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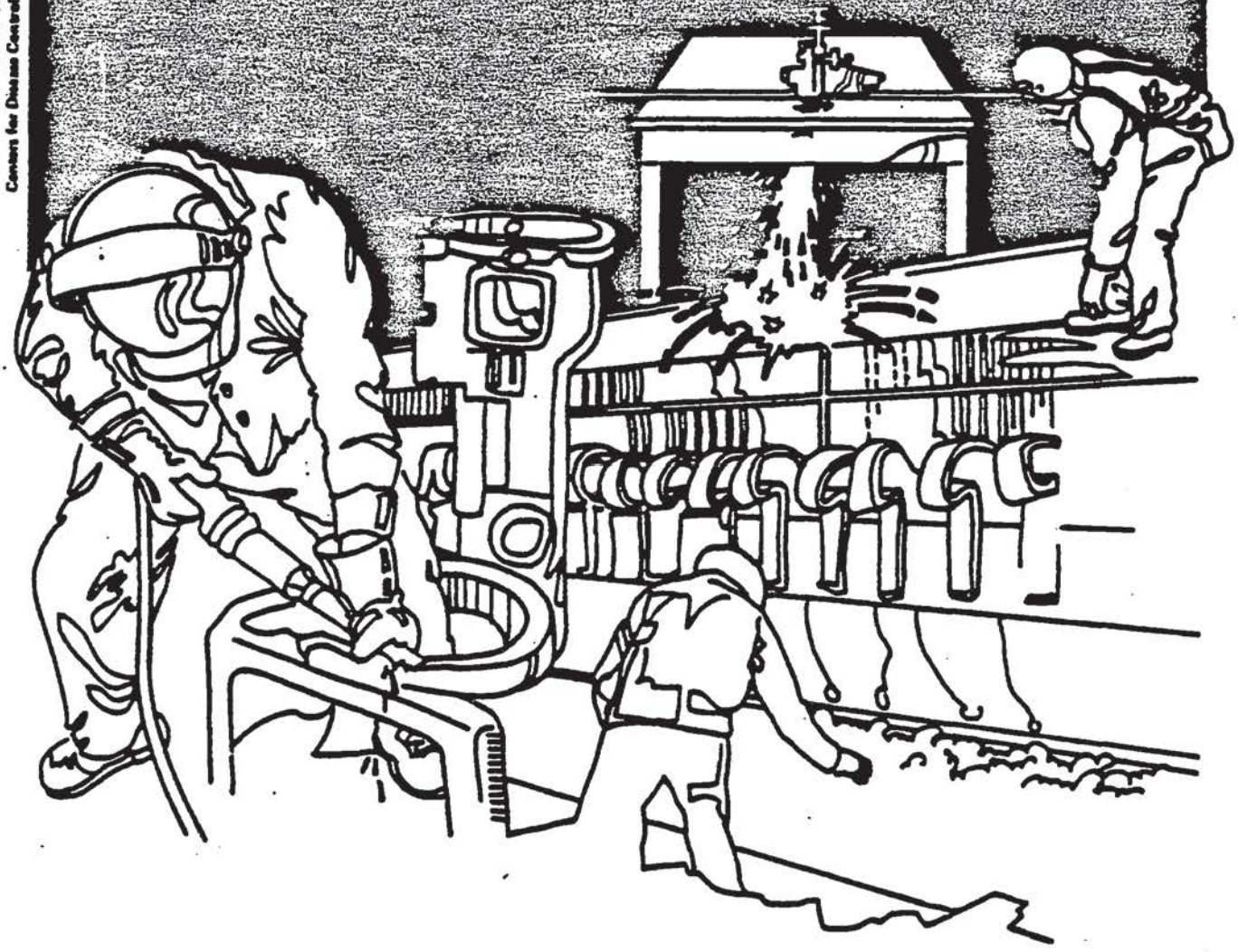

Health Hazard Evaluation Report

HETA 85-188-1627
DISTRIBUTION AND AUTO
SERVICE, INC.
BENECIA, CALIFORNIA

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.

HETA 85-188-1627
SEPTEMBER, 1985
DISTRIBUTION AND AUTO
SERVICE, INC.
BENECIA, CALIFORNIA

NIOSH INVESTIGATOR:
Pierre L. Belanger, IH.

I. SUMMARY

In February 1985, the National Institute for Occupational Safety and Health (NIOSH) received a request from a representative of the International Association of Machinists, local 1492, to conduct a health hazard evaluation at Distribution and Auto Service Inc., Benecia, California. Employees working in the air-conditioning (A/C) shop complained of a haze which they believed contributed to their headaches, drowsiness, and nausea during the A/C system test.

On March 4, 1985 an initial survey was conducted in the air-conditioning shop. Several workers were interviewed to evaluate the extent of their medical symptoms. These workers reported a haze emanating from underneath the vehicle during the A/C test. It was suspected that the haze was caused by the rust inhibitor sprayed underneath the vehicle which burned off as the exhaust system heated up during the A/C test. On March 11, 1985 a follow-up survey was conducted in the A/C shop during which time work practices were observed and carbon monoxide (CO) air concentrations were measured (2 to 5 ppm) to ascertain whether exhaust gases were being properly vented outdoors. In addition, the company modified a paint spray booth as recommended by the investigators in hopes of controlling vehicle exhaust and fumes generated during the A/C test. Carbon monoxide air concentrations were measured in the paint spray booth during an A/C test. The CO levels ranged between 4 and 5 ppm. All CO air measurements were below the NIOSH evaluation criteria of 35 ppm eight hour time weighted average and 200 ppm ceiling. In addition, the modified paint spray booth appeared to control the malodorous fumes and haze (rust inhibitor) which burned off during the A/C test.

No excessive carbon monoxide exposures were measured in the air-conditioning shop or the modified paint sprayed booth used to perform A/C testing on the dates of this survey. Employees symptoms of complaints appeared to be associated with the burn off of the vehicle underspray which primarily contains naphtha. Recommendations to control vehicle emissions, i.e. burn off and exhaust gases, were incorporated on a trial basis prior to the follow-up survey, and workers are no longer complaining of symptoms. Additional recommendations are included in Section VIII of this report.

KEYWORDS: SIC 9999 (auto-mechanics, air-conditioning installers, carbon monoxide, vehicle underspray, naphtha)

II. INTRODUCTION

In February 1985, the National Institute for Occupational Safety and Health (NIOSH) received a request for a health hazard evaluation from a representative of the International Association of Machinists, local 1492, Vallejo, California. The representative was concerned that air-conditioning installers and others working at Distribution and Auto Service, Inc. located in Benecia, California were complaining of headache, drowsiness, and nausea after being around automobile engines which are run in the A/C shop.

On March 4 and 11, 1985 an initial and a follow-up environmental survey were conducted of the garage facility where the air-conditioning systems are installed and checked. Environmental air monitoring was conducted during the follow-up survey. These results were discussed with management and labor representatives at the end of the follow-up survey. In August, 1985 a follow-up telephone call was made to labor and management representatives to ascertain if workers health problems have been permanently resolved.

III. BACKGROUND

Distribution and Auto Service, Inc. is a subsidiary of Nissan which has been at its current location for three years. The distribution center handles imported cars and trucks which are distributed to some 50 Northern California dealers. The company employs about 25 workers who generally work from 7:30 to 4:00 five days a week. Four employees work in the air-conditioning (A/C) shop where the workers health complaints originated.

The manufacturer (Nissan Motors) sprays the vehicle undercarriages with a rust inhibitor prior to shipping the vehicles to the United States. No material safety data sheet was available for the rust inhibitor during the initial survey; however, a copy of the chemical composition sheet was given the NIOSH industrial hygienist during the follow-up survey. Also, a paraffin compound (Cosmoline™) is applied to hinges, joints and under the hood compartment to inhibit salt corrosion while the vehicles are shipped to the United States.

The A/C shop is 64,000 cubic feet in size. The shop includes seven stalls, a storage area, and the workers lunch table. Four wall mounted exhaust fans are connected to the vehicle exhaust pipes while the engines are run in order to vent the exhaust outdoors. It should be noted that the exhaust fans were coated with a thick sticky oil reside which probably hampered the proper operation of the fans. In addition, two pedestal fans are used to circulate the inside room air due to workers complaints about a haze emanating from the vehicle during A/C testing.

The vehicles are brought into the shop for A/C installation, charging, and testing. Usually, one worker is running two cars at one time to check the A/C for proper operation, i.e. making certain the A/C system is cycling on and off and cooling the car properly while carburetor adjustments are being made.

Approximately 15 vehicles are tested daily for about 20 minutes each. After the A/C test, the vehicles are moved outside to eliminate the odors and haze emanating from underneath the vehicle.

It is believed that either exhaust fumes or the rust inhibitor burn off is causing the workers medical symptoms.

IV. DESIGN AND METHODS

Three workers were interviewed, during the initial survey, to determine the extent of their medical complaints. Also, carbon monoxide (CO) air monitoring was conducted using a direct reading instrument called a Gastech Interscan "CO tector" Model #1142. The meter was calibrated in the field using a CO span gas (50 ppm). Carbon monoxide air monitoring was done to determine whether the vehicle exhaust was being vented outdoors properly. The chemical composition of the rust inhibitor was unknown until the follow-up survey was conducted, thus air monitoring for naphtha was not performed.

V. EVALUATION CRITERIA

Environmental

As a guide to the evaluation of the hazards posed by workplace exposures, NIOSH field staff employ environmental evaluation criteria for assessment of a number of chemical and physical agents. These criteria are intended to suggest levels of exposure to which most workers may be exposed up to 10 hours per day, 40 hours per week for a working lifetime without experiencing adverse health effects. It is, however, important to note that not all workers will be protected from adverse health effects if their exposures are maintained below these levels. A small percentage may experience adverse health effects because of individual susceptibility, a pre-existing medical condition, and/or a hypersensitivity (allergy).

In addition, some hazardous substances may act in combination with other workplace exposures, the general environment, or with medications or personal habits of the worker to produce health effects even if the occupational exposures are controlled at the level set by the evaluation criterion. These combined effects are often not considered in the evaluation criterion. Also, some substances are absorbed by direct contact with the skin and mucous membranes, and thus potentially increase the overall exposure. Finally, evaluation criteria may change over the years as new information on the toxic effects of an agent become available.

The primary sources of environmental evaluation criteria for the workplace are: 1) NIOSH Criteria Documents and recommendations, 2) the American Conference of Governmental Industrial Hygienists' (ACGIH) Threshold Limit Values (TLV's), and 3) the U.S. Department of Labor (OSHA) occupational health standards. Often, the NIOSH recommendations and ACGIH TLV's usually are based on more recent information than are the OSHA standards. The OSHA standards also may be required to take into account the feasibility of controlling exposures in various industries where the agents are used; the NIOSH-recommended standards, by contrast, are based solely on concerns relating to the prevention of occupational disease. In evaluating the exposure levels and the recommendations for reducing these levels found in this report, it should be noted that industry is legally required to meet those levels specified by an OSHA standard.

A time-weighted average (TWA) exposure refers to the average airborne concentration of a substance during a normal 8-10-hour workday. Some substances have recommended short-term exposure limits or ceiling values which are intended to supplement the TWA where there are recognized toxic effects from high short-term exposures.

TABLE A

SUBSTANCE	Permissible Exposure Limit 8-Hour Time-Weighted Exposure Basis	Ceiling
Carbon monoxide (NIOSH)	35 ppm(1)	200 ppm
Carbon monoxide (Cal-OSHA)	50 ppm	400 ppm
Petroleum Distillates (NIOSH) (Naphtha)	350 mg/m^3(2)	------

1. ppm-Parts of a vapor or gas per million parts of contaminated air by volume.

2. mg/m^3-milligrams of a substance per cubic meter of air.

B. TOXICOLOGY

Carbon monoxide: Carbon monoxide combines with hemoglobin in the blood reducing the oxygen carrying capacity of the blood. Symptoms of CO poisoning are headache, dizziness, drowsiness, nausea, vomiting, collapse, coma, and death. Long term low level exposure to CO can increase the risk of heart attack for some people.(1.2)

Naphtha (Petroleum Ether): The naphthas are irritating to the skin, conjunctiva, and the mucous membranes of the upper respiratory tract. Systemic effects from naphtha cause central nervous system depression, and symptoms include headache, nausea, and in severe cases dizziness and convulsions.(2,3)

VI. RESULTS AND DISCUSSION

Environmental air monitoring was conducted during the follow-up survey to measure CO air concentrations (Table I) in the stalls. The CO air concentrations ranged from 2 to 5 ppm which does not exceed the NIOSH evaluation criteria of 35 ppm time weighted average or the 200 ppm ceiling.

A copy of the chemical composition sheet for the undersealer was given to the industrial hygienist during the follow-up survey, but no data sheet was available for the cosmoline™. The undersealer contains several chemicals including: calcium sulfonate (19%), oxidized wax calcium soap (5%), and naphtha (60%).

Based on three employee interviews, workers complained about dizziness, headache, nausea, and lightheadedness. Also, a haze and bad odor was reported to emanate from the vehicles, the trucks in particuliar, during A/C testing. The workers symptoms persisted for about one-half hour up to one hour after the engines were run, or until the workers went outside to fresh air at the end of the day. Initially it was unclear to the investigator whether workers complaints were primarily due to the rust inhibitor burn off, or to CO leakage, or a combination of these factors. Consequently, based on observations of the work operation, it was suggested that CO air monitoring be conducted and that the manager obtain a copy of the material safety data sheet so that the undersealer could be properly evaluated. Interim measures were suggested (see recommendations) to help alleviate medical symptoms reported by workers.

One of the paint spray booths was partly enclosed subsequent to the initial survey, and several vehicles were tested inside the spray booth for an extended period of time to see if the undesirable odors and exhaust emissions could be controlled. Based on the workers comments, it appears that the paint spray booth was very effective in controlling vehicle odors while the undersealer overspray burned off the exhaust system.

The NIOSH investigator did CO air monitoring (4 to 5 ppm) around the vehicle while it was running inside the booth, and CO measurements were well below the evaluation criteria reported in table A. The company representative indicated that the paint spray booths would be moved into the A/C shop in the near future. In August, 1985 the NIOSH investigator made a follow-up telephone call to the company and union representatives to determine if the booths were being used on a daily basis and if workers were experiencing any further symptoms of illness. Both management and union representatives indicated that workers reported symptoms had been eliminated.

VII. CONCLUSIONS

No overexposures to carbon monoxide were measured in the air-conditioning shop or in the paint spray booth on the day of this survey.

Based on interviews with three employees, the workers symptoms appear to be related to underspray burn off. A major component of the undersealer used to spray the vehicle undercarriage is a solvent called naphtha. Recommendations made by the NIOSH investigator to control worker exposures to exhaust emissions and underspray burn off have been implemented, and workers are no longer experiencing health complaints.

VIII RECOMMENDATIONS

1. It is recommended that either vehicle A/C testing be done outdoors to help dissipate the vehicle fumes, or that the two unused paint spray booths, located in an adjacent room, be utilized for A/C testing. By enclosing one side of the booths, the vehicles could be backed into the booths for the 20 minute A/C test thereby collecting any vehicle emissions and underspray burn off.

2. It is recommended that the paint spray booths exhaust fan be cleaned periodically to prevent the accumulation of the oily residue burn off seen on the exhaust fans in the A/C shop.

IX. REFERENCES

1. Criteria for a Recommended Standard...Occupational Exposure to Carbon Monoxide, DHHS (NIOSH) Publication No. HSM 73-100.

2. Occupational Diseases, A Guide to Their Recognition, Revised 1977, DHEW (NIOSH) Publication 77-181.

3. Criteria for a Recommended Standard...Occupational Exposure to Refined Petroleum Solvents, DHEW (NIOSH) Publication No. 77-192.

X. AUTHORSHIP AND ACKNOWLEDGEMENTS

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XI. DISTRIBUTION AND AVAILABILITY OF REPORT

Copies of this Determination Report are currently available upon request from NIOSH, Division of Standards Developement and Technology Transfer, 4676 Columbia Parkway, Cincinnati, Ohio 45226. After 90 days, the report will be available through the National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, Virginia, 22151. Information regarding its availability through NTIS can be obtained from the NIOSH Publication Office at the Cincinnati address.

Copies of this report have been sent to:

1. International Association of Machinists, local 1492.
2. Distribution and Auto Service, Inc.
3. NIOSH Region IX.
4. U.S. Department of Labor, OSHA, Region IX.
5. Cal-OSHA.

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

TABLE I

Distribution and Auto
Service, Inc.
Benecia, California
HETA 85-188
March 11, 1985

CARBON MONOXIDE AIR MEASUREMENTS
COLLECTED IN THE AIR-CONDITIONING SHOP

LOCATION	CONCENTRATION (ppm[1])
Ambient Room Conc.	3-4
At employees work station	2
Next to vehicle exhaust being pipe outdoors	2
Infront of room exhaust fan	4
Average conc. around vehicle parked in paint spray booth	5

1. ppm-Parts of a vapor or gas per million parts of contaminated air by volume

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