U.S. DEPARTMENT OF HEALTH EDUCATION AND WELFARE
CENTER FOR DISEASE CONTROL
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH
CINCINNATI, OHIO 45226

HEALTH HAZARD EVALUATION DETERMINATION REPORT
HE 78-81-658

TELTRONIC SYSTEMS, INC.
ROOM 1645
420 LEXINGTON AVENUE
NEW YORK, NY 10017

JANUARY 1980

I. SUMMARY

A Health Hazard Evaluation was conducted by the National Institute for Occupational Safety and Health (NIOSH) at the office of Teltronic System, Inc. to determine if compounds released during the operation of a copying machine might contribute to complaints of headaches and sore throats. Direct reading instrumentation was unable to detect the presence of ozone. Small quantities of methyl alcohol, toluene and carbon monoxide were found to be present in the office.

Although the concentrations of these contaminants are within acceptable limits, recommendations are made to limit exposure because of the coincidence of symptoms with the operation of the copying machine.

II. INTRODUCTION*

NIOSH received a request from the management of Teltronics Systems, Inc. to determine if harmful concentrations of contaminants were being given off by a copying machine in their office. Episodes of

*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 an employer or authorized representative of employees, to determine whether any substance in the place of employment might have potentially toxic effects as it is used or may be found.

headaches and sore throats seemed to correlate with the introduction and operation of a small, table top copier.

III. BACKGROUND

The Teltronics Systems office suite consists of three rooms. The secretary's office/reception area is approximately 20ft. x 30ft with a 15ft. high ceiling. The manager's office is 15ft. x 15ft.. The storage room is 10ft. x 15ft.. The suite is air conditioned. The staff consists of the manager and secretary. The only office machinery used include an electric typewriter and a Toshibafax copier. Both the manager and secretary had complained of headaches and dry or sore throats since the installation of the copier, and periods of illness seemed to correlate with the operation of the machine. The manufacturer's instructions state that the unit should be maintained in the on (or ready) mode to eliminate "warm-up" delays. When the unit is in this mode, warm air is vented from a 4-5 inch port. In order to limit the amount of effluent exhausted, the machine was activated only when copying was to be done. During the sampling for contaminants, the unit was in continuous operation.

IV. SAMPLING AND ANALYTICAL METHODS

Because the toner/developers used with copiers contain a variety of organic solvents and methyl alcohol, it was decided to sample using activated charcoal (for organic solvents) and silica gel (for methyl alcohol) sampling tubes. Air is drawn through a tube at a known rate for a known time to achieve a desired sampling volume. The airborne

contaminants will be adsorbed on the collection media. Each sample is then analyzed using NIOSH's standard gas chromatograph method. Results of the analyses of the samples are listed in Table I.

The intense light source used in this type of copying machine offers a potential source for the formation of ozone. Detector tubes were used to qualitatively test for the presence of ozone. In this sampling method, air is drawn through a glass tube that contains a chemical which will react with ozone to produce a color change. Quantitatively, a tube can be used to detect ozone concentrations as low as 0.05 parts per million parts of air (ppm). Repeated use of a single tube (5 or 6 times) can be used to indicate the presence of ozone at slightly lower concentrations. Even though carbon monoxide is not generated by copying machines, it may be generated by any internal combustion machine or may be circulated by a building's ventilation system. The detector tubes used could measure carbon monoxide concentrations as low as 5ppm.

V. RESULTS

No ozone could be detected. Only trace amounts of carbon monoxide were found - amounts which could be generated by cigarette smoking. Analysis of the silica gel and charcoal tubes indicated minor amounts of methyl alcohol (5ppm) and toluene (1ppm). Toluene was the only organic solvent detected in a bulk sample of the toner which was generated in concentrations great enough to be identified in analysis of the air samples. (see tables I & II for details of concentrations and health effects of exposure).

VI. RECOMMENDATIONS

Even though the levels of contaminants are less than their respective limits, recommendations are made, based on the following logic:

A) The physiologic complaints are compatible with exposure to toluene and especially to ozone.

B) The occurrence of complaints are closely associated with the operation of the copier.

C) Methyl alcohol and toluene were generated by even limited use of the copier.

The following recommendations are made to limit exposure to effluents from the copier:

1) The copier should be moved into the storage room and accessed only when necessary.

2) Continue the present policy of activating the unit only when necessary.

3) As much as possible, duplicating should be done at the end of the work day.

VII. DISTRIBUTION - 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, 22161. Information

regarding its availability from NTIS can be obtained from NIOSH's Publication Office at the Cincinnati address. Copies of this report have been sent to:

1) Teltronics Systems, Inc.
2) U.S. Dept of Labor, OSHA, Region II
3) U.S. Dept HEW, NIOSH, Region II
4) NY Commissioner of Health
5) N.Y. Office of Epidemiology

VIII. AUTHORSHIP - ACKNOWLEDGEMENTS

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Table I

Teltronics Systems, Inc.

Concentration of Effluents
June 9, 1978

Substance	Location	Concentration (ppm)
Methy Alcohol	Work Desk	N.D.[1] 2.1
	Book Shelf-south wall	N.D. 4.9
	Supervisor's Office	N.D. N.D.
Toluene	Work Desk	1.0 N.D.
	Book Shelf-south wall	0.6 0.6
Carbon Monoxide	Throughout Office	N.D. - Trace
Ozone	Throughout Office	N.D.

[1] N.D. = None Detected

Limits of Detection:

Methyl Alcohol $\cong$ 0.8 ppm

Toluene $\cong$ 0.25 ppm

Carbon Monoxide $\cong$ $<$5 ppm

Ozone = 0.1 ppm

Table II

Teltronics Systems, Inc.

Environmental Criteria/Health Effects

Substance	Current OSHA Environmental Standard	NIOSH Recommended Exposure Limit	Health Effects Considered
Methyl Alcohol	200 ppm[1], TWA[2][3]	200 ppm, TWA 800 ppm, ceiling/ 15 min.[4]	eye irritation, headache
Toluene	200 ppm, TWA 500 ppm, ceiling/10 min.	100 ppm, TWA[3] 200 ppm, ceiling/ 10 min.	headache, dizziness
Carbon Monoxide	50 ppm, TWA[3]	35 ppm, TWA 200 ppm, ceiling	headache, heart effects
Ozone	0.1 ppm, TWA[3]	0.1 ppm, TWA	mucous membrane irritation

[1] ppm = parts of substance per million parts of air

[2] TWA = Time Weighted Average. Exposure to this concentration, when averaged over an 8 to 10 hour work-day should not be exceeded. Fluctations greater than this concentration must be balanced by fluctuations less than this concentration.

[3] These standards also recommended by the American Conference of Governmental Industrial Hygienists (1979), an independent, professional society, which has recommended standards since 1941.

[4] Ceiling/time = Exposure to this concentration, for this length of time should never be exceeded because of possible risk of irreversable effects of serious harm. If no time is specified, the concentration should never be exceeded.