U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES ■ Public Health Service
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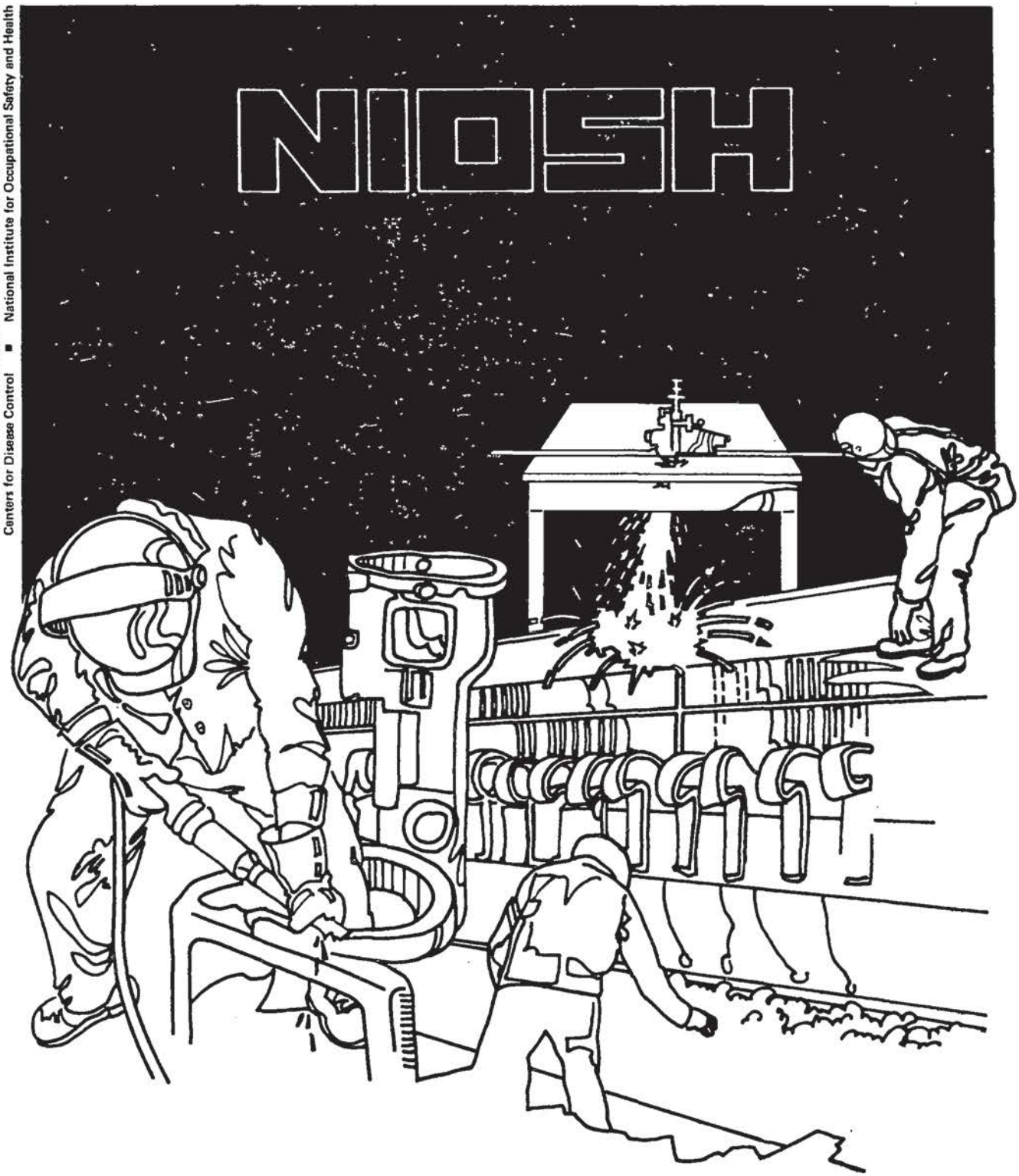
NIOSH



Health Hazard Evaluation Report

HETA 81-251-925
SKIL CORPORATION
DIVISION OF EMERSON ELECTRICAL COMPANY
PHILADELPHIA, PENNSYLVANIA

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 81-251-925
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Skil Corporation
Division of Emerson Electrical Company
Philadelphia, Pennsylvania

NIOSH Investigator: Walter J. Chrostek
Industrial Hygienist

I. SUMMARY

On March 30, 1981, NIOSH received a request from an employee of the Skil Corporation, Philadelphia, Pennsylvania for a health hazard evaluation. The request stated that the employee experienced a burning sensation in her mouth and throat when using a copying machine which was located adjacent to her desk.

An initial walk-through survey was conducted on May 6, 1981 to evaluate the operation and to determine the causative agent producing the physical discomfort. It was determined that the copying machine was an electrostatic type and ozone gas was the likely causative agent. On June 16, 1981, NIOSH conducted general air sampling to measure exposures to ozone gas.

Two general air samples were collected adjacent to the copying machine using impingers containing buffered potassium iodide solution. Analysis of these samples showed the atmospheric air concentrations of ozone to be less than the lower limit of detection (1 microgram per-sample). Six additional air samples were taken in the area where the copies are ejected, (utilizing colorimetric detector tubes for ozone gas). All six samples showed that 100 micrograms of ozone gas per cubic meter of air is generated when 20 copies are reproduced. The OSHA standard for ozone is 200 micrograms per cubic meter of air.

On the basis of the data obtained during this investigation NIOSH determined that no health hazard from overexposure to ozone gas from the electrostatic copying machine exist. However, there may have been some discomfort when the copying machine was located adjacent to the employee's desk. Movement of the machine to the present workshop location minimizes employee's exposure as the area is much larger and the ozone gas dissipates more rapidly.

Keywords: SIC 7629 (Electric Power Tool Repair), copying machine, ozone, mouth and throat irritation.

II. INTRODUCTION

Under the Occupational Safety and Health Act of 1970, NIOSH investigates the toxic effects of substances found in the workplace. On March 30, 1981 a request was submitted by an employee of the Skil Corporation, Philadelphia, Pennsylvania stating that when using the copying machine she is experiencing a burning sensation in the nose and throat and felt it was caused by the electostatic dispersant.

III. BACKGROUND

At this location Skil Corporation performs repair work on electric powered tools. New tools are also sold here. About two years ago an electostatic copying machine was bought and placed in the sales office about six feet from the secretary's desk. At that time, the employee began experiencing the physical discomfort. This copying machine was removed into the adjacent repair shop prior to NIOSH visit of May 6, 1981. Conversation with a service representative confirmed that this machine was an ozone ink curing type of copying machine.

IV. EVALUATION DESIGN AND METHODS

During the visit of May 6, 1981 it was learned that a maximum of 100 copies were reproduced daily by this copying machine. This machine prior to this visit was located in a confined space approximately six feet from the secretary's desk. Subsequently this copying machine was relocated into a larger area in the repair shop.

In order to simulate operations and to determine if the copying was the causative agent producing ozone gas, it was decided to do atmospheric air sampling adjacent to the machine utilizing an air sampling pump operating at one liter per-minute and impingers containing a one percent buffered potassium iodide solution.

Periodic air samples using ten pump strokes were taken with colorimetric detector tubes for ozone gas. The lower limit of detection for the detector tubes using ten strokes was 100 micrograms per cubic meter of air. Twenty copies of printed material were reproduced per air sampling cycle. This procedure was repeated periodically for ten cycles. Colorimetric determinations were made for six cycles.

V. EVALUATION CRITERIA

Substance	OSHA[1]
Ozone	200

Denotes micrograms of contaminant per-cubic meter of air sampled.

Ozone[2] has an odor threshold of 40-100 micrograms per cubic meter of air.

Ozone[3] is irritating to the eyes and all mucous membranes. In human exposures, the respiratory signs and symptoms in order of increasing ozone concentrations are: dryness of upper respiratory passages; irritation of mucous membranes of nose and throat; choking, coughing, and severe fatigue; bronchial irritation, substernal soreness, and cough. Pulmonary edema may occur simetimes several hours after exposure has ceased. In severe cases, the pulmonary edema may be fatal.

Symptoms and signs of subacute exposure to ozone include headache, malaise, shortness of breath, drowsiness, reduced ability to concentrate, slowing of heart and respiration rate, visual changes, and decreased desaturation of oxyhemoglobin in capillaries.

Antagonism and synergism with other chemicals also occur.

Experimentally, in animals, chromosomal aberrations have been observed.

VI. RESULTS AND DISCUSSION

Two general air samples were taken utilizing impingers containing a buffered potassium iodide solution and air sampling pumps operating at 1 liter per-minute. The sampling period was sixty-four minutes. These samples were subsequently analyzed by NIOSH Method P&CAM 154[4]. Ozone concentrations in both samples were below the lower limit of detection for this contaminant which was 1 microgram per-sample.

Six grab sample utilizing colorimetric sampling tubes were collected while the copying machine was in operation. Each sample was of 10 pump stroke duration. The sampling was performed in the area where the copies are ejected. All samples showed a decolorization of approximately 100 micrograms per-cubic meter of air. During this study a cycle consisted of twenty copies and ten cycles were performed.

All general samples collected showed that the general air ozone gas levels were below OSHA permissable levels.

Personal air sampling was not performed as this operation is intermittant. A maximum of 100 copies is reproduced during any 8-hour period.

The conditions under which this request was initiated could not be reproduced due to the fact that the machine was moved. The previous location of the copying machine in a confined space and adjacent to a work station may have been conducive for ozone gas concentrating and causing physical irritation.

Under the present working condition, no recommendations are necessary.

VII. AUTHORSHIP AND ACKNOWLEDGEMENTS

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ACKNOWLEDGEMENTS

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VIII. DISTRIBUTION AND AVAILABILITY

Copies of this Determination Report are currently available upon request from NIOSH, Division of Technical Services, Information Resources and Dissemination Section, 4676 Columbia Parkway, Cincinnati, OH 45226. After 90 days, the report will be available through the National Technical Information Services (NTIS), Springfield, VA. 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. Skil Corporation
2. Employee Representative
3. NIOSH, Region III
4. OSHA, Region III

For the purpose of informing the 5 employees of the results of the Skil Corporation survey, the employer shall promptly "post" for a period of 30-calendar days the Determination Report in a prominent place(s) near where employees work.

IX. REFERENCES

1. U.S. Department of Labor, Occupational Safety and Health Administration, Federal Register, Vol. 39, No. 125, June 27, 1974, (Revised July 1, 1980)

2. Community Air Quality Guides, Ozone, American Industrial Hygiene Association, 1969

3. Occupational Diseases: A Guide to Their Recognition, USPHS, CDC, NIOSH, Publication #77-181, Revised June 1977.

4. NIOSH Manual of Analytical Methods, Vol. 1, (NIOSH) Publication #77-157A, 1977.