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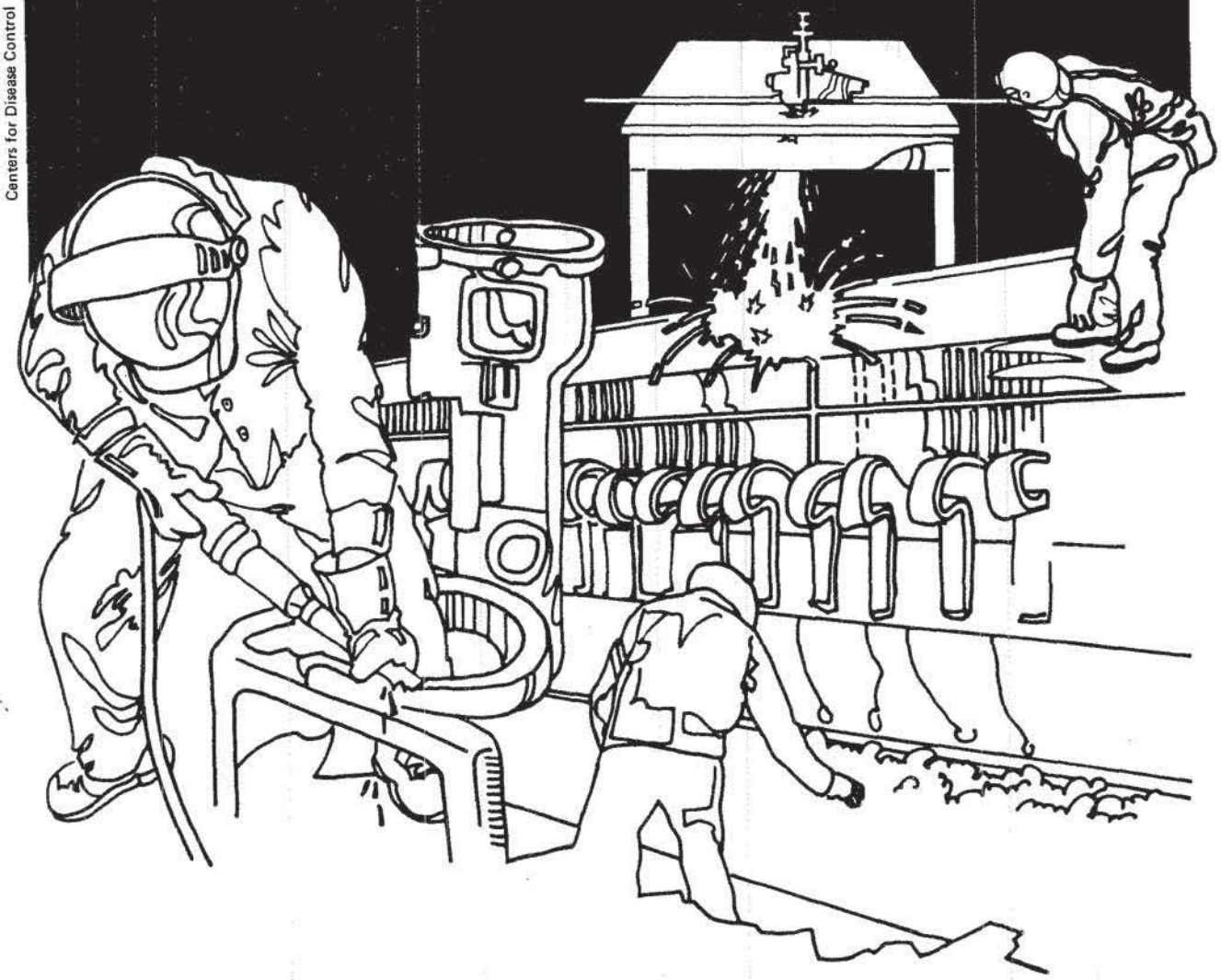

# Health Hazard Evaluation Report

HETA 81-256-913
CINCINNATI GENERAL HOSPITAL
CINCINNATI, OHIO

# 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 81-256-913
July, 1981
Cincinnati General Hospital
Cincinnati, Ohio

NIOSH Investigator:
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## I. SUMMARY

On March 24, 1981, the National Institute for Occupational Safety and Health (NIOSH) received a request for a Health Hazard Evaluation in the Printing Service Department at Cincinnati General Hospital. The request was submitted by the American Federation of State Municipal and County Employees, Ohio Council #8. The requestor was concerned about complaints of skin irritation and dermatitis associated with the use of chemicals in the ITEK printing process.

On May 12, 1981, a NIOSH industrial hygienist and medical officer met with representatives of the Cincinnati General Hospital and AFSCME to discuss the situation and conduct a walk-through of the Printing Service Department.

Employees in the print shop were interviewed and asked about any occurrence of dermatitis. The employee who worked with the ITEK process had dermatitis on the thumb and fingers of his right hand. The worker operating the ITEK machine removed the prints and applied chemicals with his right hand. Several of the chemicals used in the ITEK process are caustic and may irritate the skin. A University of Cincinnati dermatologist had examined the ITEK worker and made a diagnosis of irritant contact dermatitis.

The ITEK worker reported that his dermatitis began when he started working with the ITEK process. It was exacerbated when the automatic squeegee rollers which remove excess developing and stabilizing solutions began to malfunction and leave chemicals on the positive plates. His condition improved when the squeegee rollers were repaired and when he began to wear 2-3 pairs of medical examination gloves while working.

On the basis of the data obtained during the survey, NIOSH determined that the ITEK worker had developed a severe contact dermatitis induced by the chemicals used in the ITEK process. The other workers in the Printing Service Department did not report any symptoms of dermatitis. Recommendations were made to provide cotton-lined impervious gloves and protective work clothing to the affected worker.

KEYWORDS: SIC 2740, Miscellaneous printing, irritant, contact dermatitis, ITEK printing process, skin irritation.

## II. INTRODUCTION

On March 24, 1981, the National Institute for Occupational Safety and Health (NIOSH) received a request for a Health Hazard Evaluation from the American Federation of State, County and Municipal Employees (AFSCME), Ohio Council #8, located at Cincinnati General Hospital, Cincinnati, Ohio. The request identified a number of chemicals used in the Printing Service Department, and complaints of dermatitis and skin irritation from using these chemicals.

## III. BACKGROUND AND PROCESS DESCRIPTION

An opening conference and walk-through survey were conducted on May 12, 1981, with representatives of the Safety Department of Cincinnati General Hospital, AFSCME Local Union Representatives, and NIOSH. At the opening meeting the general situation in the print shop was discussed, and NIOSH received safety data sheets on the chemicals used in the area of concern. The meeting was followed by a walk-through of the Printing Service Department, and brief medical interviews were conducted during the walk-through survey.

Employee complaints centered on the ITEK printing process. The ITEK process creates a positive plate which is placed on a multilith for the press run. The positive plates are made by placing the original on a copy board. The copy is then "photographed" onto the ITEK film, and becomes a positive image. For example, a typed page on a white background would render a positive image on the ITEK film in which the characters were white and the background was black. The film is automatically fed into a developer bath and squeegeed dry by rollers. It then passes into a stabilizer bath and is again squeegeed dry by rollers as it leaves the bath. The plate is then coated with a positive plate etch. Holes are punched in the plate to allow alignment on the multilith, and deletion fluid may be used to correct imperfections. The positive plate is then placed on a multilith which has been prepared with ink. The positive plate revolves on a roller, picks up ink from a second roller, then transfers the image onto whichever type of copy has been loaded into the machine. This process is generally used for limited runs (usually less than 100) of copies.

The manufacturer of the chemicals used in the ITEK printing process was contacted to identify more specifically the constituents. Table I lists this information and reveals that some of these are caustic, and potential skin irritants. The print shop employee who uses these compounds has been under the care of a University of Cincinnati occupational dermatologist. This physician was contacted to discuss the worker's case.

The employee who worked with the ITEK process reported that he developed dermatitis and skin irritation during the spring of 1980. At that time, the rollers were not effectively removing the solution from the plates before they left the ITEK machine. The service representative made several repair visits to make adjustments on the rollers. Eventually, the rollers were replaced. The use of the ITEK machine was higher than normal at this time.

The employee reported that he developed blisters on his right hand and lost several layers of skin, until it was "raw." He also stated that he lost two fingernails on his right hand.

While operating the ITEK machine, the worker removed the prints with his right hand. He was also observed to apply chemicals, inks, etc. with his right hand.

Three of the four print shop employees were interviewed and asked about any occurrence of dermatitis. The employee who worked most with the ITEK and metal plate processes had dermatitis on the thumb and fingers of the right hand. He reported that the problem started when the ITEK machine began operating improperly, but that the dermatitis had improved since 1) the machine had been repaired, 2) he substituted ITEK Positive Plate Fountain Solution for the Positive Plate Etch, 3) the ITEK workload subsided, 4) he began wearing 2-3 pairs of medical examination gloves, and 5) he has been treated with a topical coricosteroid ointment. The other 2 employees denied any skin problems other than dry skin, which they attributed to frequent hand washing. All three employees worked primarily with different processes, although one other worker occasionally worked with the ITEK process.

The University of Cincinnati dermatologist reported that the ITEK worker had been patch-tested with samples of the printing chemicals and that the results were all negative. Her diagnosis of that worker's problem was irritant contact dermatitis and that it was not an allergic phenomenon.

## IV. DISCUSSION

It appears that the dermatitis in the one worker is not of an allergic nature and is an isolated case. Since many of the chemicals that he handles are either irritants or caustic, it is reasonable to think that they are a probable cause of his irritant contact dermatitis. The fact that the dermatitis occurred only on the right hand, the hand used to apply chemicals, etc., supports this conclusion. No further medical evaluation by NIOSH is necessary at this time.

## V. RECOMMENDATIONS

1. Workers handling printing chemicals should wear cotton-lined, plastic/rubber gloves to protect their hands. Gloves should be replaced regularly. A clean, protective garment, uniform, or smock should be provided daily for the print shop workers. The appropriate protective gloves and garments should be provided by the employer.

2. The use of medical examination gloves as protective equipment should be discontinued since their use in these circumstances 1) are not proven to be effective in preventing exposures, 2) may aggravate the worker's skin condition due to the accumulation of perspiration within the glove, and 3) tear easily, and are not impervious to chemical attack.

3. The workers should be instructed in hygienic work procedures. Gloves should be removed immediately upon completion of handling the chemicals and precautions should be taken to avoid contact of contaminated gloves with worker's unprotected skin surfaces, clothing, tools, and work materials.

## VI. AUTHORSHIP AND ACKNOWLEDGEMENTS


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|---|---|
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## VII. DISTRIBUTION AND AVAILABILITY OF REPORT

Copies of this report are currently available, upon request, from NIOSH, Division of Technical Services, Publications Dissemination, 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 22161. 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. Director, Dept. of Hospital Safety and Insurance, Cincinnati General Hospital
2. Director, Dept. of Hospital Safety, Cincinnati General Hospital
3. AFSCME, Ohio Council #8
4. NIOSH, Region V
5. OSHA, Region V

For the purpose of informing the "affected employees," the employer shall promptly post, for a period of 30 calendar days, the Evaluation Report in a prominent place(s) where the exposed employees work.

TABLE I

Printing Solution Contents

Printing Service Department
Cincinnati General Hospital
Cincinnati, Ohio
HETA 81-256

| Product | Constituents |
|---|---|
| SLM-OE Deletion Fluid | Water, inert thickening agents, polyethylene amine, solvents. pH = 2.5. |
| ITEK Positive Plate Foundation Solution | Water, glycols (ethylene glycol). pH = 5.5. |
| ITEK Positive Plate Etch | Water, denatured ethyl alcohol, glycols (ethylene glycol), inorganic salts. pH = 5.5. |
| ITEK Positive Plate Developer | Water, potassium hydroxide, sodium sulfite. pH = 13. |
| ITEK Positive Plate Stabilizer | Water, Potassium phosphate. pH = 5-5.6. |

NOTE: No information is available for polyethylene amine. Ethylene glycol is considered to be a mild skin irritant (Ref. 1979 RTECS). Ethyl alcohol is a dessicant. Inorganic salts, such as potassium hydroxide, and sodium sulfite, are caustic (Merck Index, 9th ed.).

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