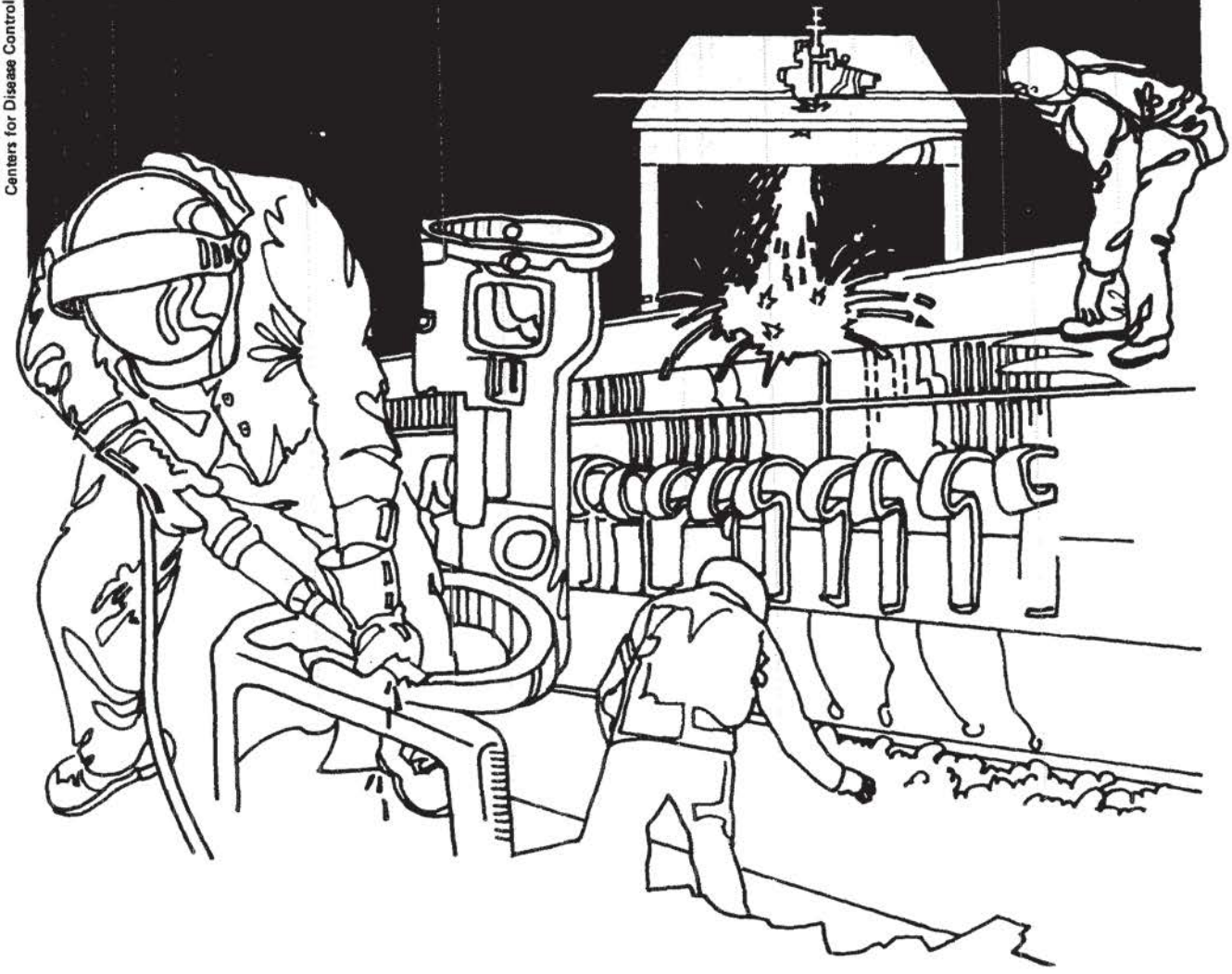
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES ■ Public Health Service
Centers for Disease Control ■ National Institute for Occupational Safety and Health

NIOSH



Health Hazard Evaluation Report

HETA 82-206-1306
NEW RENAISSANCE
GLASS WORKS
OAKLAND, CALIFORNIA

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 82-206-1306
MAY 1983
NEW RENAISSANCE GLASS WORKS
OAKLAND, CALIFORNIA

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I. SUMMARY

On March 24, 1982 the National Institute for Occupational Safety and Health (NIOSH) was requested to evaluate the reported possible exposures to polychlorinated biphenyls (PCBs) released from burning fluorescent light ballasts at the New Renaissance Glass Works shop. Workers complained of headaches, dermatitis, central and peripheral nervous system effects and diverse other symptoms.

On April 2, 1982 two NIOSH investigators conducted a walk through environmental survey of the New Renaissance Glass Works, and on April 16, 1982 NIOSH conducted a follow-up environmental survey. Bulk wipe and/or environmental air samples were collected to measure polychlorinated biphenyls (PCBs), formaldehyde, chlordane and lindane. Four wipe samples were collected to characterize the PCB surface contamination. On April 7, 1982, a NIOSH medical officer interviewed workers at the worksite, and reviewed medical records for a large number of past and present employees of the New Renaissance Glass Works. On August 20, 1982, blood samples were obtained from 14 past and current employees for analysis for PCB concentrations, and a skin examination and questionnaire were administered.

The PCB concentrations on wipe samples ranged from 31 nonograms per 100 square centimeters ($ng/100cm^2$) to 130 $ng/100cm^2$. There are no specific standards regarding PCB surface background levels; however, other NIOSH studies suggest an upper background limit of 500 nanograms PCB/100 centimeters square for surface contamination clean-up. Three air samples were collected to measure PCB concentrations, but none was detected. The NIOSH recommended criteria is 1.0 ug/m^3. One bulk air sample was collected from a 55 gallon drum, and Aroclor #1242 was identified at a concentration of 0.18 micrograms per cubic meter air. One bulk dust sample was collected and found to have 5.8 mg of PCBs. Five air samples were individually collected to measure formaldehyde and chlordane, but neither of the contaminants were detected. Two cinder block bulk samples were collected and analyzed for chlordane and lindane. No lindane was detected and one of the bulk samples detected 345 parts per billion (ppb) of chlordane.

All PCB serum levels were either non-detectable or well within the range of normal values for non-occupationally-exposed persons. The skin examination revealed one worker in which the presentation was consistent with chloracne, and four other workers had moderate symptoms of quiescent or resolving acne; these cases were difficult to assess because the workers were receiving medical treatment for the acne. The treating dermatologist had diagnosed chloracne in eight cases. The questionnaire elicited small numbers of positive responses scattered over a wide range of symptoms, with the exception of seven workers who reported frequent headaches and a history of unusual nausea and vomiting.

Based on the environmental results (PCB wipe samples) and interviews with the employees and employer, NIOSH concluded that there had existed a health hazard from burning and leaking PCB - containing light ballast oil for several brief periods in the preceeding eight months. However, no airborne exposures to PCB existed at the time of the survey. Furthermore, no airborne formaldehyde or chlordane was detected. Dermatological findings were consistent with chloracne, although chloracne has not been reported in association with PCB exposures as limited as reported in this workplace. Blood serum PCB levels were all within normal limits. Recommendations are included in Section VIII of this report.

In January, 1983 the California State Department of Health Services, Hazardous Waste Management Branch (HWMB) collected several bulk samples (dirt and floor scrapings) which detected Aroclor #1260. Additional soil analysis is being considered by the HWMB.

KEYWORDS: SIC 9999 Stained Glass Sales Outlet - fluorescent light ballast, polychlorinated biphenyls, chloracne, press board glue, formaldehyde.

II. INTRODUCTION

On March 24, 1982 a request for a health hazard evaluation was submitted to NIOSH by the owner of the New Renaissance Glass Works. After the most recent series of fires and leaks from the fluorescent light ballasts in November/December 1981, a large number of employees complained of headache, drowsiness, nausea and vomiting for several weeks. Many of the employees complained of an acneform rash developing over the first 2-4 weeks after the fires. These employees were seen by a local dermatologist, who diagnosed eight cases of chloracne and initiated treatment. Partly in response to this diagnosis, and to a diversity of neurological, reproductive and other complaints, the owner of the Glass Works requested a NIOSH health hazard evaluation.

On April 2 and 16, 1982 NIOSH conducted an initial and follow-up environmental survey to evaluate workers potential exposure to polychlorinated biphenyls (PCB), formaldehyde, chlordane and lindane. All environmental sampling results were telephoned to the requestor on April 30, 1982.

On April 7 and 20, 1982 a NIOSH physician conducted an initial and follow-up medical evaluation of present and past employees. On November 12, 1982, the participants were notified by letter, of their blood PCB levels.

III. BACKGROUND

The New Renaissance Glass Works began its operation in 1974. The Glass Works is a sales outlet/distributor for stained glass, glues, tools and other related equipment. Limited glass repair jobs are performed in the shop, and stained glass classes are periodically taught in the store. The Glass Works employed 22 full-time employees in December, 1981 when workers first reported work related health complaints to their employer as a result of light ballast fires. In November/December, 1981, five ballast fires were reported to have occurred. All of the old luminares were reportedly removed subsequent to the fires. The leaking ballasts were placed in a 55-gallon drum, sealed and identified as PCB contaminated.

In January 1982, a CAL-OSHA physician and industrial hygienist conducted an investigation into the cause of the workers problems.

The industrial hygiene survey indicated that the leaking ballast fluid contained 280 ppm (weight to weight) of PCBs. PCB wipe samples collected January, 1982 from table tops under previously leaking ballasts, detected 64.7 ugm/100cm^2 (micrograms per 100 square centimeters); however, no airborne PCB vapors were detected. Gas detector tubes were used to detect formaldehyde, acetaldehyde, hydrogen sulfide and toluene diisocyanate, but none were detected. Airborne sampling for several heavy metals (zinc oxide, iron oxide and copper) was conducted, but none of these metals were detected. Airborne sampling for organic vapors detected low concentrations of Freon II, but this substance was probably present due to the aerosol cans.

A medical questionnaire was administered by the CAL-OSHA physician to the employees. Of those questioned, at least 77% felt that their symptomology was work related; however, the physician was unable to determine the etiology of the current problem.

Since PCBs were detected in the leaking ballast fluid, CAL-OSHA recommended that the fixtures be removed. The leaking ballasts were subsequently removed and placed in a 55-gallon drum which was sealed and identified as contaminated with PCB label.

In late March 1982, a representative of the Department of Health Services, Hazardous Waste Management Branch, visited the New Renaissance Glass Works because the requestor was concerned about the shop being built on an old dump site. The chemist was contacted by NIOSH and he reported that he thought he may have smelled aldehydes and chlordane when he approached the back of the shop. The shop owner indicated that the cinder block wall was drilled several years earlier and impregnated with either chlordane or lindane. No environmental air monitoring was conducted by the state investigator at this time. It was subsequently learned from the state that the New Renaissance Glass Works was not built on an old dump site. Also, there was a concern that the gas station previously located next door had a gas tank leak, but there was no indication of this previous problem.

In the spring of 1982, most of the past and current employees of the New Renaissance Glass Works were seen by a local physician, who conducted a thorough history and physical examination and had a large number of laboratory tests performed on each patient, including a full hematological panel, SMA 12, urinalysis, cholesterol and triglycerides, screening for heavy metals, and many others. These charts were obtained and reviewed by the NIOSH medical officer; no pattern of abnormalities was apparent in the results of the histories, examinations and laboratory results except for a high incidence of dermatologic rashes and acne and a common history of upper respiratory complaints.

IV. EVALUATION DESIGN AND METHODS

A. Environmental

Several sampling techniques were used by NIOSH to evaluate the suspected airborne contaminants which included: polychlorinated biphenyls, formaldehyde, chlordane and lindane. Area air samples, wipe and/or bulk samples were collected from several locations within the building. Airborne samples were collected using a sampling train (calibrated vacuum pump and appropriate collection medium) through which a known volume of air is passed. In one instance only bulk samples were collected and analyzed for a specific contaminant. The following is a description of the sampling and analytical techniques used to characterize the airborne contaminant concentrations.

1. Polychorinated Biphenyl

Air was drawn through 150 milligrams (mg) fluorosil sorbents tube. The vacuum pump operated at a flow rate of 1.0 liter per minute. The samples were analyzed by NIOSH Physical and Chemical Analytical Method (P&CAM) no. 244, and the PCB(s) were quantitated by summation using the best matched Aroclor as the standard. The Aroclors detected were #1242 and #1260 which each had a detection limit of 2 nanograms per sample.

Wipe samples were collected using cyclohexane moistened Whatman No. 50 smear tabs and wiping a surface area of approximately 100 square centimeters. The smear tab was placed in a scintillation vial with a teflon screw cap. A dust sample was collected using a Whatman No. 50 smear tab. The sample was placed in a scintillation vial and subse-quently analyzed. The wipe and dust samples were each extracted three times or more with benzene, screened and either diluted or concentrated as needed and analyzed by P&CAM No. 244.

2. Formaldehyde

Air was drawn through a 150 mg chromosorb tube. The vacuum operated at a flow rate of 50 cubic centimeters per minute (cc/min). The samples were analyzed by NIOSH P&CAM Number 354 (modified) using a Hewlett-Packard 5711A gas chromatograph with a flame ionization detector. The limit of detection for formaldehyde was 5 mg/sample.

3. Chlordane and Lindane

Two bulk samples (cinder block) were collected, weighed extracted in toluene for 30 minutes and analyzed using a gas chromatograph-Electron Capture Detector. The limit of detection for lindane is 10 nanograms per milliliter and the chlordane limit of detection is 30 nanograms per milliter.

B. Medical

On April 7, 1982, a NIOSH medical officer reviewed medical records for a large number of past and present employees. The owner of the New Renaissance Glass Works was asked to prepare a list of workers who had been present during the most recent ballast fire, and who were still at work or available at the time of the questionnaire. Letters were sent to all of these workers inviting them to come to the workplace for a limited physical examination, to respond to a questionnaire and to have a blood sample drawn for serum PCB analysis. On August 20, 1982, the NIOSH physician administered a medical questionnaire and conducted skin examinations of 14 present and past employees. Blood samples were drawn and sent to the NIOSH laboratory to determine the PCB concentrations.

V. HAZARD EVALUATION DESIGN

A. Environmental Criteria

As a guide to the evaluation of the hazards posed by workplace exposures, NIOSH field staff employ environmental evaluation criteria for assessment of a number of chemical and physical agents (Table A). These criteria are intended to suggest levels of exposure to which most workers may be exposed up to 10 hours per day, 40 hours per week for a working lifetime without experiencing adverse health effects. It is, however, important to note that not all workers will be protected from adverse health effects if their exposures are maintained below these levels. A small percentage may expereince adverse health effects because of individual susceptibility, a pre-existing medical condition, and/or a hypersensitivity (allergy).

An addition, some hazardous substances may act in combination with other workplace exposures, the general environment, or with medications or personal habits of the worker to produce health effects even if the occupational exposures are controlled at the level set by the evaluation criterion. These combined effects are often not considered in the evaluation criteria. Also, some substances are absorbed by direct contact with the skin and mucous membranes, and thus potentially increase the overall exposure. Finally, evaluation criteria may change over the years as new information on the toxic effects of an agent become available.

The primary sources of environmental evaluation criteria for the workplace are: 1) NIOSH Criteria Documents and recommendations, 2) the American Conference of Governmental Industrial Hygienists' (ACGIH) Threshold Limit Values (TLV's), and 3) the U.S. Department of Labor (OSHA) occupational health standards. Often, the NIOSH recommendations and ACGIH TLV's are lower than the corresponding OSHA standards. Both NIOSH recommendations and ACGIH TLV's usually are based on more recent information than are the OSHA standards. The OSHA standards also may be required to take into account the feasibility of controlling exposures in various industries where the agents are used; the NIOSH-recommended standards, by contrast, are based solely on concerns relating to the prevention of occupational disease. In evaluating the exposure levels and the recommendations for reducing these levels found in this report, it should be noted that industry is legally required to meet only those levels specified by an OSHA standard.

A time-weighted average (TWA) exposure refers to the average airborne concentration of a substance during a normal 8- to 10-hour workday. Some substances have recommended short-term exposure limits or ceiling values which are intended to supplement the TWA where there are recognized toxic effects from high short-term exposures.

TABLE A

SUBSTANCE	TIME-WEIGHTED AVERAGE (TWA)a	CEILING VALUE
PCB - all Aroclors-(NIOSH)	1 ug/m^3(b)	--
PCB - 42% chlorine-CAL-OSHA	1 mg/m^3(c)	--
PCB - 54% chlorine-CAL-OSHA	0.5 mg/m^3	--
Formaldehyde (NIOSH)	Lowest feasible limit	--
Formaldehyde (CAL-OSHA)	--	2 ppm
Chlordane* (CAL-OSHA)	0.5 mg/m^3	--

a) TWA - NIOSH exposure is based on a work day up to 10 hours long, whereas CAL-OSHA Standard is based on an 8-hour work day.

b) ug/m^3 - Micrograms of a substance per cubic meter of air.

c) mg/m^3 - Milligrams of a substance per cubic meter of air.

d) ppm - Parts of a vapor or gas per million parts of contaminated air by volume.

* There is no NIOSH recommended criteria for evaluating this airborne chemical contaminant.

B. Medical

Chloracne, elevated triglyceride levels, and moderate elevation in enzymes reflecting hepatic damage have been reported among workers exposed to relatively large amounts of PCBs, frequently over prolonged time periods. These exposures are predominantly dermal, with a secondary inhalation component. A wider variety of neurological, reproductive, dermatologic and other symptoms have been reported in association with the ingestion of moderate to large amounts of PCB-contaminated substances. For the purposes of this investigation, review of medical records for triglyceride levels and liver function, and a skin examination for chloracne were considered of primary importance.

Toxicology

PCBs have low acute toxicity but are of broader concern because they persist in the environment, bioaccumulate in human and animal tissues, and have a high potential for chronic or delayed toxicity. The discovery of major environmental contamination with PCBs led to the passage of the Toxic Substances Control Acts (TSCA) in 1976. In 1977, EPA issued regulations banning the further manufacture of PCBs and PCB-containing equipment and strictly controlled the handling, storage and disposal of existing PCBs.

PCBs belong to the class of halogenated aromatic hydrocarbons, all of which are foreign to biologic (living) systems. Commercial products are always mixtures of various chlorinated biphenyls, and are described according to the percent of chlorine in the mixture. While the degree of chlorination and structure of the chemical affects the rate of metabolism and excretion of PCBs, the clinical importance of this is not known. Common trade names for PCBs compounds are "Aroclor" and "Askarel". All commerical products are contaminated to some extent with the polychlorinated dibenzofurans. The toxicity of PCDFs is much greater than PCBs in comparative animal studies; they are structurally similar to the highly toxic dibenzodioxins.

PCBs were introduced into industry in the early 1930s, and have been used widely since then because they are chemically stable, of low volatility, non-flammable, and have high dielectric constants. The most significant remaining use of PCBs is as heat exchange and dielectric fluids in transformers and capacitors constructed before 1977. Utility workers, electricians, appliance service workers and firefighters are the occupational categories at highest risk for continued exposure to PCBs.

Because PCBs are resistant to metabolic transformation, they persist in the environment and bioaccumulate in fish, wildlife and man. Trace amounts of PCBs have been found in human blood, fat and milk in over 50% of people sampled in all geographic areas of the United States. These "background" levels in human serum are typically less than 20 parts per billion (ppb). Levels reported from adipose tissue are somewhat greater 1-2 parts per million (ppm), and residues measured in human milk have ranged from 40-100 ppm.

Human Toxicology and Epidemiology

PCBs are absorbed well by all routes (skin, gastrointestinal, inhalation). Distribution is primarily into fat, and excretion is quite slow so that bioaccumulation occurs even at low exposure levels. Few good studies of the health effects of PCBs in humans are available, because accurate exposure data is frequently lacking, the study groups are small, workers may be simultaneously exposed to other potentially harmful chemicals and for other reasons. The health effects identified to date are summarized below:

Acute Toxicity

PCBs have very low potential for producing acute toxic effects, consistent with a very high acute oral LD-50 in animals (1-10 grams/kg for rodents). Reported symptoms after occupational exposures include mild to unbearable irritation of the skin and eyes (0.1-10 mg/m^3).

Dermatologic Effects

Exposure to PCBs, dibenzofurans and dibenzodioxins have been associated with a specific skin rash known as chloracne. Although it may resemble typical adolescent acne, there are certain distinct features: the most distinctive lesion is cystic, skin colored and measures from 1-10 mm; the other prominent lesion is the comedo. The comedoes and cysts can become inflamed and secondarily infected with large pustules. Unlike adolescent acne, chloracne may occur at any age and may involve trunk, arms and legs as well as face, neck and back. Chloracne may result from external contact or from systemic absorption of PCBs; onset is within days to weeks after a single large exposure, and at varying lengths of time after the beginning of chronic low-level exposures. Threshold blood levels for the development of chloracne have not been established.

Liver Damage

Abnormal liver function tests have been reported in a number of occupational studies, and clinical hepatitis was observed after accidental ingestion in the "yusho" epidemic (a poisoning epidemic caused by ingestion of cooking oil contaminated with PCBs and PCDFs in Japan, affecting more than 1,600 people). Although some studies have reported negative results, in a recent cross-sectional study abnormal LFTs were observed and found to be correlated with serum PCB levels; the only other abnormal signs, symptoms, or laboratory tests in these workers were a few cases of chloracne. Liver damage is the most consistent histological finding among the many laboratory animal species tested, and is usually the most sensitive indicator of PCB exposure.

Reproductive Effects

The Yusho incident was also important because it clearly documented the potential for reproductive and transplacental effects in humans. Stillbirths, abnormal skin pigmentation, lower birth weights, and ocular discharge at birth were observed; follow-up of these children has revealed no persistent morphologic or behavioral abnormalities. Adverse reproductive effects of PCBs have been found in many mammalian and avian species, primarily in lowered fertility, birth weight or postnatal survival rather than specific teratogenic effects. Transplacental effects have been well documented. Reproductive effects in males have not been adequately studied.

Other

The principal biochemical effect of PCBs is the stimulation and induction of certain enzyme systems, observed in both man and animals, primarily in the liver but also in the kidney, adrenals, lung, gut, skin and testes. This has potential for altering the incidence of disease secondary to increased metabolism of endogenous of exogenous substances, and for interference with medical therapy due to increased metabolism of administered drugs. PCBs have also been reported as immunosuppressants and to have endocrine effects in animals. This is presently being studied in occupationally exposed populations.

Carcinogenicity

Several PCB mixtures are clearly carcinogenic in a number of rodent bioassays, producing liver tumors (hepatocellular carcinomas). None of the PCB mixtures are active in short-term tests for mutagenicity, a finding that holds true for most heavily chlorinated carcinogens, yet substantial confirming evidence for carcinogenicity is provided by positive cell transformation assays using these same PCB mixtures. Thus, under the OSHA criteria, PCB mixtures should be considered Category I carcinogens. Both the International Agency for Research of Cancer and EPA have concluded that based on available animal data, PCBs should be considered as potential human carcinogens. No threshold or "no-effect level" is known for PCBs or any other carcinogens.

VI. RESULTS AND DISCUSSION

A. Environmental

Four wipe samples and one bulk dust sample (Table I) were collected to determine the extent of PCB contamination due to previously leaking and/or burning ballasts. One bulk dust sample detected 5800 nanograms of PCB. The PCB surface wipe samples ranged from 31 to 130 nanograms/ $100cm^2$. There are no specific health standards regarding PCB surface contamination, however, NIOSH has collected samples to establish a background level of PCBs based on several studies of schools and an office building. The limited data suggests an upper background level of 500 ng/$100cm^2$.

Three general air samples (Table II) were collected, to measure PCBs, but only trace quantities of PCBs (less than or equal to 0.06 mg/m^3) were detected on each sample. One bulk air sample was collected from the 55-gallon storage drum to determine which Aroclor was present due to the leaking ballast. The bulk air sample detected 180 ng/m^3 of Aroclor #1242.

Two bulk cement samples were collected and analyzed for chlordane and lindane. One of the samples detected 345 ppb of chlordane (Table III). Five airborne samples were collected to measure chlordane but none was detected.

Five general air samples were collected to measure formaldehyde, but none was detected.

In March, 1983 it was learned that the California State Department of Health Services, Hazardous Waste Management Branch, recently (January, 1983) returned to the New Renaissance Glass shop to collect bulk dust and dirt samples from inside and outside the building to measure PCB concentrations. There was concern that the soil underneath the building may be contaminated with PCBs. Five bulk samples were collected inside and outside the building and from the sediment dust on the roof. The bulk dust roof sample did not detect any PCB. The outside dirt sample collected next to a wall detected 8ppm of PCBs. The inside bulk samples detected various concentrations of Aroclor 1260: Floor scrapings-37ppm, dry cotton swab-21ppm and a dirt sample collected from a crack-1700 ppm. The State enforces an outdoor soil PCB standard of 50ppm for industrial areas and a 7ppm standard for sensitive areas e.g. residential areas, schools, gardens, potential water contamination. It is not clear whether the Hazardous Waste Management Branch or CAL-OSHA will have jurisdiction in this incident. The Hazardous Waste Management Branch is currently evaluating the situation.

Based on the analyses of the leaking dielectric fluid by CAL-OSHA, which detected 280 ppm of PCB(s), the wipe sample results collected by NIOSH and CAL-OSHA, and other data collected by consultants to the shop owner, the etiology of the PCB dirt sample is unknown. However, NIOSH has determined that no current occupational exposures to PCB were measured.

Due to the generally dirty (dusty) conditions observed on the inner office room, coke machine etc. and given the PCBs identified in the bulk dust sample, the owner was advised to have the shop thoroughly cleaned (vacuumed) to prevent inadvertant inhalation of dust laden with PCBs.

B. Medical

No pattern of abnormalities in liver function or triglyceride levels was found on review of the results of the laboratory tests conducted in spring of 1982; because of the relatively small number of workers in this workplace, only relatively large deviations from normal would be recognized.

As stated in the introduction, a local dermatologist diagnosed chloracne and initiated treatment in 8 of the workers later examined by NIOSH medical staff. At the time of the NIOSH investigation, one worker exhibited a moderately severe pitting acne over both cheeks, the upper chest and back and the dorsal surface of the upper and forearms, with indurated small systic lesions and a large number of comedones; in areas of previous lesions, hyper- and depigmentation were both visible. This worker also had hyperpigmentation of the gums. The worker had been exposed to a previous fire and leak of ballast oil in 1979, and the acne and the gum pigmentation change were reported to have begun a month or two after that episode, with progressive worsening until the present. The worker had no history of adolescent acne or other dermatologic conditions.

In the 13 other workers, four workers had signs of quiescent or resolving acne which could be consistent with chloracne, but which could not be fully assessed because the workers were receiving medical treatment for the acne at the time of the examination. One of these three workers, and two others, exhibited relatively marked hyper- or depigmentation on the face, neck, upper torso and/or arms. The worker who had both acne and pigmentation change also had nail deformities, and two difference workers also exhibited nail deformities. The one probable and four possible cases of chloracne identified were all among the eight cases diagnosed earlier by the treating dermatologist. A total of eight workers reported rashes, eczema and/or acne; mild dry irritant rashes were observed in five of these workers, in addition to the three with signs of acne.

There was no consistent pattern to the responses to questions regarding the eyes, endocrine and reproductive changes, respiratory, neurological, gastrointestinal, renal, or central nervous system symptoms, with the exception of frequent headaches (7 workers) and a history of nausea and vomiting (7 workers, not correlated with headache).

Serum PCB results are given in Table IV. All results were well within the NIOSH laboratory normal values.

VII. DISCUSSION AND CONCLUSIONS

Based on the environmental results, NIOSH concluded that workers were not exposed to PCBs, formaldehyde, chlordane or lindane during the date of this survey.

The positive medical findings in this investigation were one case of probable chloracne, a number of other possible cases which could not be fully evaluated because they were under medical treatment, and a diagnosis of cloracne among a larger number of workers by a qualified local dermatologist. Chloracne has not been described as a result of the low exposure levels which are assumed to have occured in this workplace. Serum PCBs for all workers were within normal limits. This does not rule out an association with chloracne, but makes it less likely; a single large exposure, however, could have produced symptoms without producing markedly elevated serum levels. There are no other known exposures to account for the distinctive appearance of chloracne in at least one worker.

VIII. RECOMMENDATIONS

1. Due to the generally dusty conditions observed on the inner-office roof, it is suggested that shop be thoroughly cleaned to remove any dust which may be laden with PCB.

2. Person(s) who attempt to clean the building should be apprised of the situation in order that they may wear hall-mask high efficiency particulate air filters to prevent inhalation of the dust as it is being disturbed.

3. It should be determined whether the dirt collected in the crack is due to soil contamination below the building.

IX. REFERENCES

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XI. DISTRIBUTION AND AVAILABILITY

Copies of this report are currently available upon request from NIOSH, Division of Standards Development and Technology Transfer, 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. Information regarding its availability through NTIS can be obtained from NIOSH, Publication Office, at the Cincinnati address.

1. New Renaissance Glass Works
2. NIOSH - Region IX
3. CAL-OSHA
4. Federal-OSHA

For the purpose of informing the affected employees, a copy of this report shall be posted in a prominent place accessible to the employees for a period of 30 calendar days.

TABLE I

PCB WIPE AND DUST SAMPLES
NEW RENAISSANCE GLASS WORKERS
OAKLAND, CALIFORNIA

APRIL 16, 1982

HETA 82-206

Field Number	Location/Description	Aroclor #1260(ng)	Concentration ng/100^2*
W-1	Dust Sample-from owners inner-office roof-top	5800	--
W-2	Ceiling bar for false ceiling where burning ballast was positioned.	42	--
W-3	Dark Room - Wall	31	--
W-4	Top of coke machine	130	130
W-5	Cashiers Station	44	44

* The upper background surface contamination level of 500 ng/100cm^2 might be used as a guideline to determine when PCB clean-up is necessary.

TABLE II

AIRBORNE PCB SAMPLES
NEW RENAISSANCE GLASS WORKS
OAKLAND, CALIFORNIA

APRIL 16, 1982

HETA 82-206

Location/Description	Time Period	Aroclor	Concentration ug/m^3
Counter where glass is cut.	1315-1345	1260	< 0.06
Dark Room-Mezzanine Level	1315-1350	1260	< 0.06
Inner-Office	1350-1430	1260	< 0.05
55-gallon drum (bulk air)	1400-1430	1242	$0.18 ug/m^3$

TABLE III

BULK CEMENT BLOCK SAMPLES
ANALYZED FOR CHLORDANE AND LINDANE
NEW RENAISSANCE GLASS WORKS
OAKLAND, CALIFORNIA

APRIL 16, 1983

HETA 82-206

Substance	Concentration (ppb)[1]	
	Lindane	Chlordane
Cinder block	ND[2]	345
Cinder block	ND	ND

ppb - parts per billion (weight to weight).

ND - none detected.

TABLE IV

SERUM 1242, 1254, AND 1260 VALUES
FROM EMPLOYEES OF RENAISSANCE GLASS WORKS

Sample I.D. No.	ng 1242/ml serum (ppb)	ng 1254/ml serum (ppb)	ng 1260/ml serum (ppb)
1	< 10, <10	20, 17	<10, <10
2	< 10	<10	<10
3	< 10	<10	<10
5	*	*	*
6	< 10	<10	<10
7	< 10	<10	<10
8	< 10	<10	<10
9	< 10	<10	<10
10	< 10	<10	<10
11	< 10, < 10	<10, 11	<10, <10
12	< 10	11	<10
13	< 10**	< 10**	< 10**
14	< 10	< 10	< 10

* Contents of culture tube lost in transit.

**Evidence indicated that some of the contents had leaked but sample analysis performed.

DEPARTMENT OF HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE
CENTERS FOR DISEASE CONTROL
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