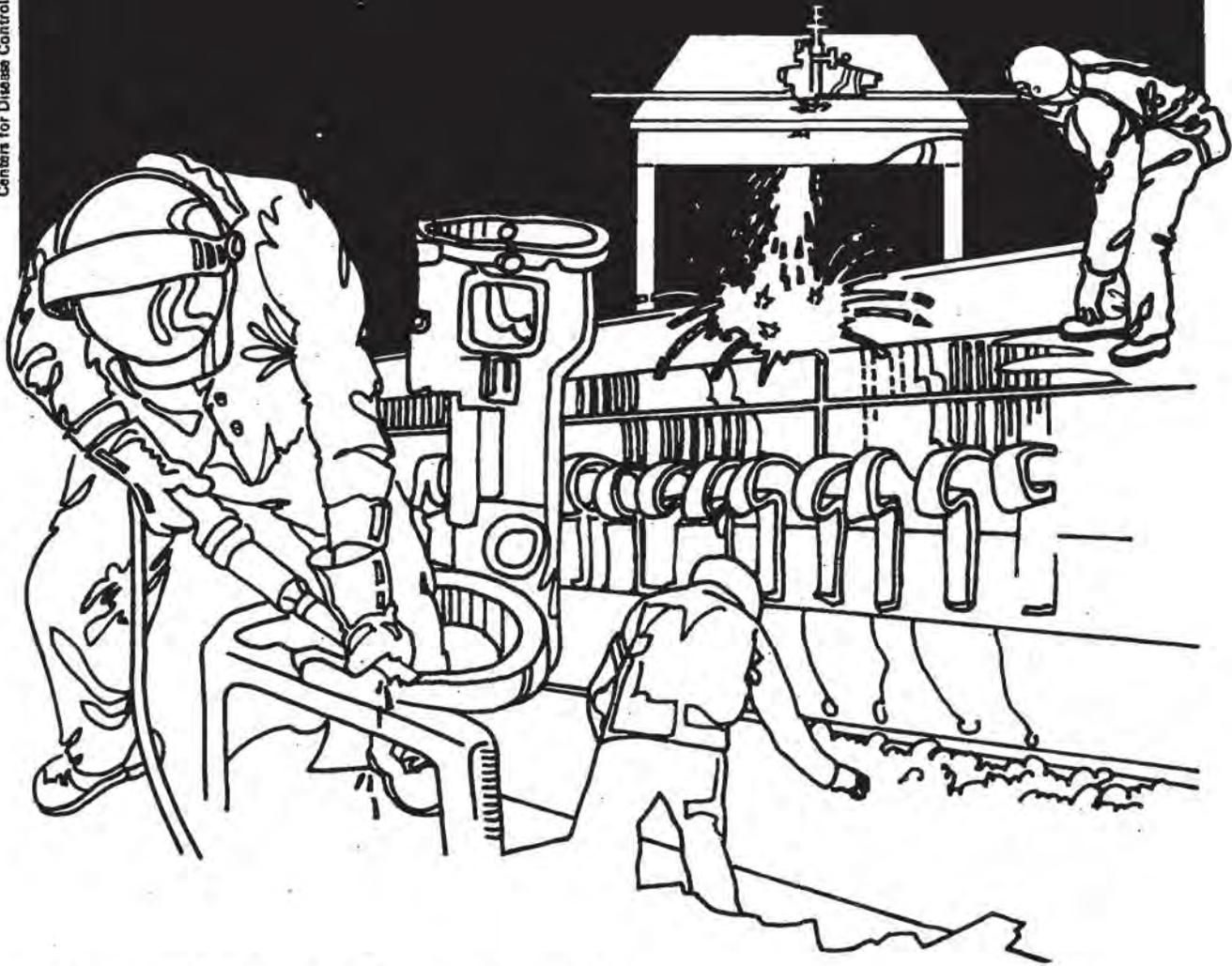


NIOSH



Health Hazard Evaluation Report

HETA 82-266-1218
OXY PETROLEUM, INC.
DENVER, COLORADO

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.

HETA 82-266-1218
OXY PETROLEUM, INC.
DENVER, COLORADO
NOVEMBER 1982

NIOSH INVESTIGATOR:
Bobby J. Gunter, Ph.D., IH

I. SUMMARY

In May, 1982, the National Institute for Occupational Safety and Health (NIOSH) received a request from management at Oxy Petroleum, Inc., Denver, Colorado, to evaluate a potential health hazard from exposures to water-based colored inks used to print geographical maps.

On July 16, 1982, the NIOSH investigator conducted an environmental evaluation of the painting room. One breathing zone and three general room air samples for measurement of chromium, lead, and total particulate were collected for a 90 minute sampling period (the duration of the process that day). All samples for lead and chromium were below detection limits of 0.003 milligrams per sample or 0.022 mg/M³. Total particulate samples ranged from 0.5 to 1.10 mg/M³; these values are well within the evaluation criteria of 10 mg/M³. The average time spent by the airbrush painter varies from one hour to eight hours per day.

The NIOSH investigator also interviewed the airbrush artist and the other three employees who frequent the painting room. The only complaint was of the deposition of colored pigments in the nose and on clothing. No adverse health effects were mentioned.

On the basis of the environmental data and employee interviews, NIOSH concluded that a health hazard did not exist from exposure to chromium, lead, and total particulate at the time of this survey. Recommendations for improving the workplace environment are included in this report.

KEYWORDS: SIC 2751 (Commerical Printing), chromium, lead, total particulate, airbrush painting.

II. INTRODUCTION

In May 1982, the National Institute for Occupational Safety and Health (NIOSH) received a request from management at Oxy Petroleum, Inc., Denver, Colorado; to evaluate a potential health hazard from exposures to water-based colored inks used to print geographical maps.

On July 16, 1982, NIOSH conducted an environmental evaluation. Results of the environmental sampling were discussed with the requestor in August 1982.

III. BACKGROUND

This area of the Oxy Petroleum's drafting department has a special room used specifically for airbrush painting. Airbrush painting involves the use of compressed air and a small nozzle apparatus to dispense the liquid (water soluble paint) onto a paper surface. In this department the painter air paints maps that are used by other departments of the company. The coloring solution (paint) has the consistency of a diluted ink. This paint is purchased in small 3-4 ounce bottles. All the pigments in the paint as identified on the Chemical Safety Data Sheets are non-toxic inert compounds. The most paint used in one day would be approximately 4-5 ounces. The paint room was very clean, and there was very little evidence of paint overspray.

IV. EVALUATION DESIGN AND METHODS

One breathing zone and three general room air samples were collected for measurement of chromium, lead, and total particulate on 37 mm filters using vacuum pumps operated at 1.5 liters per minute and analyzed according to NIOSH Method No. P&CAM 173 and by filter weight difference. The reason chromium and lead were evaluated during this survey was that these two metals are often found as contaminants in colored inks.

All four employees were interviewed using a brief questionnaire which was directed towards respiratory and skin irritation.

V. EVALUATION CRITERIA

A. Environmental

Three sources of criteria used to assess the workroom concentrations of the chemicals were (1) recommended Threshold Limit Values (TLVs) and their supporting documentation as set forth by the American Conference of Governmental Industrial Hygienists (ACGIH), 1981, (2) NIOSH criteria for recommended standard, and (3) the Occupational Safety and Health Administration (OSHA) standards (29 CFR 1910.1000), July 1980.

	Environmental Limits 8-Hour Time-Weighted Exposure Basis
Chromium.....	0.1 mg/M ³ (NIOSH) 0.5 mg/M ³ (ACGIH) 1.0 mg/M ³ (OSHA)
Lead.....	0.05 mg/M ³ (NIOSH/OSHA) 0.15 mg/M ³ (ACGIH)
Total Particulates.....	10 mg/M ³ (ACGIH) 15 mg/M ³ (OSHA)

mg/M³ = approximate milligrams of substance per cubic meter of air

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

Chromium -- the most toxic route of entry is by inhalation, followed by percutaneous. Chrome (metal) is very corrosive and is a strong sensitizer. Perforation of nasal septum is seen frequently. Adequate ventilation and frequent monitoring of the work environment is necessary to prevent overexposures. No eating and smoking should be allowed in the work area. Workers sensitized should be removed from the workplace¹. Chromium VI is also a carcinogen.²

Lead -- Inhalation (breathing) of lead dust and fume is the major route of lead exposure in industry. A secondary source of exposure may be from ingestion (swallowing) of lead dust deposited on food, cigarettes, or other objects. Once adsorbed, lead is excreted from the body very slowly. Adsorbed lead can damage the kidneys, peripheral and central nervous systems, and the blood forming organs. Chronic lead exposure is associated with infertility and with fetal damage in pregnant women.

Blood lead levels below 40 ug/deciliter whole blood are considered to be normal levels which may result from daily environmental exposure. The new Occupational Safety and Health Administration (OSHA) standard for lead in air is 50 ug/M³ calculated as an 8-hour time-weighted average for daily exposure.³ The standard also dictates that workers with blood lead levels greater than 60 ug/deciliter must be immediately removed from further lead exposure and, in some circumstances, workers with lead levels of less than 60 ug/deciliter must also be removed. Removed workers have protection for wage, benefits, and seniority for up to 18 months until their blood levels decline to below 50 ug/deciliter and they can return to lead exposure areas.

Total and Respirable Particulate -- Overexposures to any particulate may produce irritation and possibly damage to the total respiratory system especially if the particulate contains disease producing substances.

VI. RESULTS AND DISCUSSION

On July 16, 1982, the NIOSH investigator conducted an environmental evaluation of the painting room. One breathing zone and three general room air samples for measurement of chromium, lead, and total particulate were collected for a 90 minute sampling period (the duration of the process that day). All samples for lead and chromium were below detection limits of 0.003 milligrams per sample--equivalent to a minimum air concentration of 0.022 mg/M³. Total particulate samples ranged from 0.5 to 1.10 mg/M³. These values are well within the evaluation criteria of 10 mg/M³. The average time spent by the airbrush painter varies from one hour to eight hours per day.

The NIOSH investigator also interviewed the airbrush artist and the other three employees who frequent the painting room. The only complaint was the deposition of colored pigments in the nose and on clothing. No adverse health effects were mentioned.

There was no exhaust hood. The only dilution ventilation was the normal office heating and air conditioning system.

VII. CONCLUSION

Based on the environmental sampling and employee interviews, a health hazard did not exist during this evaluation from exposures to chromium, lead, and total particulates.

VIII. RECOMMENDATION

Additional local exhaust ventilation should be installed to eliminate employee exposures to the ink pigments. A very simple recirculating hood with good paper and fibrous glass filters would be sufficient.

IX. REFERENCES

1. Plunkett, E.R., Handbook of Industrial Toxicology, Chemical Publishing Company, New York, 1976, pp. 108-109.
2. National Institute for Occupational Safety and Health. Criteria for a recommended standard--occupational exposure to chromium VI. Cincinnati, Ohio: National Institute for Occupational Safety and Health, 1976. (DHEW Publication No. (NIOSH) 76-129).
3. Occupational Safety and Health Administration. Occupational exposure to lead--final standard. Federal Register 1978 Nov 14:63007.

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 Standards Development and Technology Transfer, 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. Oxy Petroleum, Inc.
2. U.S. Department of Labor/OSHA - Region VIII.
3. NIOSH - Region VIII.
4. Colorado Department of Health.
5. State Designated Agency.

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

Breathing Zone and General Room Air Concentrations of Chromium, Lead, and Total Particulates

Oxy Petroleum, Inc.
Denver, Colorado

July 16, 1982

Sample Number	Job Classification/Location	Sampling Time	mg/M ³		
			Chromium	Lead	Total Particulates
M5 8891	Painter's Breathing Zone	9:00 AM - 10:30 AM	*	*	0.83
M5 8902	General Room/top of drawing board	9:00 AM - 10:30 AM	*	*	1.10
M5 8896	General Room/table where inks are mixed	9:00 AM - 10:30 AM	*	*	0.16
M5 8897	General Room/middle of room	9:00 AM - 10:30 AM	*	*	0.50
EVALUATION CRITERIA (8 hour Time-Weighted Average)			0.1	0.05	10.0
LABORATORY LIMIT OF DETECTION mg/sample			0.003	0.003	0.01

* = below laboratory limit of detection; for these samples the minimum air concentration detectable is 0.022 mg/M³.