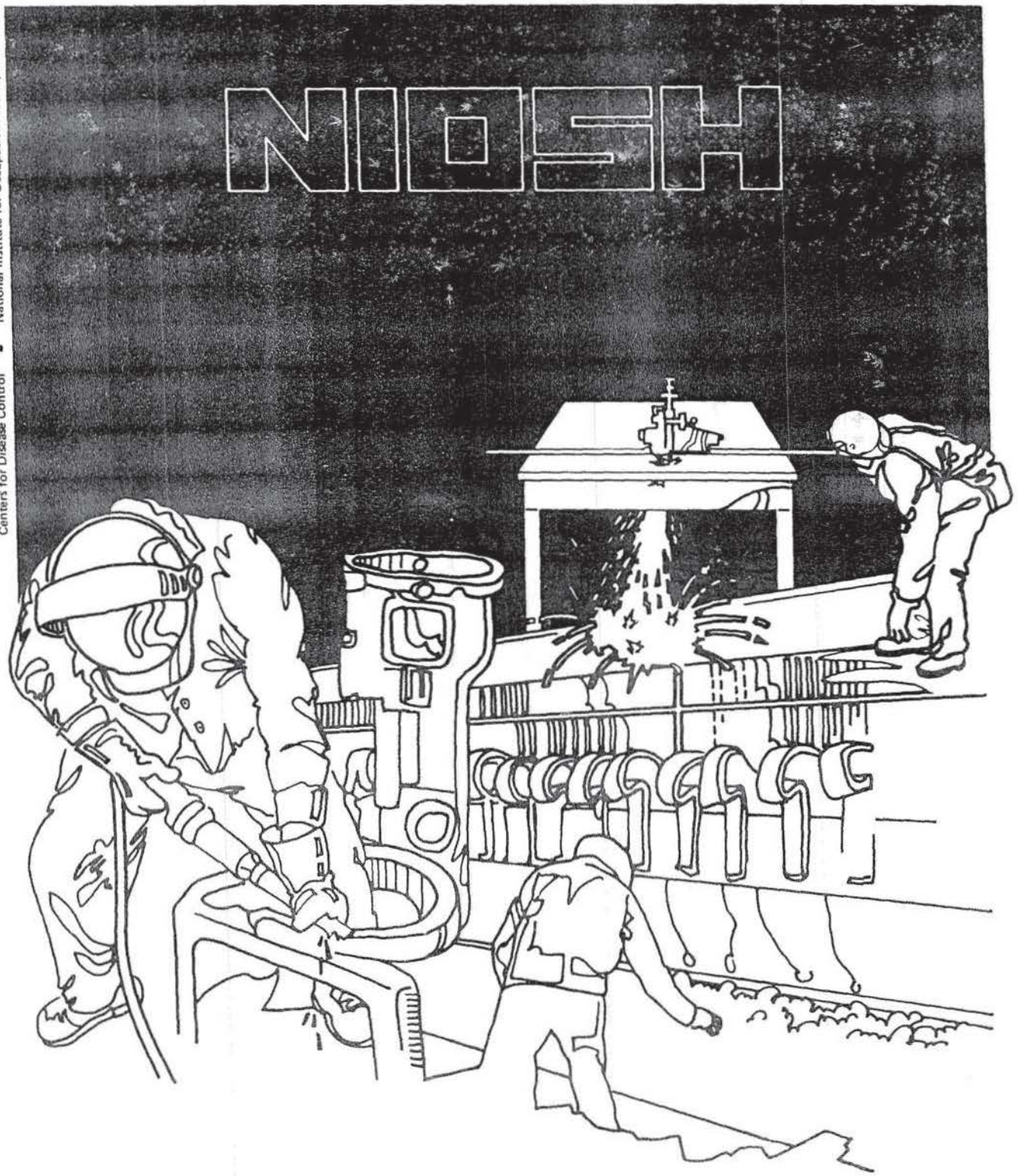
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES ■ Public Health Service
Centers for Disease Control ■ National Institute for Occupational Safety and Health

NIOSH



Health Hazard Evaluation Report

HHE 80-238-931
NEW YORK PORT AUTHORITY
BROOKLYN, NEW YORK

PREFACE

The Hazard Evaluations and Technical Assistance Branch of NIOSH conducts field investigations of possible health hazards in the workplace. These investigations are conducted under the authority of Section 20(a)(6) of the Occupational Safety and Health Act of 1970, 29 U.S.C. 669(a)(6) which authorizes the Secretary of Health and Human Services, following a written request from 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 Hazard Evaluations and Technical Assistance Branch also provides, upon request, medical, nursing, and industrial hygiene technical and consultative assistance (TA) to Federal, state, and local agencies; labor; industry and other groups or individuals to control occupational health hazards and to prevent related trauma and disease.

ERRATUM

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Brooklyn, New York

PAGE 2: The workers at the site being evaluated were employed by Spearin, Preston & Burrows, Inc. of New York City, New York; not by Underpinning and Foundation Construction Company, Inc., of Maspeth, New York.

The request for the health hazard evaluation stated that both contractors employed workers at the site. On the specific days of the NIOSH site visits, the contractor employing the workers at the site was Spearin, Preston & Burrows, Inc..

HE 80-238-931
August 1981
New York Port Authority
Brooklyn, New York

NIOSH INVESTIGATORS:
Dean Baker, M.D., M.P.H.
Nicholas Fannick, IH

I. SUMMARY

In August, 1980, the National Institute for Occupational Safety and Health (NIOSH) received a request from the Carpenters Union, Local 1456, AFL-CIO, to evaluate coal tar creosote exposure among dock builders. Specifically the request concerned six employees engaged in pile-driving creosote-preserved wood logs for a dock underpinning in Brooklyn, New York.

After preliminary visits during September 1980, NIOSH investigators conducted an environmental-medical survey on October 14, 1980. Personal and area air samples were collected for measurement of creosote and coal tar volatiles using a gravimetric method of analysis. The medical evaluation included employee interviews and skin examinations.

The breathing zone air concentrations of the cyclohexane-extractable fraction of the coal tar pitch volatiles (CTPVs) ranged from none detected to 0.059 milligram per cubic meter of air, mg/m^3. However, sampling occurred on an atypically cool, cloudy day during which the pile driver was in operation for less than one hour. The NIOSH recommended environmental exposure limit is 0.1 mg/m^3 Time Weighted Average (TWA) based on a 10 hour work day, 40 hour work week.

Five of six employees participated in the medical evaluation. All employees reported skin and eye irritation, erythema (excess sunburn), dry skin, and occasional blistering. Symptoms increased on warm or sunny days. None reported having chronic respiratory problems or a history of skin cancer. Skin examinations revealed erythema and dry, peeling skin on faces and necks, with irritation and folliculitis on the forearms and hands.

Because environmental sampling occurred under atypical conditions, NIOSH could not determine usual levels of exposure to CTPVs during this operation. Inspection revealed that employees had substantial direct skin contact with creosote. Employees reported symptoms and exhibited medical signs consistent with exposure to coal tar products, including creosote. NIOSH has concluded that coal tar products, including creosote, are carcinogenic (have the potential to cause cancer). Inhalation of CTPVs may increase the risk of developing lung cancer. Direct skin contact with creosote causes acute irritation and can lead to the development of skin tumors, including skin cancer. Recommendations on personal protection and hygiene, respirator usage, and medical monitoring are presented in the report.

Keywords: SIC 1629 (Driving Piling); creosote, coal tar pitch volatiles, pile-driving, dock building, skin irritation, phototoxic dermatitis, folliculitis, skin cancer.

II. INTRODUCTION

In August 1980, Local 1456 of the Carpenters Union, AFL-CIO, requested that the National Institute for Occupational Safety and Health (NIOSH) conduct a health hazard evaluation of exposure to coal tar creosote. Members of the Union work for contractors in the New York City area doing dock construction. In many instances, the underpinning for the docks consists of creosote-preserved wood piles which are driven into the river bed. This request specifically concerned exposure to creosote of union members currently employed by the Underpinning and Foundation Construction Company, Inc. of New York, N.Y. at a construction site for the New York Port Authority at Pier #10, Brooklyn, N.Y.

Driving of creosoted piles at the site lasted approximately from December 1979 until October 1980. NIOSH initially visited the site on September 2 and 9, 1980. Bulk samples were collected on September 11, 1980. A medical evaluation, consisting of interviews and skin examinations, and environmental sampling were done on October 14, 1980. Shortly thereafter, construction involving creosote exposure was completed. Verbal recommendations were given to the requestor during December 1980. The recommendations highlighted the need for personal protection and hygiene while explaining the need for a more extensive study to evaluate potential chronic health effects.

This report contains several medical terms which may be unfamiliar to the reader. A glossary is included at the end of the report.

III. BACKGROUND

An initial step in dock construction is placing an underpinning foundation on which the dock can be constructed. The underpinning usually consists of steel, reinforced concrete, or wood piles which are driven into the water bed. Most wood piles are preserved to decrease the rate of biological and environmental degradation. Marine pilings are treated almost exclusively with creosote and creosote-containing materials(1). Creosote is most commonly combined with coal-tar or hydrocarbon solvents, such as No. 2 fuel oil, in the preservative solutions(2). Over 96 million gallons of creosote were used for wood preservation in 1975(3).

Creosote is a "distillate of coal tar produced by the high temperature carbonization of bituminous coal. Creosote consists principally of liquid and solid aromatic hydrocarbons and contains some tar acids and tar bases; it is heavier than water. It has a continuous boiling range beginning at about 200°C."(4) It has 200 or more components, including principally naphthalene, anthracene, phenanthrene, fluorene and fluoranthene, and acenaphthene and pyrene(2,3). Upon heating, creosote and coal tar emit volatile organic matter referred to as coal tar pitch volatiles (CTPVs). A sub-group of these CTPVs are compounds with ring structures called polycyclic aromatic hydrocarbons(PNAs). Some of the PNAs in creosote have been identified and include known carcinogenic agents, such as benzo(a)pyrene(1,2).

Creosote and other wood preservatives are generally applied to wood by pressure-treating methods. During treatment, the preservative penetrates deeply into the log and saturates the wood. Excess creosote remains on the surface making the wood appear dark brown or black. The wood has a characteristic creosote odor, commonly ascribed to "railroad ties".

During underpinning construction, the creosoted wood pile (usually long leaf pine) is marked for length on the storage barge, transferred to the pile driver, aligned, and driven into the water bed through successive impacts of the pile-driver weight. Afterwards, the top of the pile is sawed to a precise height and the end is painted with additional creosote. The process may involve substantial set-up time for repositioning the pile-driving crane. Direct contact with creosote occurs during the marking, handling and aligning of the pile. The impact of the pile-driver weight causes creosote to exude from the wood and be splattered throughout the surrounding area. Sawing generates creosote impregnanted wood dust particles and painting requires close contact with liquid creosote. Finally, components of the creosote (CTPVs, including PNAs) volatilize from the surface, especially on warm or sunny days.

The dock construction at Pier #10 required approximately 1700 piles which were emplaced at a minimum rate of 10 per day. These piles were preserved with a solution of creosote oil and petroleum distilate (hydrocarbon solvents). The crew of workers consisted of 8 persons: 1 engineer and 1 fireman inside the pile driver with minimal creosote exposure; 2 "pile choppers" who mark and ready the piles on the storage barge; 1 "monkey" who climbs the pile-driving tower to align the piles and pile-driver weight; 1 "A-frame man" and 1 headman who cut the piles and paint them with creosote; and 1 foreman.

Most of the employees had worked at the site since March 1980. Throughout the summer, they experienced skin burning and irritation with exaggerated sunburns on exposed skin. Symptoms were worse on warm or sunny days and, in addition, employees developed watery, burning eyes and nausea. Over the years, these symptoms had been commonly experienced by the workers whenever they had worked with creosote. They were also concerned about chronic health effects. Therefore, a request was submitted to NIOSH to evaluate this exposure to creosote.

IV. EVALUATION DESIGN AND METHODS

A. Environmental

Breathing zone and area air samples were collected to measure airborne exposure to creosote and to coal tar volatiles using the method described in the NIOSH Criteria Document for Coal Tar Products(1). Samples are collected on a combination of glass fiber and silver membrane filters, using a personal air sampling pump at 2 liters per minute for extended periods of time. The material collected on the filters is extracted with cyclohexane in an ultrasonic bath, filtered, dried, and weighed. The resulting amount of cyclohexane-extractable fraction is indicative of the total CTPVs present in the sampled air.

Breathing zone samples were obtained on the "headman" and both "pile choppers". The "monkey", who works closest to the pile-driver, could not be sampled without interfering with his job activities. Area samples were obtained in two locations on one of two storage barges contiguous to the pile-driver barge. Sampling times ranged from 405 to 585 minutes.

Environmental sampling occurred on October 14, 1980. The day was atypically cool and cloudy - not representative of environmental conditions throughout the preceding summer. However, the pile-driving operation was being concluded and sampling could not be deferred. During that day, the pile-driving crane malfunctioned and actual operating time was less than one hour. Since sampling occurred on a cool day when the pile-driver was mostly not operating, the resulting samples essentially represent minimum ambient air exposure to CTPVs while working in the barge area.

B. Medical

A medical questionnaire was administered to 5 of 6 employees working outside on the barges. The questionnaire covered present and past work descriptions and exposures; present health problems, with an emphasis on skin, respiratory, gastrointestinal, and central nervous system problems; past medical history; and personal protection and hygiene. Skin and mucous membrane examinations were performed on each employee.

V. EVALUATION CRITERIA

Exposure to creosote can occur through direct contact with the skin or by airborne exposure to the coal tar pitch volatiles. Environmental standards are based on airborne exposure to CTPVs, assuming that direct contact will be kept to a minimum at all times.

The environmental evaluation criterion as related to airborne exposure to coal tar products, including creosote, is based on a gravimetric analysis of the CTPVs. The NIOSH Recommended Standard for coal tar products is 0.1 milligram per cubic meter of air (mg/m^3) of the cyclohexane-extractable fraction of the sample, determined as a Time-Weighted Average (TWA) concentration for up to a 10-hour work shift in a 40-hour work week(1). The Federal occupational health standard as promulgated by the Occupational Safety and Health Administration (OSHA), U.S. Department of Labor (29 CFR 1910.1000) is 0.2 mg/m^3 of the benzene-soluble fraction of the sample, determined as a TWA concentration for a 8-hour work shift in a 40-hour work week. Cyclohexane and benzene soluble fractions are esentially equivalent in coal tar products.

The NIOSH Recommended Standard is based primarily on a finding that coal tar products, including creosote, are potentially carcinogenic in humans. NIOSH states in the Criteria Document on Coal Tar Products:

> From the epidemiologic and experimental toxicologic evidence on coal tar, coal tar pitch, and creosote, NIOSH has concluded that they are carcinogenic and can increase the risk of lung and skin cancer in workers. Therefore, the permissible

> exposure limit recommended is the lowest concentration that can be reliably detected...While compliance with this limit should substantially reduce the incidence of cancer produced by coal tar products, no absolutely safe concentration can be established... The employer should make every effort to keep exposure as low as technically feasible (1, page 2).

This conclusion is based on the production of skin papillomas and carcinomas, and lung adenomas in mice. (Papillomas and adenomas are benign growths, while skin carcinoma is a malignant cancer with high curability if detected at an early stage.) In addition, creosote contains some polynuclear aromatic hydrocarbons known to have carcinogenic potential. While population studies of workers exposed to coal tar pitch have shown excess cancer of the skin and lung, no epidemiologic study of workers exposed to creosote has yet demonstrated an excess risk of cancer. NIOSH is currently investigating creosote exposure among workers engaged in preserving wood.

Creosote has been recognized as an environmental toxin because of its potential to cause cancer. Recently, the Environmental Protection Agency initiated the Rebuttable Presumption Against Registration (RPAR) review process on pesticide products containing creosote because they exceed their risk criteria (40 CFR 162.11(a)(3)) for oncogenicity and mutagenicity (2,3).

The NIOSH Recommended Standard for creosote is also based on other known health effects, including primary skin irritation, phototoxic dermatitis, conjunctivitis (eye irritation), and the development of benign skin tumors (1). The irritation and phototoxicity develop acutely following exposure to creosote or CTPVs. Skin tumors can grow after prolonged direct contact with creosote.

Skin irritation from creosote exposure results in itching and burning with erythema. Continued contact can result in dry, scaly skin with acne and folliculitis. Exposure to airborne CTPVs and direct contact with creosote can also cause a phototoxic reaction of the skin. (Phototoxicity is a reaction of the skin associated with exposure to light.) "Characteristically there is a short induction period of a few hours, followed by the appearance of an exaggerated sunburn on areas exposed to the sun or ultraviolet light - usually the face and hands." (5, page 178). The symptoms and signs of the reaction include burning, itching, erythema, vesiculation or blistering, ulceration, and later hyperpigmentation and desquamation (peeling of the skin). This skin reaction occurs most severely among fair-complexioned persons.

The phototoxic reaction develops when creosote-contaminated skin is exposed to ultraviolet light. Ultraviolet light (UV) is the part of natural sunlight with an electromagnetic wave length of 290 to 400 nanometers (nm or 10^{-9} meters). It can be subdivided into two groups - longer wave UVA (320-400nm) and shorter wave UVB (290-320nm). UVB light is responsible for the usual sunburn experienced when a person is

overexposed to the sun. On the other hand, the phototoxic skin reaction following exposure to creosote occurs with exposure to light in the UVA range. This difference is important because most sunscreen lotions protect against UVB, but not UVA light. The phototoxicity of creosote can be minimized by using an appropriate sunscreen.

CTPVs reaching the eyes cause a chemical conjunctivitis with burning and tearing; photophobia; swelling of the lids; and corneal scars and pterygia (growths on the surface of the eyes) with chronic exposure.

With chronic direct exposure to creosote, there is an increased susceptibility to proliferative lesions of the the skin (growths on the skin), including papillomas, virus-induced warts, and pitch acanthomas (pitch warts) or keratoacanthomas. These tumors can be disfiguring, but are benign and generally represent no danger to the person who has them.

VI. RESULTS AND DISCUSSION

A. Environmental

The results of environmental sampling are shown in Table I. Breathing zone air samples were obtained on 3 of 6 employees working outside on the barges. Two area samples were obtained. Sampling times ranged from 405 to 585 minutes, providing an adequate sampling period. Breathing zone samples ranged from below the detectable limit to 0.06 mg/m^3. Area samples ranged from below the detectable limit to 0.02 mg/m^3.

All sampling results were below the NIOSH Recommended Standard of 0.1 mg/m^3. However, the sampling occurred on an atypically cool day when the pile-driver was mostly not operating. These factors would likely substantially reduce the exposure. Because the phase of construction involving creosote was being completed, NIOSH could not obtain additional samples on a more representative day. Therefore, usual levels of exposure could not be determined. Since the measured values ranged up to 60% of the Recommended Standard even under these atypical conditions, it is likely that the usual environmental exposure could approach or exceed the NIOSH recommended exposure limit.

B. Medical

Five of the 6 exposed workers responded to the questionnaire and had skin examinations. All were male of Scandinavian descent with light complexion, blond or light brown hair, and blue eyes. Their ages ranged from 24 to 61 years (average was 44.6 year). All had worked at the construction site for at least 5 months. They were generally employed as dock builders doing pile-driving. The work time doing pile-driving averaged 16.6 years (range 2 - 25 years). Of this time, an average of 8.3 years was spent pile-driving creosote-preserved wood piles.

Since working at Pier #10, the employees had noted skin irritation and rashes, eye irritation, nausea, lightheadedness, and swelling of the face, eyes, and hands. The skin problems consisted of erythema (5/5), burning (3/5), dryness (3/5), desquamation (3/5), itching (2/5) and cracking (2/5). The rashes were located on the exposed areas of the face, neck and hands. All respondents said symptoms were worse on hot or sunny days and improved over weekends and vacations. In addition, on hot days employees experienced tearing and burning eyes (5/5), red eyes (5/5), swollen or puffy eyes (4/5), and photophobia requiring use of sunglasses (3/5). Four persons reported gradually worsening visual acuity. All employees had similar complaints without apparent differentiation by job description.

There were no other significant patterns of health complaints. Past medical histories were negative except for one person who had had skin warts removed from the back. Three persons currently smoked cigarettes and all had had chest X-rays within 5 years reported as being normal.

On examination, all five persons demonstrated erythema on the exposed areas of face, neck, and hands. Three had dry skin with desquamation in sun exposed areas. All persons had varying amounts of black comedones (black heads) and oil plugging of hair follicles on the hand and forearms. Three had mild folliculitis on the forearms. One person had a skin tag on the neck. Another person had a small, scaly lesion on the nose which had not healed over several weeks. (He was contacted two months after the initial examination and reported that the lesion had healed after exposure to creosote had ceased.) Overall, the findings on skin examinations were consistent with a phototoxic skin reaction in the exposed areas of the face, neck and hands. The folliculitis was consistent with prolonged direct contact with creosote. No creosote-associated skin tumors were observed.

Employees changed into work clothes in a small room on the pile-driver barge. Each wore a long-sleeve shirt and, generally, overalls. Work clothes were taken home for cleaning approximately once every week or two. Two wore gloves while working; the others wore them only occasionally. Three wore sunglasses; none wore goggles. Most employees did not shave during the work week because of skin irritation. They generally applied Noxema, Vitamin E, or other lotions to soothe the irritation. Waterless hand cleaner was provided in the changing room. Employees could eat and smoke in this room, but some went on shore for lunch. None had received training on personal protective equipment or hygiene for potential exposure to creosote.

C. Conclusion

Environmental sampling occurred under atypical conditions and could not indicate usual environmental exposure to airborne CTPVs. The barge area was black with creosote splattered from the pile-driver, indicating substantial potential for direct skin contact. Evaluation of potential creosote exposure among workers engaged in pile-driving would require additional environmental sampling.

Medical histories and physical examination were consistent with exposure to CTPVs, especially on hot or sunny days, and with direct exposure to creosote involving the hands and arms. No chronic health effects, such as respiratory problems or skin cancer, were found. However, these chronic diseases would still occur relatively infrequently even if their incidence were increased substantially by exposure to creosote. One would still not expect to see these problems among a sample of only 5 workers. Based on this evaluation, NIOSH can not make conclusions regarding respiratory problems or skin cancer due to chronic exposure to creosote.

NIOSH has previously concluded that creosote is carcinogenic based on experimental toxicologic evidence. Creosote also causes phototoxic skin reactions and eye irritation. Therefore, exposure to airborne CTPVs should be kept to the lowest technically feasible amount. Direct contact with creosote should also be minimized. Creosote remains the predominate wood preservative used for marine pilings. Other common preservatives, such as pentachlorophenol or arsenic pentoxide, can be used in water, but also have significant toxicity(2). Until feasible substitutes become available, control measures should be directed toward lowering exposure through administrative practices, personal protective equipment, and personal hygiene and preventive health practices.

VII. RECOMMENDATIONS

A. Engineering Controls:

1. Less toxic wood preservatives should be substituted for creosote when they become available and feasible for use on marine pilings.
2. Employers may consider developing mechanisms for wetting down surfaces covered with creosote (such as extra piles on the storage barge). Cool water could possibly decrease the volatilization rate of CTPVs, especially on warm days.

B. Work Practices:

1. Employees should wear appropriate respiratory and body protective equipment to limit exposure.
2. Storage containers of creosote should be maintained in good condition and be kept closed when not being used.
3. Leaks or spills should be cleaned up immediately. Working surfaces (barges) should be kept as free of creosote contamination as feasible.
4. Employees should avoid working downwind of creosote-contaminated surfaces.

C. Personal Protective Equipment:

1. Cup-type or rubber-framed chemical safety goggles should be worn by employees if there is a reasonable possibility that creosote may come in contact with the eyes.

2. The employer should provide gloves, protective sleeves, trousers, caps, and shoes as necessary to prevent skin contact with creosote. These garments should be made of a material resistant to penetration by creosote.
3. Chemical cartridge respirators with an organic vapor cartridge(s) and a fume or high-efficiency filter, or a self-contained breathing apparatus, should be supplied and worn by employees if the air concentration of CTPVs exceeds 2 mg/m^3(7). (This value is 20 times the NIOSH Recommended Standard and would be unlikely to occur outdoors.)

D. Sanitation:

1. Protective clothing should be cleaned by a professional cleaner regularly and as necessary when contaminated with creosote. The employer should inform the cleaner of the nature of the clothing contamination. The employer should provide sufficient number of clothing changes to allow for regular cleaning.
2. The employer should provide clean change rooms equipped with separate storage facilities for street clothes and work clothes.
3. When feasible, showers should be made available to employees for showering at the end of the work shift.
4. Waterless hand cleaner should be used for hands and arms. To prevent skin absorption, employees should not use hydrocarbon solvents to clean their hands.
5. Eating, food preparation, and smoking should be prohibited in areas where creosote is present. Employees should wash their hands before eating or smoking.

E. Personal Health Practices:

1. Employees should wear an adequate sunscreen lotion to prevent the phototoxic skin reaction. As mentioned above, a phototoxic skin reaction can occur when creosote contaminated skin is exposed to UVA light. Most common sunscreens, including those containing para-aminobenzoic acid (PABA), provide protection primarily against UVB light. Appropriate sunscreens should contain "benzophenone" or related compounds. Sunscreens rated 12 or 15 usually include these compounds. (Appropriate sunscreen products include, but are not limited to, Coppertone 15, Total Eclipse, Total Block, and Bain de Soleil 15 - These are examples only and do not imply endorsement by NIOSH.) These sunscreens should be applied <u>every day</u> in the morning <u>before</u> going to work and reapplied as necessary during and after work to maintain an effective sunscreen. THESE SUNSCREENS SHOULD BE USED EVERY WORK DAY BY ANY EMPLOYEE WHO WORKS OUTDOOORS AND IS POTENTIALLY EXPOSED TO CREOSOTE.
2. If an employee's skin becomes dry or irritated, he or she should use moisturizing ointments or lotions, not creams. Creams tend to further dry the skin as the water in them evaporates. The irritation of the skin could be treated by the appropriate application of 1/2% hydrocortisone ointment available in most drug stores.

3. An employee should see his or her personal medical practioner for severe skin reactions or if any skin problems fail to heal after a reasonable period of time. New skin growths should be promply evaluated by a qualified medical practioner.

F. Informing Employees:

1. At the beginning of a work assignment that may involve exposure to creosote, the employer should inform each empoyee of the potential hazards of such exposure.
2. Employers and/or the employees' union should institute a continuing education program to ensure that all employees have current knowledge of the job hazards and proper personal protective equipment, personal hygiene, and preventive health practices. The instruction should cover the correct use of respirators for construction sites where their use may be indicated.
3. The employer should post warning signs in areas where there is exposure to creosote stating:

DANGER
CANCER HAZARD

AUTHORIZED PERSONNEL ONLY
COAL TAR PRODUCTS (CREOSOTE)
IRRITATING TO SKIN AND EYES
NO SMOKING OR EATING

G. Monitoring and Record Keeping:

1. Each employer who has a place of employment in which there is exposure to creosote or coal tar should institute a program of personal monitoring to evaluate the exposure of all employees. Records of personal monitoring should be kept for 30 years.
2. Medical surveillance should be made available to all employees potentially exposed to creosote:
   a. Pre-placement medical evaluation should include a comprehensive medical and work history and physical examination, with emphasis on identifying preexisting disorders of the skin and respiratory tract. The evaluation should include a posteroanterior chest X-ray.
   b. Periodic surveillance should be made available at least annually. This evaluation should include an interim medical and work history and a physical examination of the skin and respiratory tract. Annual chest X-rays need not be done unless considered appropriate by the responsible physician.

H. Further Evaluation:

1. Because of the limited nature of this evaluation, NIOSH believes that further investigation would be warranted. NIOSH would consider a request for a Health Hazard Evaluation regarding employees engaged in a similar operation.

2. The chronic health effects of creosote can not be evaluated epidemiologically on small numbers of employees. NIOSH recommends that the Carpenters Union, Local 1456, consider conducting a study among its members on the health effects of long-term exposure to creosote among dock builders. NIOSH can provide technical assistance on the conduct of such a study. The Industry Wide Studies Branch, DSHEFS, NIOSH, is currently investigating the chronic health effects of creosote exposure among wood preservers.

VIII. AUTHORSHIP AND ACKNOWLEDGEMENT:

Evaluation Conducted and Report Prepared by:	Dean Baker, M.D., M.P.H. Medical Officer Medical Section Hazard Evaluation and Technical Assistance Branch Nicholas Fannick Industrial Hygienist NIOSH/Region II
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Clerical Assistance:	Eileen Tenerella Secretary PHS, DPHS, Region II

IX. REFERENCES

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X. DISTRIBUTION AND AVAILABILITY

For the purpose of informing the "affected employees" NIOSH will mail copies of this report to each of the six exposed employees.

Copies of this report will be available from NIOSH, Division of Technical Services, Information Resources and Dissemination Section, 4676 Columbia Parkway, Cincinnati, Ohio, 45226, for 90 days. Thereafter, copies will be available from the National Technical Information Service (NTIS), Springfield, Virginia. Information concerning its availability through NTIS can be obtained from the NIOSH publication office at the Cincinnati address.

Copies of this report have been sent to:

Exposed employees
The Underpinning and Foundation Construction Company, Inc., New York, New York
Carpenters Union, Local 1456, AFL-CIO
U.S. Department of Labor, OSHA, Region II
New York State Department of Health, Division of Occupational Safety and Health
NIOSH, Public Health Service, Region II

TABLE 1

ENVIRONMENTAL SAMPLING FOR CREOSOTE ON 10/14/80

Sample Location	Sampling Times	Sample Volume (liters)	Analysis[1] (mg/m^3)
Headman (Breathing Zone)	8:00 - 15:45	1168	0.059
Pile Chopper A (Breathing Zone)	8:03 - 15:35	813	B.L.D.[2]
Pile Chopper B (Breathing Zone)	8:04 - 15:50	1056	0.038
North Storage Barge, S.W. Corner	8:06 - 15:40	951	0.021
North Storage Barge, S.E. Corner	8:07 - 15:38	1170	B.L.D.[2]

1. Cyclohexane - extractable CTPV fraction of creosote. Lower limit of detection 0.02 mg. per silver membrane sample.

2. Below the lower limits of detection.

GLOSSARY OF MEDICAL TERMS USED IN THE REPORT

Adenoma - Non-cancerous tumor (growth) in the tissues of the body. While adenomas do not spread like cancer, they can sometimes grow large enough to cause health problems.

Benign - No potential for turning into cancer.

Carcinoma - A cancer.

Carcinogenic - Potential to cause cancer.

Desquamation - Peeling of the skin in patches.

Erythema - Redness of the skin (as with a severe sunburn).

Folliculitis - Inflammation of the hair follicles, with redness, swelling, and tenderness.

Hyperpigmentation - Darkly pigmented areas of the skin. (such as a dark birth mark or flat mole).

Keratoacanthoma - A non-cancerous growth of the upper layer of the skin. It is a warty growth usually less than an inch in diameter, located on exposed skin. It occurs in the upper age groups and in oil and tar workers.

Malignant - "life threatening". As in malignant tumors which are cancerous.

Mucous membranes - The moist tissues of the body, such as the eyes, nose mouth, or throat.

Mutagenicity - The ability to cause changes in the genetic structure of a cell. Mutagenicity is usually tested by putting a chemical in a dish with certain bacteria and observing the chromosomes (genetic material) within the cells of the bacteria. A substance which is mutagenic is more likely to cause cancer than a substance which is not mutagenic.

Oncogenicity - The ability to cause cancer.

Papillomas - A benign tumor arising from the surface tissues of the body, including the skin and the mucous membranes.

Photophobia - "fear of the light". It refers to when the eyes become very sensitive to the light. The affected person wants to avoid light or wear sun glasses to decrease his or her exposure.

Phototoxic Reaction - A non-allergic reaction of the skin following exposure to light.

Pterygium(a) - A small, benign triangular growth of membrane on the surface of the eye, usually on the nasal side of the iris. It develops following chronic irritation of the eyes. Pterygia are not harmful unless they grow so large that they block the pupils and obstruct vision. In such a case, they need to be surgically removed.

Vesiculation - The skin forming very small blisters.

Wart - A non-cancerous growth of the upper layer of the skin. Common warts are due to a viral infection of the skin. They grossly look similar to acanthomas and other "warty" growths. The specific idenity of a growth can be determined by looking at a specimen using a microscope.

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