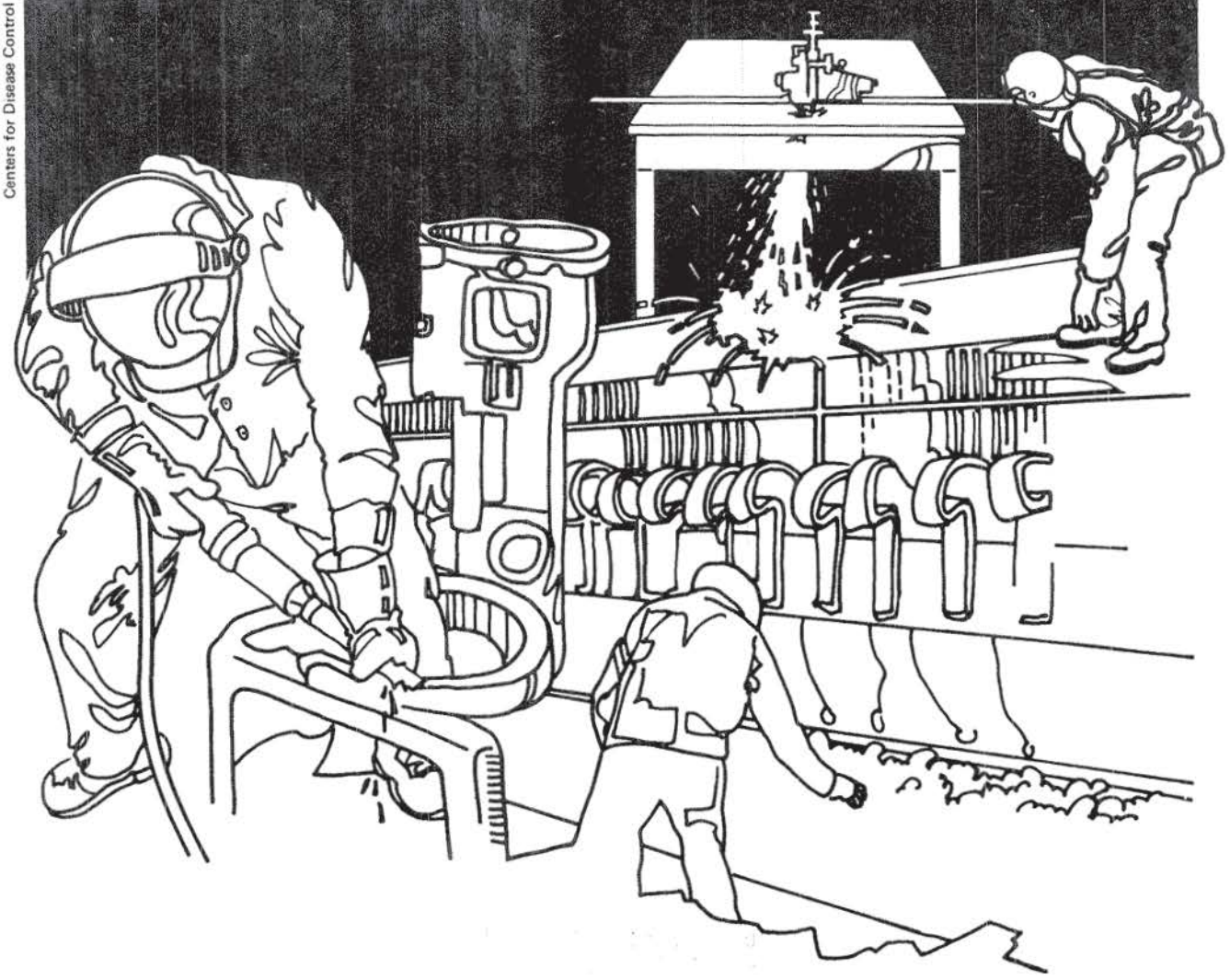
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES ■ Public Health Service
Centers for Disease Control ■ National Institute for Occupational Safety and Health

NIOSH



Health Hazard Evaluation Report

HHE 80-216-877
RICHWAY DEPARTMENT STORES
MARIETTA, GEORGIA

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.

HHE 80-216-877
MAY 1981
RICHWAY DEPARTMENT STORES
MARIETTA, GEORGIA

NIOSH INVESTIGATORS:
S. SALISBURY, IH

I. SUMMARY

On August 4, 1980, the National Institute for Occupational Safety and Health (NIOSH) was asked to investigate a possible exposure to polychlorinated biphenyls (PCBs) from lighting transformers being installed by electricians at the Richway Department Store in Marietta, Georgia. One electrician assisting with the transformer installation was reported to have developed a skin rash on his left forearm.

Inspection of the transformer and data from the manufacturer indicated that a capacitor inside the transformer contained approximately 1 pound of PCB fluid. The capacitor and all other transformer components were completely sealed in a styrene modified polyester resin. There were no reports that any of the transformers had been damaged or that PCB fluid had leaked from the capacitors or surrounding sealant.

Based on the findings of this investigation, it appears highly unlikely that workers were exposed to PCBs during the installation of transformers at the Richway Department Store in Marietta, Georgia. It is possible the electrician may have developed a skin rash because his left forearm had repeatedly rubbed against the surface of the transformer's styrene modified polyester sealant. However, it should be emphasized that the potential for irritant or allergic dermatitis from cured polyester resins is very low.

KEYWORDS: SIC 1731, PCB's, polychlorinated biphenyls, transformers, styrene modified polyester resin, skin rash, dermatitis

II. INTRODUCTION

On August 4, 1980, The National Institute for Occupational Safety and Health (NIOSH) received a request from the Business Agent, International Brotherhood of Electrical Workers, Local 613, to investigate a possible exposure to polychlorinated biphenyls (PCBs) during the installation of electrical transformers at the Richway Department Store in Marietta, Georgia. The transformers were being installed above the false ceiling of the newly constructed building as part of a high intensity interior lighting system.

III. BACKGROUND

During June, 1980 an electrician assisting with transformer installation (91 transformers were installed, one for each light) developed a skin rash on his left forearm. This worker had been removing transformer covers and lifting the transformers up to another electrician who performed the actual installation. In the process of lifting the transformers, the first electrician's forearm had been in direct contact with a "waxy like" sealant which encapsulated the wiring and all electrical components inside the transformer. Because a PCB warning label was affixed to the outside of the transformer, the workers suspected that the skin rash might have been caused by exposure to PCB fluid.

A member of Local 613 contacted the Occupational Safety and Health Project (OSHP), Labor Studies Program, at Georgia State University, Atlanta, Georgia, to request toxicity information on PCB transformer fluids. Subsequently, two OSHP staff members visited the work site, interviewed the affected workers, and brought back one of the transformers to the OHSP office. OHSP suggested the union submit a request for a NIOSH health hazard evaluation.

IV. EVALUATION DESIGN

On September 5, 1980, an industrial hygienist from NIOSH, Region IV, consulted with the Director of OSHP and inspected the transformer in question. A site visit to the Richway Department Store was not conducted because the construction work had been completed and electricians were no longer installing transformers. The electrician who had experienced the skin rash was not available for interview and could not be contacted by telephone. The manufacturer of the transformers, Advance Transformer Company, Chicago, Illinois, was contacted and was asked to furnish technical information on the type of sealant used in the transformer and on the amount and composition of the PCB fluid found in the transformer capacitors.

V. EVALUATION CRITERIA

Polychlorinated biphenyls (PCBs) are complex mixtures of fat-soluble aromatic hydrocarbons that were manufactured in the United States from 1929 until 1977. Their thermal stability and electrical insulating properties led to their widespread use in transformers and capacitors. They were also used in plasticizers, inks, adhesives, pesticide extenders, and carbonless duplicating paper. PCBs are now widely distributed in the environment. Like DDT residues, PCBs are accumulated and concentrated by fish. Nonoccupational human exposure to PCBs occurs primarily via the diet.

PCBs are poorly metabolized by the body and tend to accumulate in fat tissues. Concern for human accumulation of PCBs is based on their liver carcinogenicity in rodents, their reproductive effects, and their effects on immune response in several animal species. Human health effects associated with heavy PCB exposure include chloracne (an acne-form dermititis), liver function abnormalities and serum lipid concentration abnormalities. Chloroacne was among the earlist reported effects associated with worker exposure to PCB's. Based on the findings of adverse reproductive effects and the increased risk of liver cancer that has been associated with exposure to PCBs, NIOSH recommends that exposure be minimized to the lowest detectable limit which is considered to be 1 microgram of PCBs per cubic meter of air as a time weighted average concentration for up to a 10-hour work day, 40 hours per week.[1]

VI. EVALUATION RESULTS

Inspection of the transformer indicated that it is highly unlikely that workers were exposed to PCBs during the installation of transformers at the Richway Department Store in Marietta, Georgia. The manufacture of the transformer, Advance Transformer Company, has notified NIOSH in writing that the transformers contain capacitors which contain 1.1 pounds of PCB dielectric fluid. However, the fluid is sealed in a metal container which is incapsulated in a styrene modified polyester sealant. The sealant completely fills the interior of the transformer providing a leakproof encapsulant around all transformer components.

The sealant is supplied to Advance Transformer by the Freeman Chemical Company of Port Washington, Wisconsin. The resin used is 60% polyester and 40% styrene monomer with a silica sand filler. Once the electric componments are installed in the transformer casing, the sealant is poured in and hardened using a methyl ethyl ketone peroxide activator.

No evidence has been provided by any of the electricians working at Richway which would lead NIOSH to suspect the transformers had been damaged or had leaked any PCB fluid. According to the

electrical contractor, Bagby Elevator and Electric Company, these transformers had been installed in at least 3 different Richway buildings in the Atlanta area and only the one electrician, mentioned above, had reported a skin rash.

VII. CONCLUSION

Dermatitis is frequently reported among workers handling uncured styrene modified polyester resins, and methyl ethyl ketone peroxide is a strong skin irritant. However, these compounds are completely reacted after curing. Workers handling partially polymerized resins may develop allergic dermatitis. Dermatitis caused by contact with polymerized and fully cured finished products is rare but does occur.[2] It is possible the electrician may have developed a skin rash because the left forearm had repeatedly rubbed against the surface of the transformer's styrene modified polyester sealant. However, it should be emphasized that the potential for irritant or allergic dermatitis from cured polyester resins is very low.[3]

VIII. RECOMMENDATIONS

It is recommended that electricians be informed there is little chance of PCB exposure from handling these transformers unless the sealant material has been cracked or damaged. The PCB warning label is required by law, but handling transformers which have been so labeled does not mean that PCB exposure is likely to occur. Only if the sealant were damaged and the PCB fluid had leaked from the capacitor to the outside of the transformer case, would there be need for concern.

IX. AUTHORSHIP AND ACKNOWLEDGEMENTS

Evaluation Conducted and Report Prepared By:	Stanley A. Salisbury Principal Environmental Investigator NIOSH Region IV Atlanta, Georgia
Originating Office:	Hazard Evaluations and Technical Assistance Branch Division of Surveillance, Hazard Evaluations, and Field Studies NIOSH Cincinnati, Ohio
Report Typed by:	Marion Hickey Secretary NIOSH, Region IV Atlanta, Georgia

X. DISTRIBUTION AND 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 ninety (90) days the report will be available through the National Technical Information Service (NTIS), Springfield, Virginia 22161. Information regarding its availability through NTIS can be obtained from the NIOSH Publications Office at the Cincinnati, Ohio address.

Copies of this report have been sent to:

a) Authorized Representatives of Employees
   International Brotherhood of Electrical Workers, Local 613
   International Brotherhood of Electrical Workers, International
b) U.S. Department of Labor - OSHA, Region IV
c) NIOSH, Region IV
d) Designated State Agencies
e) Occupational Safety and Health Project, Ga. State U.

XI. REFERENCES

1. Criteria for a Recommended Standard, Occupational Exposure to Polychlorinated Biphenyls (PCB's). DHEW (NIOSH) Publication No. 77-225, Cincinnati, Ohio: NIOSH; 1977.

2. Morris, G.E.: Vinyl Plastics, Their Dermatological and Chemical Aspects. A.M.A. Archives of Industrial Hygiene and Occupational Medicine. 8:535-539, 1953.

3. Scovill, R.G.: Dermatitis Prevention: Polyester Resins. Industrial Health and Pollution Control (Michigan). 17, No.2:6-7, Winter 1971-72.

DEPARTMENT OF HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE
CENTERS FOR DISEASE CONTROL
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH
ROBERT A. TAFT LABORATORIES
4676 COLUMBIA PARKWAY, CINCINNATI, OHIO 45226

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, $300

Third Class Mail

POSTAGE AND FEES PAID
U.S. DEPARTMENT OF HHS
HHS 396