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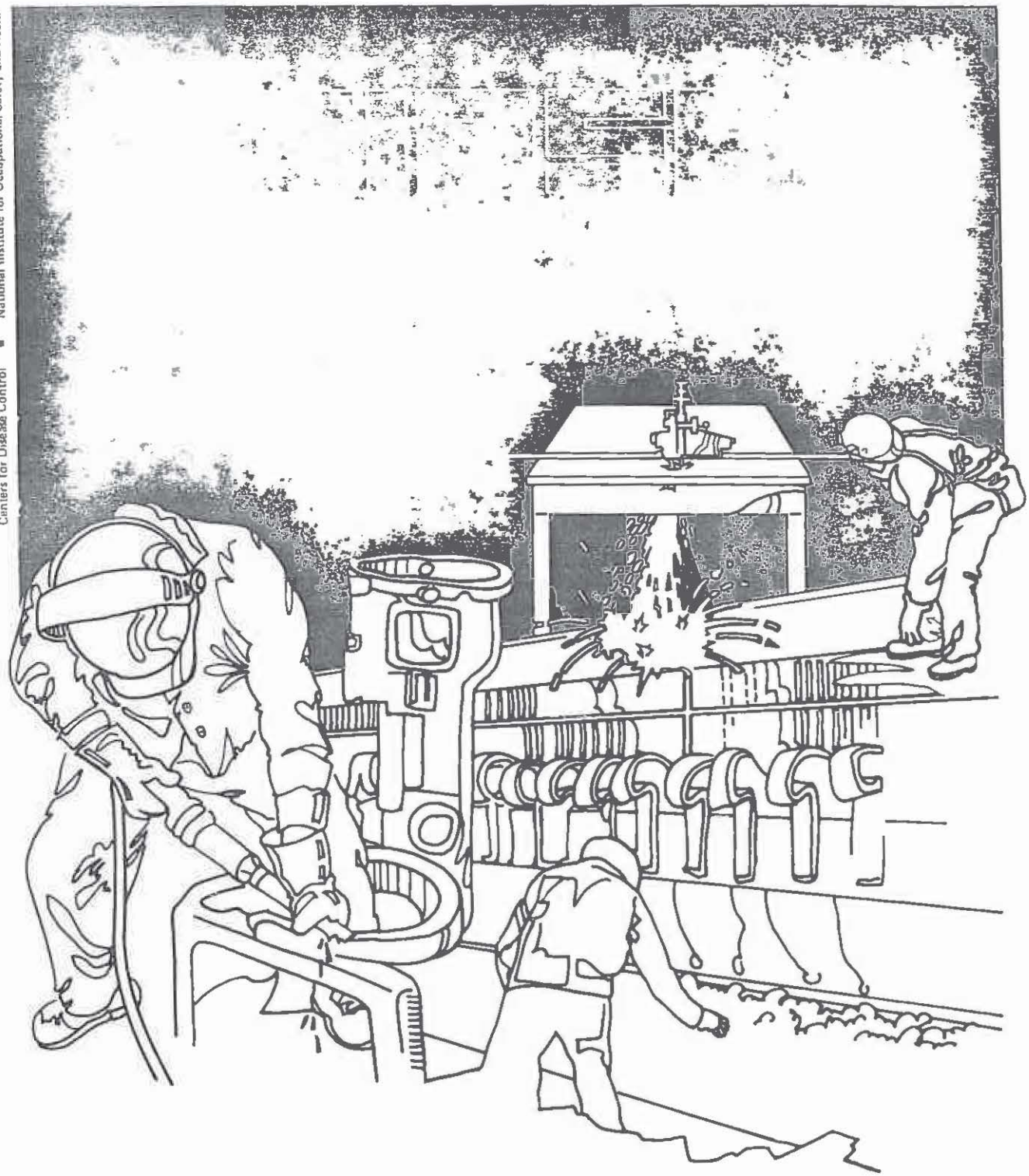

Health Hazard Evaluation Report

80-207-786

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. 699(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.

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

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DECEMBER 1980
FLATHEAD POST AND POLE YARD
DIXON, MONTANA

NIOSH INVESTIGATORS:
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I. SUMMARY

In July 1980 the National Institute for Occupational Safety and Health (NIOSH) received a request to evaluate occupational exposures to pentachlorophenol and tetrachlorophenol at Flathead Post and Pole Yard, Dixon, Montana. This facility manufactures various types of wood fence posts and poles.

All nine workers in the area evaluated were questioned about potential sources of exposure. Each worker's work station was monitored for pentachlorophenol and tetrachlorophenol exposures. General area samples were taken since impingers were used and workers were very active making it impossible to take breathing zone samples. These samples were very representative of a total 8-hour exposure, which is actually longer than the workers are at these stations. All air samples were below the laboratory detection limit of 0.008 mg/M^3.

The medical evaluation indicated some possible hearing loss among several workers due to high noise levels at the sawing and cutting operations.

Safety hazards included unguarded drive belts, saws, and post sharpeners and flying wood chips.

On the basis of the environmental and medical data, a health hazard did not exist at the time of this survey from exposure to pentachlorophenol and tetrachlorophenol. Safety hazards included unguarded drive belts, saws, and post sharpeners and flying wood chips. Excessive noise levels existed; workers were wearing hearing protection. Recommendations on work practices necessary to control any future hazard are included on page 4 of this report.

KEYWORDS: SIC 2490 (Miscellaneous Wood Products), pentachlorophenol, tetrachlorophenol, wood preserving.

II. INTRODUCTION

NIOSH received a request in July 1980 from the management of Flathead Post and Pole Yard, Dixon, Montana, to determine if there was a health hazard from pentachlorophenol and tetrachlorophenol during the manufacture of wood fence posts and poles. An environmental and medical survey was conducted on September 10, 1980, to evaluate exposures to pentachlorophenol and tetrachlorophenol.

III. BACKGROUND

This facility receives small lodge pole and ponderosa pine logs. These logs are sawed and placed in various machines where they are sharpened (so they may be driven into the ground). These may have holes, slots, and other modifications performed by drills or saws. After the poles are formed to the exact size and shape, they are placed in a large open vat of pentachlorophenol and tetrachlorophenol approximately 10 feet x 5 feet x 3 feet, which preserves the poles. The major health hazard is noise. Safety hazards exist from unguarded drive belts and improperly shielded knife and saw blades.

IV. METHODS AND MATERIALS

A. Environmental

Workers perform heavy manual labor with lots of bending and lifting. Therefore, impingers were not placed on the workers. Six-hour general area air samples for pentachlorophenol and tetrachlorophenol were collected in impingers filled with ethylene glycol using vacuum pumps operated at 1.5 liters per minute and analyzed according to NIOSH Physical and Chemical Analysis Method No. 297.

B. Medical

After initial observation of the work area the NIOSH medical officer privately interviewed all (nine) workers in the pentachlorophenol treating area using the standard non-specific questionnaire. The Indian Health Service (IHS) pharmacist and public health nurse at the IHS facility at St. Ignatius were consulted regarding possible health problems coming from the Post and Pole Yard, but no problems had come to their attention.

V. EVALUATION CRITERIA

A. Environmental

The two sources of criteria used to assess the workroom concentration of pentachlorophenol and tetrachlorophenol were the (1) Occupational Safety and Health Administration (OSHA) standards (29 CFR 1910.1025), January 1978, and (2) American Conference of Governmental Industrial Hygienists' Threshold Limit Values (TLV), 1979.

	Permissible Exposures 8-Hour Time-Weighted Exposure Basis (mg/M^3)
Pentachlorophenol.....	0.5 (OSHA) (TLV)
Tetrachlorophenol.....	*

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

* = no criteria--assumed to be no more than 0.5 mg/M^3 due to its chemical similarity to pentachlorophenol.

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

B. Toxicological

Pentachlorophenol (Penta) and tetrachlorophenol can cause irritation of eyes and upper respiratory tract. Contact with the skin can cause irritation and dermatitis. Excessive absorption (by inhalation, skin absorption, or ingestion) can cause headache, dizziness, weakness, loss of appetite, nausea, vomiting, shortness of breath, chest pain, and profuse sweating. Interference with the body's temperature regulation can lead to death from extreme fever.

Chronic exposure can lead to persistent acne-like skin lesions, although unlike the acne of youth, they are not confined to the face, neck, shoulders, and upper back. There may be some liver and nervous system disorders associated with the skin lesions.

Animal studies suggested there may be some toxicity to the fetus at higher doses of pentachlorophenol. (References 1, 2)

VI. RESULTS AND DISCUSSION

A. Environmental

All general area air samples taken for pentachlorophenol and tetrachlorophenol were below the laboratory detection limits, 0.008 milligrams per sample. Refer to Table 1.

The safety hazards were numerous. These included unguarded drive belts, saws, and post sharpeners and flying chips (none of the workers wore eye protection).

B. Medical

Of the nine workers (including the manager and foreman, both of whom also worked in the area) one was a woman. The average age was 39.2 years with a range of 21 years to 56 years. The average length of employment at the Post and Pole Yard was 1.6 years with a range of three months to three years. Timber cutting was a frequent previous or concomitant activity.

Most of the workers only occasionally handle the treated wood. The fork lift operator, who regularly loads and unloads the wood into the treating tank indicated that he always wore rubber gloves and had no problems. In the past he had had trouble with skin irritation until he started to wear the gloves regularly. One other worker involved in clean-up indicated occasional hand irritation with rash. The problem had been more serious--bumps and itching--when working more directly with treated wood. Other than the above there were no skin problems and no indication of chloracne.

Except when working with the "penta", workers wore leather gloves. Rubber gloves were the rule when working with "penta". Although most of the clean-up involved wood chips from sawing, dowelling, or planing untreated wood, it was observed that the fork lift operator would clean off his gloves with waste wood chips, leaving the "contaminated" chips to be cleaned up with the rest. This may be the source of the intermittent slight rash noted by the worker in charge of clean-up.

One worker complained of ringing in his ears and some hearing loss. He claimed he did wear his earplugs when sawing. The only other hearing loss mentioned related to military service in the artillery. Although a hearing study was not done during this evaluation, certainly there is enough noise in the sawing, dowelling, and planing to warrant a hearing conservation program. Posted notices did not relate to hearing protection.

One worker indicated previous employment in a plant processing cedar. Although he reported continued problems with nasal stuffiness, since leaving the cedar plant there has been no progression of his condition.

VII. CONCLUSIONS

A health hazard did not exist at this work place from exposures to pentachlorophenol and tetrachlorophenol. This conclusion is based on air levels below laboratory detection limits and on the absence of any adverse health effects determined by medical interviews.

In summary, hazards appear mainly to be safety hazards and a questionable hearing conservation program. Protective clothing when handling treated wood seemed adequate except when dealing with "contaminated" wood chips.

VIII. RECOMMENDATIONS

1. Smoking, eating, and drinking must be prohibited in the work area.

2. Workers should wash hands thoroughly before eating, smoking, and snuff usage.

3. Routine safety inspections should be performed.

4. Hearing conservation should be initiated.

5. Confine "contaminated" wood chips to a specific area so the clean-up worker can be adequately protected when cleaning up.

IX. REFERENCES

1. Proctor, N.H. and Hughes, J.P. Chemical Hazards of the Workplace, J. B. Lippincott, Philadelphia, 1978. pp. 404-405.

2. IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Humans. Some Halogenated Hydrocarbons., Vol. 20, IARC, Lyon (France), 1979, pp. 303-325.

X. AUTHORSHIP AND ACKNOWLEDGMENTS

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XI. DISTRIBUTION AND AVAILABILITY

Copies of this report are currently available upon request from NIOSH, Division of Technical Services, Information Resources and Dissemination Section, 4676 Columbia Parkway, Cincinnati, Ohio 45226. After 90 days the report will be available through the National Technical Information Service (NTIS), Springfield, Virginia. Information regarding its availability through NTIS can be obtained from NIOSH, Publications Office, at the Cincinnati address.

Copies of this report have been sent to:

1. Flathead Post and Pole Yard.
2. Indian Health Service, Billings Area Office.
3. NIOSH - Region VIII.
4. Montana Department of Health and Environmental Sciences.

For the purpose of informing affected employees, a copy of this report shall be posted in a prominent place accessible to the employees for a period of 30 calendar days.

TABLE 1

Air Concentrations of Pentachlorophenol and Tetrachlorophenol

Flathead Post and Pole Yard
Dixon, Montana

September 10, 1980

Job/Location	Sampling Time	mg/M^3 Pentachlorophenol	mg/M^3 Tetrachlorophenol
Drill	9:11 AM - 2:30 PM	*	*
Pole Pointer	9:10 AM - 2:30 PM	*	*
Middle Tank-Outside	9:05 AM - 2:30 PM	*	*
South Tank-Outside	8:59 AM - 2:15 PM	*	*
North Tank-Outside	9:08 AM - 2:20 PM	*	*
Forklift-Outside	8:58 AM - 2:40 PM	*	*
Middle Tank-Inside	8:55 AM - 2:30 PM	*	*
EVALUATION CRITERIA		0.5	**
LABORATORY LIMIT OF DETECTION mg/sample		0.008	0.008

* = below laboratory limit of detection
** = no criteria--assumed to be no less than 0.5 mg/M^3 due to its chemical similarity to pentachlorophenol.

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