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PROJECT REPORT

INDUSTRIAL HYGIENE SURVEY
AIR ANALYSES
BOUND BROOK PLANT

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DATE: December 17, 1971

PROJECT NO.: 910E10

FILE NO.: 16535

SUMMARY The Bound Brook Plant was visited November 11 and 12, 1971. This visit was made at the specific request of Mr. D. R. Albright for the purpose of making asbestos determinations in air in Building 3. Samples for other contaminants were also taken in Buildings 4, 6, 21, and 91 in areas pertinent to the Plant environmental health program.

The results of analyses taken during this visit indicate that there are some operations where established OSHA standards are exceeded. For the most part, these operations are performed at periodic intervals and are of such a nature that peak concentrations are transitory. Under these conditions, data should be collected to indicate concentration levels under all operating conditions. Operator exposure time must also be determined in order to properly evaluate the actual allowable exposure to concentrations exceeding the Threshold Limit Values (TLV). Specific suggestions concerning the various areas are as follows:

1. The U. S. Department of Labor has issued an emergency asbestos standard of 5 fibers greater than 5 microns in length per milliliter of air, for an 8-hour time-weighted average (1).

2. More data are needed in the area of the crushers in Building 4 to properly evaluate the hazard potential.

3. Lead concentrations exceed the TLV when product 5436 Bk 25 is being made on Unit 1 in Building 6. Operators should be provided with respiratory protection during this operation.

4. The ventilation procedure to remove epichlorohydrin fumes during upset operating conditions needs revision to prevent epichlorohydrin burns at the liquid epoxy unit in Building 21.

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5. The use of carbon black is resulting in exposures to dust concentrations exceeding the TLV in Buildings 91 and 101. The handling of empty bags seems to cause the high dust concentration in the blender room of Building 91. In my report of the October visit to the Plant (2), I reported the situation in Building 101. That report mistakenly showed the carbon black TLV to be 5 mg/M^3. This should be corrected to 3.5 mg/M^3.

INTRODUCTION Mr. D. R. Albright requested dust measurements in the vicinity of Units A and B, Building 3, during an experimental run of phenolic molding resin, using asbestos as one of the raw materials. The products using asbestos as an additive are not usually manufactured on these two units. The experimental run was scheduled for Friday, November 12, 1971. To achieve the maximum utilization of time and in case there was a last-minute change in plan, arrangements were made to obtain samples in other areas of interest in the Plant environmental health program.

DISCUSSION Air samples were taken for the determination of asbestos fibers in Building 3, nuisance dust from the crushers in Building 4, lead and nuisance dust concentrations around Unit 1 in Building 6, epichlorohydrin vapor in Building 21, and carbon black in Building 91. The results of the analyses are summarized in the following discussion.

Building 3, Phenolic Resins, Unit A

The data obtained are shown in Table I. The primary interest is in the asbestos fiber count, but the total dust particles are also shown to compare with dust determinations made previously (2). Asbestos containing materials were being manufactured on both Units A and B.

The U. S. Department of Labor has issued an "emergency" asbestos standard of 5 fibers (of greater than 5 microns in length) per milliliter of air for an 8-hour time-weighted average (1). The standard covers exposure of asbestos to all workers and was based on the recommendation of the National Institute of Occupational Safety and Health (NIOSH). The standard permits 5 to 10 fibers per ml of air for up to 15 minutes in an hour, for up to 5 hours in any 8-hour work day.

Building 3, Phenolic Resins, Unit B

These results are also shown in Table I, the same as Unit A. Unit B was on asbestos containing resin and Unit A was not. The results on the third floor exceed the new "emergency" standard.

Building 4, Pulverized Resins, Units 3, 4, and 5

At the request of Mr. Carl Decina, production engineer, samples were taken at the crushers of Units 3, 4, and 5. He was specifically interested in the dust level when rework material

was being dumped into the crushers. However, the only drum of rework material to be added was on Unit 4. This was added during the first sample of the data shown in Table II. The operator of this unit was careful not to make any more dust than necessary.

In contrast, the operator on Unit 3 was making an effort to create as much dust as possible. He was especially disturbed that I was trying to measure the dust at his face level rather than in the major dust cloud over the crusher.

There was obviously some malfunction in the Unit 5 system. Shortly after the crusher was turned on, there was a tremendous dust cloud that poured out of the crusher. This cloud of dust dispersed throughout most of the room during the time it was being emitted. A second dust cloud was generated as soon as the operator added resin to the crusher. The last two samples in Table II were taken during the period of dust emission but after the worst had subsided. These two samples are the only ones that exceed the TLV of 50 millions of particles per cubic foot of air.

Building 6, Phenolic Resins, Unit 1

The product being manufactured on this line contained lead as one of the raw materials. The results in Table III show both dust and lead concentrations in air. The dust levels are about the same as those obtained on the same line in October (1). The lead concentrations equal or exceed the TLV of 0.2 mg/M^3.

Building 21, Liquid Epoxy Resin Unit

We have been trying to obtain samples for epichlorohydrin in air around this unit for several months. Each time I have been in the Bound Brook Plant the unit was down for one reason or another. On November 11, the unit was just going on-line, so it was possible to get samples under various operating conditions. The results are shown in Table IV and are all under the TLV of 5 ppm (skin).

The worst hazards from epichlorohydrin exposure were observed during the time that vacuum was lost on the system. There was an epichlorohydrin fume cloud from the top opening in the centrifuge on the mezzanine level. This would be a definite hazard to any worker required to spend much time in the immediate vicinity. A flexible ventilation line was put at the opening to help control the fumes. Fumes removed by the vent line then condensed in the ventilation system, dripped onto a light fixture at the control panel, and then on anyone under the light. There should be some way to correct this situation to prevent possible skin burns to operators and anyone else required to be in the area.

Building 91, Vulcanizable Polyethylene

Carbon black is mixed with the other raw materials in a blender on the second floor. Weighed amounts of the mixture

are then dropped into fiber drums in the Banbury room on the first floor for charging into the Banbury. The mixture is milled, extruded, pelletized, and bagged in the mill room on the ground floor. The most dust is likely generated while charging the blender and loading the drums. I was unable to obtain samples during the drum-loading operation. The results obtained are shown in Table V. The only sample exceeding the TLV of 3.5 milligrams per cubic meter for carbon black was the one taken while charging the blender.

CONCLUSIONS AND RECOMMENDATIONS The results of analyses taken during this visit indicate that there are some operations where established OSHA standards are exceeded. For the most part, these operations are performed at periodic intervals and are of such a nature that peak concentrations are transitory. Under these conditions, data should be collected to indicate concentration levels under all operating conditions. Operator exposure time must also be determined in order to properly evaluate the actual allowable exposure to concentrations exceeding the TLV's. Specific suggestions concerning the various areas are as follows:

1. The new "emergency" standard for asbestos will require closer surveillance of those operations involving asbestos. This means more frequent sampling under all handling and exposure conditions.

2. More data are needed in the area of the crushers in Building 4 to properly evaluate the hazard potential.

3. Lead concentrations exceed the TLV when product 5436 Bk 25 is being made on Unit 1 in Building 6. Operators should be provided with respiratory protection during this operation.

4. The ventilation procedure to remove epichlorohydrin fumes during upset operating conditions needs revision to prevent epichlorohydrin burns at the liquid epoxy unit in Building 21.

5. The use of carbon black is resulting in exposures to dust concentrations exceeding the TLV in Buildings 91 and 101. The handling of empty bags seems to cause the high dust concentration in the blender room of Building 91. In my report of the October visit to the plant, I reported the situation in Building 101. That report inadvertently showed the carbon black TLV to be 5 mg/M^3. This should be corrected to 3.5 mg/M^3.

BIBLIOGRAPHY

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(2) Industrial Hygiene Survey - Air Analyses - Bound Brook Plant
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Attachments:
5 Tables

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R. W. Cope

TABLE I

DUST DETERMINATIONS
BUILDING 3, DEPARTMENT 014
UNITS A AND B

Date: November 12, 1971 Project: Unit A = BMG 5498 Bk25
Unit B = BMRS 5314Bk10

Analytical Method: Phase contrast and Lightfield microscopy. All samples taken at face level in the working area.

Time	Sample Description and Location	Results mppcf (a)	Fibers/ml (b)
10:06 a.m.	Charging raw materials into Unit A scales on the third floor	2.6	2.2
11:10 a.m.	Taken at charge roll of Unit A on first floor	0.6	1.1
11:29 a.m.	Taken at finish roll of Unit A on first floor	0.7	2.0
11:43 a.m.	Taken at squeeze roll of Unit A on first floor	0.7	1.3
12:12 p.m.	General area around Unit A on first floor	0.5	1.0
8:33 a.m.	Taken at charge roll of Unit B on first floor	0.7	1.7
8:51 a.m.	Taken at finish roll of Unit B on first floor. Unit went down temporarily during sample.	0.2	0.4
9:36 a.m.	Taken at finish roll of Unit B, first floor	0.2	0.8
9:50 a.m.	Taken at squeeze roll of Unit B, first floor	0.3	1.1
10:28 a.m.	General area around Unit B, first floor	0.2	1.1
10:56 a.m.	At operator's chair near charge roll, Unit B, first floor	0.5	3.1
12:00 noon	Charging raw materials into Unit B scales on the third floor	1.0	5.9

(a) Millions of particles per cubic foot of air by Lightfield microscopy.

(b) Phase contrast microscopy. Fibers greater than 5 microns in length per milliliter.

TABLE II

DUST DETERMINATIONS
BUILDING 4, DEPARTMENT 014
UNITS 3, 4, AND 5

Date: November 12, 1971 Product: BRPA 4485, Unit 3
BRPA 8152, Unit 4
BRPA 4572, Unit 5

Analytical Method: Lightfield microscopy. All samples taken at face level of workers in the area.

Time	Sample Description and Location	Results, mppcf
9:28 a.m.	Taken at Unit 4 crusher while operator dumped one drum of rework material.	1.0
1:00 p.m.	Taken at Unit 3 crusher while operator was dumping resin. This man tried to generate dust.	8.4
1:10 p.m.	Same as previous sample	8.0
1:15 p.m.	Taken at Unit 4 crusher during addition of resin and hexa	3.0
1:46 p.m.	Taken at the Unit 5 crusher and throughout the room to the scales in the west end. The crusher had a tremendous cloud of dust emitting from it for approximately five minutes.	>200
1:50 p.m.	Taken along crushers 3, 4, and 5 after the worst of a dust cloud from crusher 5 had dispersed.	>90

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TABLE III

DUST AND LEAD DETERMINATIONS
BUILDING 6, DEPARTMENT 014
UNIT 1

Date: November 11, 1971 Project: 5436 Bk25

Analytical Methods: Lightfield microscopy and X-ray fluorescence. All samples taken at face level of workers in the area.

Time	Sample Description and Location	Results	
		Dust mppcf(a)	Lead, mg/M^3(b)
11:26 a.m.	Taken along west side of charge and finish rolls on first floor. Operation normal.	1.0	>1.5
11:45 a.m.	General area of charge roll, and conveyor. Line stopped because of trouble with crusher and conveyor.	0.4	0.2
12:40 p.m.	Taken between finish roll and conveyor.	0.2	0.3

(a) Millions of particles per cubic foot of air by Lightfield microscopy.

(b) Milligrams per cubic meter of air by X-ray fluorescence.

TABLE IV

EPICHLOROHYDRIN IN AIR
BUILDING 21, DEPARTMENT 002

Date: November 11, 1971

Product: ERLE 0500
Liquid Epoxy Resin

Analytical Method: gas chromatography
All samples taken at face level in the working area.

Time	Sample Description and Location	Results, ppm (a)
8:53 a.m.	Taken in the area of the operators desk, the control panel, and the walkway between the feed and holding tanks. Unit was not up to full operation.	0.9
9:18 a.m.	Same as previous sample.	1.3
10:20 a.m.	In addition to the above areas, the sample was taken following the operator to the product tank, the control panel at the scales, and to the decanter area on the mezzanine. Operation normal.	0.4
12:17 p.m.	Taken entirely at operator's desk. Operation normal.	0.5
3:33 p.m.	Stayed with the operator all over the unit. They had lost vacuum on the system. There were epichlorohydrin fumes from the centrifuge on the mezzanine.	2.3

(a) Parts per million by gas volume in air.

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TABLE V

DUST DETERMINATIONS
BUILDING 91, DEPARTMENT 018
CARBON BLACK

Date: November 11, 1971

Product: DFDA 0144
Vulcanizable Polyethylene

Analytical Method: Microbalance

All samples taken at face level of workers in the area.

Time	Sample Description and Location	Results, mg/M^3(a)
12:58 p.m.	Taken in Banbury room, first floor, while operator was dumping drums of mixed resin and carbon black into the Banbury mixer.	2.0
1:50 p.m.	Taken on the ground level beside the mill operator. He was also packing bags during this time.	<0.2
4:10 p.m.	Taken in the blender room on the second floor while the operator was charging DYDT, carbon black, and titanium dioxide to the blender.	7.5

(a) Milligrams per cubic meter.

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