/Comp.

Items from Last Survey

1. Lead/antimony exposure controls installed.

1. The Pedricktown compound operation has completed installation of air air pallet system designed to control lead and antimony exposures. Unfortunately, the operation was not running compound that used lead; therefore I was unable to evaluate the effectiveness of the system for control of Pb or Sb. The plant has conducted a limited amount of personnel monitoring for lead; results are encouraging. More monitoring needs to be done to document that lead exposures have been controlled. Three personnel monitorings for lead per exposed employee need to be collected over the next 6 months. If results show exposures to be below the 50 ug/M^3 OSHA standard, collect two samples per exposed employee per year. Blood lead monitoring is to continue at the current frequency; antimony monitoring could be reduced to once per year as results are well below the 500 ug/M^3 OSHA standard.

2. Local exhaust for removing welding fumes in maintenance shop.

2. Local exhaust units designed for welding fume removal have been installed in the new maintenance building welding bay. All units meet OSHA ventilation standards. Discussions with plant personnel indicated that the units are not being used. The best, most effective way to prevent direct employee exposure to welding fume is to utilize local exhaust ventilation. Capturing welding fume at its source will prevent the fume from getting into the general work environment and eliminate the need for general room exhaust for fume removal. Local exhaust ventilation is more effective and efficient at removing fumes, and less expensive since only small volumes of air need to be moved.

3. Reduction of personnel monitoring for VCM.

3. A program is available through the Cleveland personnel monitoring computer which will schedule and pre-print monitoring cards based upon the OSHA VCM standard required sampling frequency. The plant, instead of establishing its own frequency should utilize this system. This program will reduce the amount of sampling and also provide for better control of sampling requirements.

Findings	Comments/Discussion	Responsibility	Exp. Date/Comp.
Items from this Survey			
1. No hazard inventory.	1. The essence of the BFG medical information system is its ability to rapidly and accurately relate employee medical information by job class to actual or potential exposure to hazards from that job. Personnel monitoring supplies some of the necessary data on actual job class exposures; however, numerous other hazards are not monitored. Therefore it is necessary to obtain a hazard inventory by job class so that potential hazards that may be encountered by employees working in any job class can be evaluated. Such an inventory will list the chemical or physical agent that may cause an exposure by job class. This project will require a hazard analysis of each job to determine what chemical or physical agent a person working in that job class may be exposed to. Such a job hazard analysis will fulfill the requirements of the medical surveillance system and also present an opportunity for the health/safety team to become more aware of any potential health hazards that may exist in the plant. A copy of the form to be used is attached.		
2. SA 30B plant respirator procedure out of date.	2. The plant's respirator procedure was written in 1978. It needs to be re-written to indicate changes in types of respirators worn for VCM and lead exposures. The new procedure must include provisions for periodic inspections of all respirators, frequent cleaning, proper storage and assigning responsibility of the overall implementation of the program to one individual to ensure it is accomplished as written.		
3. SA 23A, Hearing protection procedure out of date.	3. The plant's hearing protection procedure needs to be rewritten to include provisions for proper employee fitting and training by qualified medical personnel. It must also list hearing protection types which are available.		

Findings	Comments/Discussion	Responsibility	Exp.Date/Comp.
4. SA 25A. Lead Handling procedure needs to be updated.	4. The plant's lead handling procedure needs to be updated to reflect the changes in types of respirators used, i.e. air stream and airline types, and when to use them. The procedure needs to reflect the changes in handling due to the installation of the air pallet system.		
5. B/505 Ammonia building, 2nd floor large poly building, large poly utility area; noise levels above 85 dBA.	5. The noise levels in these areas were found to be above 85 dBA on the day of the survey. These areas must be posted as noise hazardous and hearing protection required to be worn when employees are working in them per BFG occupational health policy 5.05. See Section 9.80 of the BFG OHP manual for discussion of recognition and evaluation of noise exposures.		
6. No periodic noise dosimetry conducted on employees working in noise hazardous areas.	6. The plant must obtain at least one dosimeter reading per year per employee working in noise hazardous areas. Periodic noise dosimetry must be done to ensure that the plant's compounding area remains in compliance with OSHA noise standards and to develop a data base to evaluate employee audiometric exams against, per BFG OHP 5.05. The data base will also assist in assessing the appropriateness of any future workman compensation claims for occupationally related, noise induced hearing loss.		
7. ATSC make-up was observed; one personal sample collected.	7. The laboratory analytical technique for ATSC has not been finalized. As soon as analysis has been developed, results will be reported. The procedures and personnel protective devices utilized during ATSC make-up provide excellent protection.		

Findings	Comments/Discussion	Responsibility	Exp.Date/Comp.
8. PVC dust was observed blowing around doors to compound 9" line mixer bin.	8. The access door to the 9" Henschel mixer bin was not sealed tightly. As a result, much fugitive emission of PVC dust was observed blowing from around it. Compounding personnel tried to correct problem by tightening the door to the hopper. This helped, but did not alleviate the problem. Straightening the door, realigning it to the opening, and installing a new gasket around the opening were all offered as possible solutions.		
9. VCM exposures at large poly unit not extensively characterized.	9. Since the large poly area has been in operation for only a few months, personnel exposure data to VCM are minimal. It is recommended that one VCM reading be taken on each employee working in the large poly area each month for one year. This will provide an indication of yearly exposure trends and provide data to be used in determining if the large poly area is to be regulated per the OSHA VCM standard. All VCM exposures from hazardous tasks requiring the use of respirators must also be monitored to provide documentation for the file to demonstrate to OSHA that the respirators selected provide adequate protection against the VCM exposures encountered. Task monitoring is to be done for length of the task or for 15 minutes, whichever is shortest.		

Additional Discussion:

Table I contains the results of personnel monitoring conducted during the survey. I obtained three VCM personnel monitorings from the mass resin area; two were below the action level of 0.5 ppm; one sample was 0.9 ppm, below the 1 ppm TLV, but above the action level. Per the OSHA VCM standard, this man (S. Sanderlin) has to be resampled every three months until two consecutive samples taken greater than seven days apart are below 0.5 ppm, at which time sampling can be discontinued.

A latex technician and a latex technician/charge operator were sampled for ethyl acrylate and methyl methacrylate. Both sets of monitorings were below the 5.0 ppm TLV for EA and the 100 ppm TLV for MMA.

Three large poly employees were sampled for noise; a large poly technician, a large poly pigment technician and a large poly lead technician. The 8-hour equivalent percent readings were 18, 17 and 11.8 respectively. A reading greater than 50% would require the employee to wear hearing protection in noise hazardous areas and inclusion in the plant's hearing conservation program. More audiodosimeter work is needed in the large poly area to determine what the actual noise exposures may be. It is recommended that three noise dosimeter readings per employee working in the LP area be taken during the next year.

Two employees in the compounding area were also monitored for noise. The employees rotated between millman and rover jobs. Their 8-hour TWA readings were 73.15% and 88.7%. Hearing protection was worn by both employees. The combination of engineering and administrative controls imposed by the plant has successfully abated the OSHA citation, but because the readings are above 50%, annual audiometric examinations and the wearing of hearing protection is required. To ensure continued compliance with the OSHA noise standard, all compounding employees are to be monitored for noise at least one time per year.

One respirable dust sample was collected on a PVC paste bagger. The sample was collected for 350 minutes and 0.4 mg/M^3 of respirable dust was found. This is well below the respirable dust exposure limit of 5.0 mg/M^3.

During the survey, I sat in on the monthly meeting of the plant's environmental council meeting. I was impressed with the way monitoring data were used to demonstrate effectiveness of established controls and with the enthusiasm demonstrated by the production managers in the area of environmental health and pride in keeping their areas ambient VCM levels low. In fact, I must applaud the interest shown me by all Pedricktown production personnel regarding the health of their employees.

TSB

TABLE I.

PERSONNEL MONITORING RESULTS
Pedricktown; Apr. 13-15, 1982

Employee/SS#	Job	Sample Time (min.)	Results
	VCM[1]		
D.Graston 157-52-9741	Mass. lead technician	380	0.4 ppm VCM
S.Sanderlin 156-50-4522	Mass. technician	380	0.9 ppm "
E.Bueden 135-56-3942	Mass. utility	380	0.4 ppm "
	ACRYLATES[2]		
W.Welsch 153-40-8968	Latex technician	385	3.7 ppm ethyl acrylate 0.3 ppm methyl methacrylate
R.Hunter 186-26-4310	Latex charge tech.	375	0.5 ppm ethyl acrylate 0.4 ppm methyl methacrylate

NOISE[3] (80 dBA threshold)

		Wore hearing protection	% 8-Hr. TWA
R.Thompson 148-28-8803	LP technician	No	18.0
N.Augers 145-44-0485	LP pigment tech.	No	17.0
W.Wilson 140-30-3536	LP lead tech.	No	11.8
H.Spencer 141-50-0891	Cpd.millman/rover	Yes	73.15
W.Sadler 156-50-4522	" " "	Yes	63.8
	RESPIRABLE PVC DUST[4]		
E.Brickey 229-64-9518	PVC paste bagger	350 min.	0.4 mg/M^3

8-Hr. Threshold Limit Values

[1]VCM	1.0 ppm	[3]Noise	100%
[2]Ethyl acrylate	5.0 "	[4]Resp. PVC Dust	5.0 mg/M^3
methyl methacrylate	100 "		

June 30, 1978

A. W. Clements
E. C. Martinelli

INDUSTRIAL HYGIENE SURVEY - PEDRICKTOWN

During April, Mr. T.S. Bialke visited the Pedricktown plant for the purpose of conducting an industrial hygiene survey. The report of his visit is attached.

Please note there are a number of recommendations. In order that we may follow-up on these and maintain a close working relationship, I would appreciate being advised of the status of these recommendations within 60 days.

E B Katzenmeyer

E.B. Katzenmeyer, Jr.

v

cc: R.A. Guyton,M.D.
H.W. Dietz, M.D.
R.A. Kelley
R.W. Strassburg
K.J. Kaminski
H. Waltemate