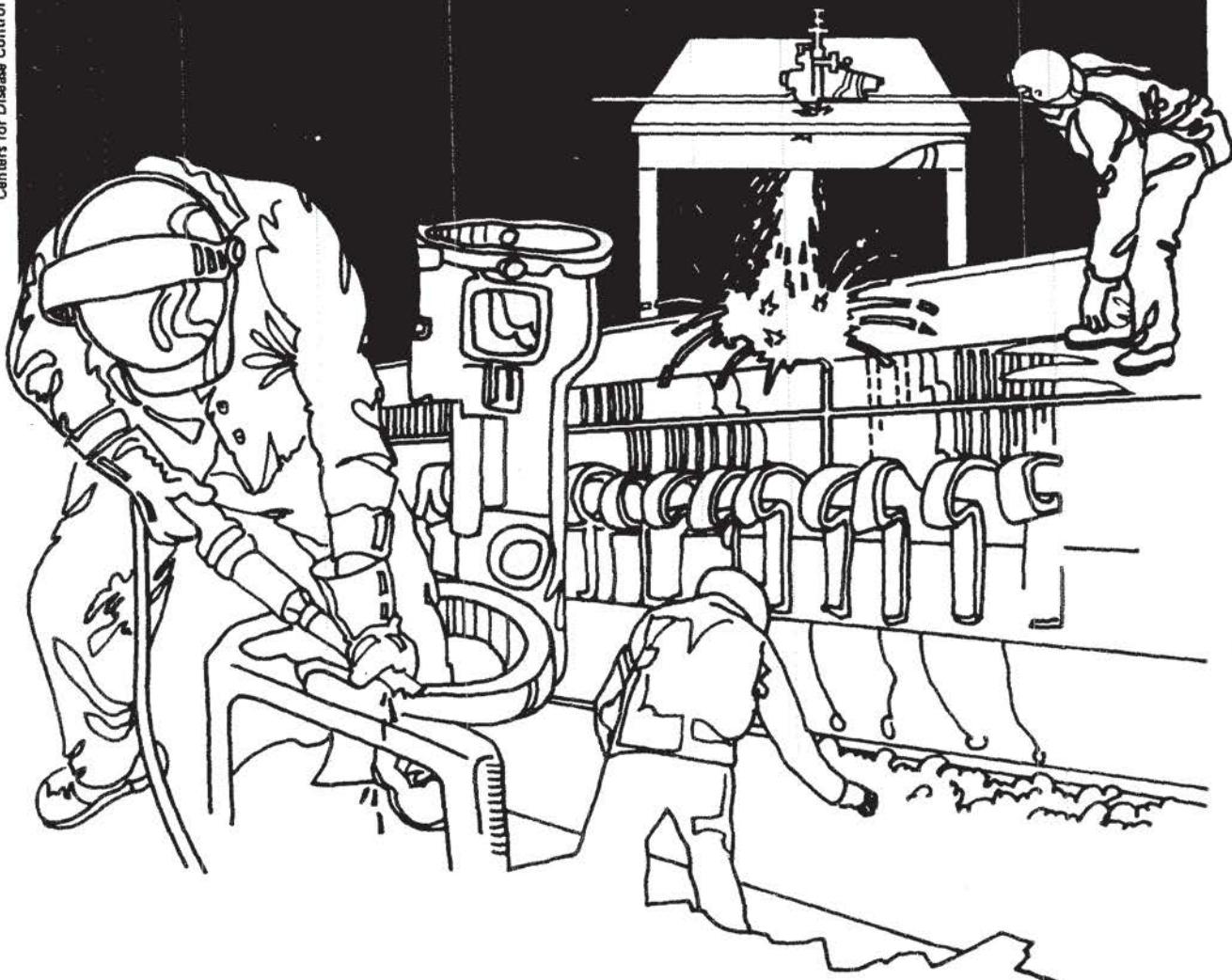


NIOSH



Health Hazard Evaluation Report

HETA 82-324-1279
CHEMICAL LEAMAN
TANK LINES, INC.
STOCKERTOWN, PENNSYLVANIA

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.

Mention of company names or products does not constitute endorsement by the National Institute for Occupational Safety and Health.

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CHEMICAL LEAMAN TANK LINES, INC.
STOCKERTOWN, PENNSYLVANIA

NIOSH INVESTIGATORS:
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I. SUMMARY

On July 7, 1982, the National Institute for Occupational Safety and Health (NIOSH) received a request for a Health Hazard Evaluation from employees of Chemical Leaman Tank Line, Inc., Stockertown, Pennsylvania, to evaluate working conditions at Cooper's Creek Chemical Company, Conshohocken, Pennsylvania - a coal tar pitch loading and unloading depot. The workers were concerned about eye and skin irritation and long-term exposure effects from coal tar pitch exposures. Chemical Leaman is contracted out by Cooper Chemical to haul coal tar pitch to various construction sites.

On October 5, 1982, with the cooperation of both Chemical Leaman and Cooper's Creek Chemical, NIOSH conducted personal air sampling for coal tar pitch volatiles at the Cooper's Creek Facility.

Breathing zone air samples for coal tar pitch volatiles were taken on two of Chemical Leaman's truck drivers; one for the loading operations and the other for an unloading operation. A review of the vapor recovery system and personal protective equipment was conducted and both drivers were interviewed.

No polynuclear aromatics (benzene solubles) were detected in the breathing zone of the driver during the unloading operation. Very low concentrations of phenanthrene (0.006 mg/M₃) and anthracene (0.003 mg/M₃) were detected in the breathing zone of the other driver during the loading operation.

Based on the environmental findings of this study, NIOSH has determined that no health hazard exists during the loading and unloading operations of coal tar pitch at the Cooper's Creek Chemical site. However, recommendations are outlined to confirm good work practices to reduce personal contact with the substance(s) during valve and pipeline attachment and detachment.

KEYWORDS: SIC 2952; coal tar pitch, coal tar pitch volatiles, phenanthrene, anthracene, polynuclear aromatics, chemical tank car transfer operations, eye irritation, skin irritation.

II. Introduction

On July 7, 1982, the Hazard Evaluations and Technical Assistance Branch (HETAB) of the National Institute for Occupational Safety and Health (NIOSH) received a request from employees of Chemical Leaman Tank Lines, Inc., Stockertown, Pennsylvania. These employees were concerned about working conditions at Cooper's Creek Chemical Company, Conshohocken, Pennsylvania (a coal tar pitch loading and unloading depot) for coal tar pitch. The workers were concerned about eye and skin irritation and long term health effects from coal tar pitch exposures at this facility.

On October 5, 1982, with the cooperation of both Chemical Leaman and Cooper's Creek Chemical, a NIOSH Regional Industrial Hygienist conducted breathing zone air sampling for coal tar pitch volatiles at the Cooper's Creek facility.

III. Background

The Cooper's Creek facility is engaged in the distillation of coal tar for the manufacture of roof coating products as coal tar pitch. The crude tar is charged from tank trucks into holding tanks and is heated to approximately 500° F. All of the heating and distillation of coal tar is in closed vessels and is piped into storage tanks; flow is monitored by using gauges and checking pumps. All unloading and loading operations are conducted outdoors.

The number of drivers used and the number of pickups actually done vary greatly and is very much dependent on weather, season and construction activity. However, two truck drivers (Chemical Leaman) were evaluated for coal tar pitch exposure (only coal tar pitch is transferred at this tank farm). One driver was loading a tank truck from the storage tank and the other was unloading his truck to a storage tank.

The loading operation involves going up the tank dome (on top of tank) and connecting up the feeder line into the dome opening; the feeder pump is turned on and the driver is down on the ground level; after about twenty minutes, he goes up to eyeball the tank level until it fills near the top of the tank. He then lifts the riser away and closes the dome lid. The driver wears chemical goggles and butyl rubber gloves. Total exposure time would be about five minutes. A vapor recovery system (local exhaust setup) is adjacent to the riser outlet to capture any coal tar pitch vapors that escape from the outlet or the dome opening. The captive velocity of this system at the face of the exhaust is greater than 300 ft. per minute as measured by a portable velometer. Both loading and unloading operations require about 45 minutes from start to finish.

The unloading operation involves the driver loading up one end of a hose to the truck tank bottom flange and the other to a pump at the site. The top lid is opened and the pump valve and the truck tank valve is opened; crude coal tar or coal tar pitch is then pumped into heated holding tanks. The driver must go up

top of his truck to observe when the tank is finally emptied; the lines are carefully drained and removed. Heat insulating gloves are worn along with chemical goggles.

The loading and unloading operations may take 3-5 minutes. The remainder of the time is spent on the ground away from the immediate operations area. Both drivers said that they did not have any adverse health effects from working (10 and 15 years) with these materials. (These drivers did not initiate the original health hazard evaluation request.) Exposure times for these operations range from 5-10 minutes total and would occur at the dome opening or in taking off the lines after drainage.

During the period of October 9, 1981 through June 16, 1982, the Occupational Safety and Health Administration (OSHA) conducted an inspection of the Cooper's Creek facility in response to a complaint filed by a Chemical Leaman employee. The complaint alleged that Chemical Leaman tank truck operators were exposed to coal tar pitch volatiles during the loading of trucks at Cooper's Creek Chemical Company. Chemical Leaman supplies various building and roofing products to the building and construction industry. The results of the personal air sampling by OSHA showed that there were no overexposures to the truck drivers. The sample results for coal tar pitch volatiles were non-detectable during loading operations. OSHA also reported that the workers were supplied with gloves, hard hat, respirator, coveralls, and safety glasses.

IV. Methods

On October 5, 1982 two personal air samples were collected for coal tar pitch volatiles on each of the two drivers; one for the loading operation and the other for an unloading operation.

Coal tar pitch volatiles were collected on a glass fiber filter with an XAD tube behind it at a flow rate of 1.5 liters per minute for the total work period of 45 minutes; portable personal air sampling pumps were used with a plastic hose hookup.

The PNA's were determined by a simple ultrasonic extraction of the glass fiber and silver membrane filters in 5 mL of benzene. A labeled recovery standard of 5 ug of d₁₂-chrysene was spiked into each sample before extraction. No concentration of the extract was performed. An internal quantitation standard of 1.0 ug of d₁₀-anthracene was added to a 1.0 mL aliquot of each sample following sample preparation. 5

The XAD-2 resin tubes were also extracted ultrasonically into 1.0 mL of benzene. A spike of 1.0 ug of d₁₂-chrysene was added to each tube before extraction. A Spike of 0.5 ug of d₁₀-anthracene was added to a 0.5 mL aliquot of the extract. Each sample was individually corrected for its own recovery.

The benzene soluble material was determined by the NIOSH Coal Tar Pitch Volatile (CTPV) procedure P&CAM #217. A 1.0 mL aliquot of each filter extract was evaporated to dryness in a tared teflon cup. The weight change of each sample was recorded using a Perkin Elmer AD-2 autobalance.

V. Evaluation Criteria 2-4
Environmental

The following environmental standards or criteria were considered in this report:

Substance	Source	8-Hr. TWA (mg/m ³)
Coal Tar	NIOSH	0.10 (cyclohexane solubles)
Pitch Volatiles	ACGIH3	0.20 (benzene solubles)
	OSHA4	0.20 (benzene solubles)

The ACGIH's "Threshold Limit Values for Chemical Substances in Workroom Air", 1982 recommends a TLV-TWA of 0.20 mg/m³ for both coal tar pitch volatiles and particulate polycyclic aromatic hydrocarbons.

OSHA's current standard 1910.1000 Table Z-1 of 0.2 mg/m³ 8-hr. TWA for coal tar pitch volatiles (benzene solubles - anthracene, benzo(a) pyrene, phenanthrene, acridine, chrysene and pyrene) is applicable to employee exposures outside of coke plants. The OSHA exposure limit for coke oven emissions (29 CFR 1910.1029) is 0.15 mg/m³ measured as the benzene-soluble fraction of total particulate matter and as a time-weighted average (TWA).

As for standards for the polynuclear aromatics (as related to CTPV's), only benzo(a) pyrene and chrysene have been addressed directly. A TWA of 0.2 ug/m³ was recommended by the coke oven advisory committee for benzo(a) pyrene under the OSHA 29 CFR 1910.1029 coke oven emissions standards but was not adopted; and a special NIOSH hazard review of chrysene recommended that it be controlled as an occupation carcinogen. The carcinogenic potential of the other polycyclic aromatic hydrocarbons, benzo(a) anthracene, anthracene, hydrene and fluoranthene has also been documented.

Toxicological Data

Coal tar pitch is a black or brown liquid or semi-solid material derived from the heating and distillation of coal-based tars.

Coal tar pitch volatiles are the volatile substances emitted into the air when coal tar pitch is heated. These may contain several polynuclear aromatics among which may be anthracene, benzo(a) anthracene, benzo(b) chrysene, benzo(a) pyrene, pyrene, chrysene, fluoranthene, and benzo(e) pyrene.

Exposure to coal tar products may produce phototoxic effects, such as erythema (reddening of the skin) and burning and itching of skin, photophobia, conjunctivitis, and skin and lung cancer, in humans.

Benzo(a) pyrene, benzanthracene, chrysene, and phenanthrene are by themselves carcinogenic substances. Anthracene, carbazole, fluoranthene, and pyrene may also cause cancer, but their cause and effect relationship have not been documented adequately.

The environmental criteria established for coal tar pitch volatiles and their polynuclear aromatics is designed to reduce the risk of lung and skin cancer. NIOSH has recommended that the permissible exposure limit be set at the lowest concentration that can be reliably detected by the recommended analytical method. However, NIOSH states that while this may reduce the incidence of cancer, no threshold of carcinogenic response can be established at this time.

VI. Results

The quantitation of benzene solubles and polynuclear aromatics show no benzene solubles or polynuclear aromatics detected in the breathing zone of the driver during the unloading operations. On the other hand, very low concentrations of phenanthrene and anthracene were detected in the breathing zone of the other driver during the loading operations. The levels of PNA's detected were 0.006 mg/m³ of phenanthrene and 0.003 mg.m³ of anthracene. No benzene solubles were detected in the filters. These levels are well below the environmental criteria represented by NIOSH, OSHA, ACGIH and would pose no significant health hazard under those conditions

VII. Recommendations 2

1. Impervious thermal gloves and shoes and chemical goggles or a face shield should be worn when handling hot liquid coal tar pitch.
2. Protective clothing and equipment should be removed only in a change room (storage facilities for street clothes and separate facilities for protective clothing and equipment) and if contaminated, placed in a closed container for cleaning or disposal.

3. Smoking, eating, drinking or food dispensing should be prohibited during loading and unloading operations.
4. Employees should wash hands thoroughly with soap and water before eating or using toilet facilities; Solvents are not to be used for washing hands and when using solvents for cleaning coal tar pitch contaminated surfaces/parts, impervious gloves should be worn to avoid skin absorption.
5. Containers of coal tar pitch and contaminated clothing or equipment should be labeled with information on hazards and precautions.
6. Spills and/or leaks of liquid coal tar pitch should be covered with sand and cleaned up after allowing necessary time for cooling; appropriate personal protective equipment is to be used.
7. Employee training should also consist of informing the employee of the hazards and safe handling of coal tar pitch, purpose and operation of engineering controls and protective equipment, and maintenance, clean-up and emergency procedures. This should be written up and be readily available to management and employees.
8. Medical surveillance should be made available through pre-placement and periodic examinations with particular attention to the oral cavity, skin and respiratory system for workers exposed to coal tar products. Records should be maintained for at least 30 years (Reference - "NIOSH Criteria for a Recommended Standard, Occupational Exposure to Coal Tar Products", DHEW(NIOSH) Publication #78 107, pages 3-4).

IX. Authorship and Acknowledgement

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X. Distribution and Availability of Report

Copies of this report are currently available upon request from NIOSH, Division of Standards Development and Technology Transfer, 4676 Columbia Parkway, Cincinnati, OH 45226. After 90 days, the report will be available through the National Technical Information Service (NTIS), 5285 Port Royal, Springfield, Virginia 22161.

Information regarding its availability through NTIS can be obtained from the NIOSH Publications Office at the Cincinnati address. Copies of this report have been sent to:

1. Employee(s) - truck drivers of Chemical Leaman
2. Chemical Leaman Tank Lines, Inc., Stockertown, PA
3. NIOSH Region III
4. OSHA Region III

XI. References

1. NIOSH Manual of Sampling Data Sheets, 1977 Edition, U.S. DHEW, PHS, CDC, NIOSH, March 1977.
2. Criteria for a Recommended Standard....Occupational Exposure to Coal Tar Products, NIOSH Publication No. 78 107.
3. Threshold Limit Values for Chemical Substances and Physical Agents in the Workroom Environment with Intended Changes for 1982, American Conference of Governmental Industrial Hygienists, Cincinnati, OH
4. General Industrial, OSHA Safety and Health Standards 29 CFR 1910 - OSHA 2206, Nov. 7, 1978.