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

HEALTH HAZARD EVALUATION DETERMINATION
REPORT NO. 73-195-152

COLUMBIA UNIVERSITY, TEACHERS COLLEGE
NEW YORK CITY, NEW YORK
NOVEMBER 1974

I. TOXICITY DETERMINATION

It has been determined that concentrations of chemical substances produced by the Minolta Electrostatic Copying Machine are not toxic under the circumstances observed, namely the use of the machine for only one hour per day, in Room 44, Horace Mann Building, Columbia University, Teachers College, New York City, New York.

If this copying machine were used for a longer periods of time, for example, up to 8 hours/day, it is likely that a health hazard would result because of poor ventilation in this worksite.

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) Columbia University, Teachers College, New York City, New York
b) Authorized Representative of Employees
c) U.S. Department of Labor - Region II
d) NIOSH - Region II

For purposes of informing the 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 such a request from an authorized representative of employees regarding exposure to fumes from the Minolta Electrostatic Copying Machine used in Room 44 of the Horace Mann Building.

IV. HEALTH HAZARD EVALUATION

A. Plant Process - Conditions of Use

Room 44 of the Horace Mann Building, Teachers College, Columbia University is a suite of offices where research and publication of sociological studies is done (the current project is a study of the social structure of high school students). Approximately 14 persons work in this area: 1 secretary, 11 research associates, 1 accountant, and 1 administrator. The actual hazard evaluation request originated from the secretary who works in the general office, where the copier is located.

The Minolta copier works by producing an electrostatic charge on the zinc oxide coating on the surface of the copying paper. This charge enables the copying solutions, which consist of paraffin and small carbon particles to concentrate on areas of the copying paper which match dark areas of the original. According to the manufacturers, ozone may be present in the air when ventilation is poor.

This machine was installed in September 1973 and was subsequently used for approximately an hour a day. However, during May 1973, the copier was used much more extensively, up to 8 hours a day because large numbers of copies of a new report were needed. During this time complaints from the secretary and the research associates in the surrounding offices occurred.

On March 12-14, 1974 an evaluation of alleged toxicity of substances associated with the use of a copying machine used in Room 44 of the Horace Mann Building was conducted. Three workers were interviewed in a non-direct manner, a study of the ventilation in the offices was undertaken and air samples were taken.

At the completion of the initial evaluation, an exit interview was held with the employee representative to discuss the preliminary findings of the survey. Because management was unavailable during that week it was contacted separately.

C. Evaluation Methods

Twelve personal samples and two bulk samples were collected during the survey and analyzed for xylene, toluene, benzene, parafins and other peaks. Sixteen rubber strips were placed around the secretarial office for varying periods of time and were analyzed for ozone concentrations by looking for microscopic cracks in the rubber.[1] Ventilation in the office was studied by the use of smoke tubes. The copying machine was in use for about 1 hour a day and air samples were taken during this time.

D. Applicable Criteria

The OSHA Standards for the air contaminants of interest are taken from Part 1910 of Title 29 of the Code of Federal Regulations, Section 1910.23, Table G-1.[2]

Material	8-Hour Time-Weighted Average	
Aliphatic hydrocarbons (petroleum distillate)	No TLV	
Ozone	0.2 mg/M^3	0.1 ppm

E. Results

1. Environmental

a. Ozone

Concentrations of ozone were all less than 0.02 ppm.

b. Hydrocarbons

Bulk samples of the two substances used in the Minolta Copier, Minolta Fax Concentrate and Minolta Fax Starter Toner, were found to contain long chain aliphatic hydrocarbons (C7-C9). No other compounds, including benzene, toluene, xylene were found. Analysis of personal samples taken for periods of 20 minutes to 65 minutes showed the same aliphatic hydrocarbons in concentrations from 60-260 mg/M^3. The threshold limit value for high molecular weight aliphatic hydrocarbons are in the range of 1900 mg/M^3 (octane) to 2000 mg/M^3 (heptane).

c. Ventilation

The general office has no windows and has two exhaust vents and one vent for make-up air. Despite the presence of two exhaust vents and one make-up air vent, virtually no flow of air was found in the secretarial office when the main door was closed. The satellite offices surrounding the conference area had a similar arrangement of vents; airflow was also poor.

When the door to the main entrance was opened, airflow improved considerably. However, in actual practice, this door is kept closed at all times.

Almost all workers in this office were out on the field doing research and only two secretaries and one researcher were available for interviews.

One of those interviewed, (the secretary working in the same room as the copier) did state that she had become nauseated when the copier was in extensive use, but since then has had no specific symptoms.

F. Evaluation Discussion

Environmental and Medical

Bulk sample and air analysis at this worksite indicates that aliphatic hydrocarbons are the probable air contaminants responsible for complaints of nausea in the past at this worksite. At the present time, both air levels and symptomatology indicate that there is no health hazard present at this time. However, because of poor ventilation and past history of more extensive use of the copier, it is likely that use of this copying machine can cause high air levels of petroleum distillate in the general office and result in symptoms of toxicity such as central nervous system depression, loss of appetite, and nausea. Presumably if the unit were used 8 hours per day, petroleum distillate levels could approach 8 times their present levels or approximately 2000 mg/M^3, a toxic level.

V. RECOMMENDATION

Since the above-mentioned copier is used approximately 1 hour/day at this time, no health hazard exists. Because of the potential for toxicity the petroleum distillate and the possibilities of additive effects of ozone to aliphatic hydrocarbons to cause highly irritant gases, and past history of more extensive use, it is recommended that (1) the copying machine be used for no more than a small fraction of the work day (<2 hours/day) or (2) efforts to improve ventilation be undertaken, these may be as simple as keeping the main door open or as extensive as changing the in-take and exhaust ducts.

VI. REFERENCES

1. American Industrial Hygiene Association Journal, p. 80-84, January - February, 1966.

2. Federal Register, Vol. 37, No. 202, p. 22141.

3. Industrial Hygiene and Toxicology, VII, p. 1199, 1963.

VII. AUTHORSHIP AND ACKNOWLEDGMENTS

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