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U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH
CINCINNATI, OHIO 45202

HEALTH HAZARD EVALUATION DETERMINATION
REPORT NO. 73-155 - 112

SOUTHWESTERN OHIO STEEL INC.
HAMILTON, OHIO
MARCH 1974

I. TOXICITY DETERMINATION

It has been determined that carbon monoxide and nitrogen dioxide gases are not toxic at the concentrations measured in the coil department during near normal operations with restricted idling of gasoline and diesel truck engines. This determination is based upon environmental measurements in the workplace, employee interviews, and available literature on carbon monoxide and nitrogen dioxide toxicity. During the environmental evaluation (November 26-27, 1973) no significant symptoms were reported by interviewed employees and concentrations of carbon monoxide and nitrogen dioxide were well below levels believed to be toxic to employees.

It is recommended that the plant continue and vigorously enforce its policy restricting indoor truck engine idling.

II. DISTRIBUTION AND AVAILABILITY OF DETERMINATION REPORT

Copies of this Determination Report are available upon request from the Hazard Evaluation Services Branch, NIOSH, U.S. Post Office Building, Room 508, 5th and Walnut Streets, Cincinnati, Ohio 45202. Copies have been sent to:

- a) Southwestern Ohio Steel Incorporated - Hamilton, Ohio
- b) U.S. Department of Labor - Region V
- c) NIOSH - Region V

For the purposes of informing the approximately 98 "affected employees" the employer will promptly "post" the Determination Report in a prominent place(s) near where exposed employees work for a period of 30 calendar days.

III. INTRODUCTION

Section 20(a)(6) of the Occupational Safety and Health Act of 1970, 29 U.S.C. 669(a)(6), authorizes the secretary of Health, Education, and Welfare, following a written request by 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 National Institute for Occupational Safety and Health (NIOSH) received a request from the employer regarding exposures to carbon monoxide and nitrogen dioxide in the coil department of the Southwestern Ohio

Steel Company plant in Hamilton, Ohio.

IV. HEALTH HAZARD EVALUATION

A. Description of Process - Conditions of Use

Southwestern Ohio Steel (SOS) is primarily a service center for sheet and coil steel. This service comprises purchasing, storing, and selling sheet or coil steel according to customer specification. The coil department is located in a building approximately 1000 feet long, 400 feet wide and 30 feet high which is subdivided into three bay areas: processing, storage and structural. Flat bed truck trailers entering the building are either loaded or unloaded. In addition to transit truck drivers, approximately 98 employees distributed over three work shifts are potentially exposed to the exhaust gases (carbon monoxide and nitrogen dioxide) of gasoline and diesel powered trucks.

B. Evaluation Design

An evaluation of the coil department was made on November 26-27, 1973. Environmental concentrations of carbon monoxide and oxides of nitrogen were measured and employees were interviewed to elicit symptomatology. (Although nitric oxide is a contaminant present in diesel exhaust gases, nitrogen dioxide was evaluated since it is relatively more toxic than nitric oxide.) Overhead crane operators were monitored closely as there historic exposure to these gases was considered to be the most significant since crane cabs are often stationed directly above truck tractor exhausts while servicing truck trailers.

C. Evaluation Methods

Continuous carbon monoxide determinations were made using ECOLYZER[®] carbon monoxide detectors equipped with chart recorders. Mine Safety Appliance detector tubes were used to determine concentrations of nitrogen dioxide. A carbon monoxide detector with recorder was placed in three of the four overhead cranes, during various sampling periods. Another detector and recorder was placed four feet above the floor adjacent to the Traffic Manager's Office.

D. Evaluation Criteria

The occupational health standards promulgated by the U.S. Department of Labor (Federal Register, October 1972, Title 29, Chapter XVII, Subpart G, Table G-1) and the American Conference of Governmental Industrial Hygienists applicable to individual substances of this evaluation are as follows:

<u>Substance</u>	<u>8-hour time-weighted average (TWA) ppm*</u>
Carbon monoxide	50 ppm
Nitrogen dioxide	C5 ppm**

* Parts of vapor or gas per million parts of contaminated air by volume at 25°C and 760 mm Hg pressure.

** A value bearing a "C" designation refers to a "ceiling" value that should not be exceeded; all values should fluctuate below the listed "C" value.

Additionally, NIOSH has recommended that occupational exposures to carbon monoxide be controlled to a time-weighted-average concentration of 35 ppm.

Occupational health standards for individual substances are established at levels designed to protect workers occupationally exposed on an 8-hour per day, 40 hours per week basis over a normal working life time.

E. Evaluation Results and Discussion

1. Environmental

Nitrogen dioxide was not detected inside the overhead crane cabs or adjacent to the Traffic Manager's Office. Ten strokes on the detector tube hand pump results in a nitrogen dioxide detector tube sensitivity of approximately 2 ppm.

The continuous carbon monoxide monitors and recorders furnished the average ambient carbon monoxide concentrations and peak concentrations. Time-weighted-average (TWA) carbon monoxide levels were calculated for each sampling location. The TWA carbon monoxide concentrations during the warm up period ranged 11 to 17 ppm and were 11 to 20 ppm during the first shift. It should be noted that brief carbon monoxide peak levels of 50ppm were observed. A summary of the environmental air sampling data is found in the table at the conclusion of this report.

It should be emphasized that the company policy restricting engine idling inside the building was enforced during the environmental evaluation. This policy is probably sufficient to preclude carbon monoxide and nitrogen dioxide accumulation in the workroom air.

2. Medical Interviews

Several employees working in areas of maximal engine emission were interviewed in an effort to ascertain any medical symptoms associated

with exposures to the gases evaluated. Symptoms associated with carbon monoxide such as headache or dizziness were reported as occurring infrequently. Symptoms associated with exposures to nitrogen dioxide such as coughing excessively and difficulty in breathing were not reported.

V. AUTHORSHIP AND ACKNOWLEDGMENT

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Acknowledgments

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Summary of Air Samples Obtained at
 Southwestern Ohio Steel, Inc.
 Hamilton, Ohio
 November 25-26, 1973

Date	Shift	Location	Carbon Monoxide TWA*	Nitrogen Dioxide ppm**
November 25	2	1st Crane	11 ppm	
	2	2nd Crane	17 ppm	
	2	3rd Crane	11 "	
November 26	1	1st Crane	20 ppm	None Detected***
	1	2nd Crane	11 "	None Detected
	1	3rd Crane	21 ppm	None Detected
	1	Main Aisle	13 "	

Federal Standards

50 ppm

5 ppm

* Time weighted average concentration

** Parts of vapor or gas per million parts of contaminated air by volume at 25°C and 760 mm Hg pressure

*** Less than 2 parts per million