U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
CENTER FOR DISEASE CONTROL
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH
CINCINNATI, OHIO 45202

HEALTH HAZARD EVALUATION DETERMINATION REPORT 75-13-265
PROTECTO WRAP COMPANY
DENVER, COLORADO

MARCH 1976

I. TOXICITY DETERMINATION

Based on results of environmental evaluations conducted by the National Institute for Occupational Safety and Health (NIOSH) on April 8, June 3, and August 13, 1975, it has been determined that a health hazard exists from exposures to coal tar and petroleum tar vapors at the Protecto Wrap Company, Denver, Colorado.

II. DISTRIBUTION AND AVAILABILITY

Copies of this hazard evaluation are available upon request from the Hazard Evaluation Services Branch, NIOSH, U.S. Post Office Building, Room 508, Fifth and Walnut Streets, Cincinnati, Ohio 45202. Copies have been sent to:

(a) Protecto Wrap Company
(b) U.S. Department of Labor - Region VIII
(c) NIOSH - Region VIII

For the purpose of informing approximately 10 exposed employees, this report shall be posted in a prominent place readily accessible to workers for a period of at least 30 days.

III. INTRODUCTION

Section 20(a)(6) of the Occupational Safety and Health Act of 1970, 29 U.S.C. 669(a)(6), authorizes the Secretary of Health, Education, and Welfare, following a written request by any employer or authorized representative of employees, to determine whether any substance normally found in the place of employment has potentially toxic effects in such concentrations as used or found.

The National Institute for Occupational Safety and Health received such a request from management at Protecto Wrap Company, Denver, Colorado, to evaluate the potential hazards associated with exposures to vapors coming from reservoirs containing coal tar and petroleum tar solutions.

IV. HEALTH HAZARD EVALUATION

A. Plant Process

This company manufactures a plastic pipe covering which is made by coating a continuous sheet of plastic with a hot solution made from coal tar, petroleum tar, and powdered PVC. This solution is maintained at a high temperature, resulting in emission of coal tar and petroleum tar vapors. Once the plastic is coated with the solution and cooled, it is cut into various lengths and packaged for shipment. This coating protects the pipe from moisture and other corrosive substances. A prior health hazard determination for vinyl chloride revealed levels below NIOSH detection limits.

B. Evaluation Design

During this evaluation, breathing zone and general room samples were taken throughout the area where coal tar and petroleum tar vapors were evident. Samples were collected on pre-weighed silver membrane filters. Confidential employee interviews were completed on all of the workers.

C. Methods

The silver membrane filters were forwarded to the Western Area Laboratory for Occupational Safety and Health, Salt Lake City, Utah, where total benzene soluble fraction of total particulates collected on the filters were analyzed by the Parma method[1] and benzo(a)pyrene analyzed by gas chromatography.[2] Refer to Tables I, II, and III for detailed laboratory data.

D. Criteria for Assessing Workroom Concentrations of Air Contaminants

The primary source of criteria used to assess workroom concentrations of coal tar and petroleum tar vapors is the occupational health standard as promulgated by the U.S. Department of Labor (Federal Register, June 27, 1974, Title 29, Chapter XVII, Subpart G). The 1975 American Conference of Governmental Industrial Hygienists (ACGIH) threshold limit values (TLV's) also lists 0.2 mg/M^3 as a safe exposure limit for an 8-hour day, 40-hour work week.

Accumulated epidemiological evidence gathered in many countries, and for various occupational groups, conclusively demonstrates that workers alternately exposed to the products of the combustion or distillation of bituminous coal are at increased risk of cancer at many sites. These sites include skin, lungs, larynx, nasal sinuses, kidneys, bladder, stomach, intestine, pancreas, and leukemia.[3]

In the following tabulation of criteria, the most appropriate value is presented with its reference and other information footnoted.

Substance	Permissible Exposure 8-Hour Time-Weighted Exposure Basis
Total benzene soluble fraction Coal tar and petroleum tar vapors.....	0.2 mg/M^3

mg/M^3 = approximate milligrams of substance per cubic meter of air

Reference: The 1975 ACGIH TLV and the current Occupational Safety and Health Administration (OSHA) standard.

Occupational health standards are established at levels designed to protect individuals occupationally exposed to individual toxic substances on an 8-hour per day, 40-hour per week basis over a normal working lifetime.

E. Evaluation Results and Discussion

This evaluation was performed on April 8, June 3, and August 13, 1975. Results of air sampling are shown in Tables I, II, and III. Sixteen of 17 samples taken exceeded the hygiene standard of 0.2 mg/M^3 (results ranged from 0.18 to 4.41 mg/M^3). Questionnaires were reviewed by a NIOSH physician. This review revealed only one worker with possible job-related symptoms. This worker has since left employment. Confidential employee interviews were completed on all of the workers on August 13. A health hazard does exist from coal tar and petroleum tar vapors, which is shown by the most recent health criteria being grossly exceeded.

Benzo(a)prene analyses were performed on seven samples. All samples were below NIOSH detection limits except one, which was 0.0019 mg/M^3.

ENVIRONMENTAL RECOMMENDATIONS:

1. Local and general exhaust ventilation should be installed throughout the work area to eliminate exposures to coal tar and petroleum tar vapors.

2. Until the ventilation system is installed, workers should be provided with NIOSH-approved respiratory protection.

MEDICAL RECOMMENDATIONS:

All employees, including maintenance workers, who are exposed to coal tar pitch volatiles at least 30 days per year should be offered:

1. A work history and a comprehensive medical history which should include the presence and degree of respiratory, urinary, and skin symptoms, i.e., breathlessness, cough, sputum production, wheezing, skin photo-sensitivity and bloody urine.

2. A medical examination which should include as a minimum the following:

(a) 14 x 17 posterior-anterior chest X-ray with UICC classification of the X-ray.

(b) Pulmonary function tests to include forced expiratory volume in one second (FEV_1) and forced vital capacity (FVC).

(c) Baseline weight.

(d) A skin examination for premalignant and malignant lesions and evidence of hyperpigmentation and photosensitivity.

(e) Urinalysis for sugar, albumin, and microscopic test for red blood cells.

(f) A urinary cytology examination for employees having five or more years employment with exposure to coal tar pitch volatiles or who are 40 years of age or older.

(g) A sputum cytology examination for employees having ten or more years employment with exposure to coal tar pitch volatiles or who are 45 years of age or older

The above procedures should be performed at least annually for all exposed employees and semi-annually for employees 45 years of age or older or who have had ten or more years exposure to coal tar pitch volatiles.

When an employee who has been covered by these examination procedures transfers to an area where he is not exposed to coal tar pitch volatiles, the examinations should be continued as long as that employee is employed by the company or by a successor employer. If the employee has not had these examinations performed within three months of termination of employment, the examination procedure should be made available to the employee at the time of termination of employment.

V. REFERENCES

1. R. T. Richards, D. Donovan, and J. Hall. AIHA Journal, 28, 590 (1967).

2. T. D. Searl, et al. Anal. Chemistry, 42, 954 (1970).

3. Criteria for Recommended Standard...Occupational Exposure to Coke Oven Emissions, Department of Health, Education, and Welfare, NIOSH, page v-1, 1973.

VI. AUTHORSHIP AND ACKNOWLEDGMENT

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TABLE I

ATMOSPHERIC CONCENTRATIONS OF
TOTAL BENZENE SOLUBLE FRACTION OF
COAL TAR AND PETROLEUM TAR VAPORS

April 8, 1975

Sample Number	Location	Time of Sample (min.)	Atmospheric Concentrations Total Benzene Soluble Fraction (mg/M^3)	Type Sample
1	Tank Operator	295	0.41	Breathing Zone
2	Mixer Operator	157	3.76	Breathing Zone
3	Coal Tar and Petroleum Tar Mixing Room	290	1.27	General Room
4	Coal Tar and Petroleum Tar Mixing Room	291	1.65	General Room
5	Mixer Operator	286	1.13	Breathing Zone
6	(BLANK)	---	---	---
	HYGIENIC STANDARD		0.2	

TABLE II

ATMOSPHERIC CONCENTRATIONS OF
TOTAL BENZENE SOLUBLE FRACTION OF
COAL TAR AND PETROLEUM TAR VAPORS

June-3, 1975

Sample Number	Location	Time of Sample (min.)	Atmospheric Concentrations Total Benzene Soluble Fraction (mg/M^3)	Type Sample
1	Tank Operator	333	0.18	Breathing Zone
2	Shop Foreman	204	4.41	Breathing Zone
3	Tank Operator	326	0.45	Breathing Zone
4	Tank Operator	324	0.25	Breathing Zone
5	Plant Manager	316	0.32	Breathing Zone
6	(BLANK)	---	----	---
		HYGIENIC STANDARD	0.2	

TABLE III

ATMOSPHERIC CONCENTRATIONS OF
TOTAL BENZENE SOLUBLE FRACTION OF
COAL TAR AND PETROLEUM TAR VAPORS

August 13, 1975

SAMPLE NUMBER	LOCATION	TIME OF SAMPLE (min.)	ATMOSPHERIC CONCENTRATIONS TOTAL BENZENE SOLUBLE FRACTION (mg/M^3)	TYPE SAMPLE
1	Mixer Operator	152	1.97	OBZ
2	Foreman	170	0.29	OBZ
3	Rods	152	0.32	OBZ
5	Mixer Operator	167	0.29	OBZ
6	Tank Operator	155	0.96	OBZ
7	Winder Operator	173	0.57	OBZ
8	Tank Operator	161	0.31	OBZ
	HYGIENIC STANDARD		0.2	

OBZ = Operator's Breathing Zone