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U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH
CINCINNATI, OHIO 45202

HEALTH HAZARD EVALUATION DETERMINATION REPORT 73-180/183-159
DOCUTEL CORPORATION
IRVING, TEXAS

NOVEMBER 1974

I. TOXICITY DETERMINATION

Based on the results of environmental evaluations on January 28-30, 1974, and medical monitoring on April 30, 1974, conducted by the National Institute for Occupational Safety and Health (NIOSH), it has been determined that a health hazard did not exist during the periods of evaluation. All environmental measurements were well below the 1973 Threshold Limit Values (TLV) and the established Federal standards for substances investigated in the hand soldering, welding, metal sanding, and degreasing operations. Personal observations made by both the Industrial Hygienist and physician indicated that there was no apparent health hazard in all areas observed in this investigation.

II. DISTRIBUTION AND AVAILABILITY

Copies of this hazard evaluation determination are available upon request from the Hazard Evaluation Services Branch, NIOSH, U.S. Post Office Building, Room 508, 5th and Walnut Streets, Cincinnati, Ohio 45202. Copies have been sent to:

(a) Docutel Corporation
(b) U.S. Department of Labor - Region VI
(c) NIOSH - Region VIII

This report should be posted in a prominent place accessible to the workers for a period of approximately thirty days.

III. INTRODUCTION

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 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 National Institute for Occupational Safety and Health received such a request from management at Docutel Corporation, Irving, Texas, to evaluate the potential hazards associated with the alleged exposures to metallic grinding dust, soldering fluid, petroleum oil fluid, cadmium, and welding fumes. Management also requested that NIOSH evaluate other areas in the plant where possible harmful exposures might exist.

IV. HEALTH HAZARD EVALUATION

A. Plant Process

Docutel Corporation is housed in three buildings:

1. Pioneer No. 1 Plant manufactures printed circuit boards. They are soldered automatically and then cleaned by an automatic degreasing unit. The degreasing agent used is methyl chloroform. The automatic soldering machine is separated from workers doing manual soldering in Pioneer No. 1 by a wall and considerable distance. Workers complaining of nasal irritation were located in the larger room where manual hand soldering was done. The solder used is composed of 63% tin and 37% lead with formaldehyde-type resin core. No other chemicals were used in this area.

2. Pioneer No. 2 Plant is mostly composed of abrasive finishing operations which are capable of generating large quantities of metallic dust. Personal samples were taken in this area, and chemical analyses for iron and total dust were performed.

3. Tarna Drive Plant manufactures automated banking and baggage handling systems. The major exposure in this area was to fumes. Personal samples were taken and analyzed for cadmium, lead, iron, and manganese.

B. Evaluation Design

In the three plants surveyed, there are approximately 250 workers. Environmental samples were taken in all three plants and were analyzed in the Salt Lake City NIOSH laboratory. All environmental measurements were well below established Federal standards and the 1973 TLVs. Medical evaluations were performed in Pioneer No. 1 plant, which was the only area requiring such evaluation. No disease of occupational origin was found. For actual concentrations of breathing zone contaminants found, please refer to the attached tables.

C. Evaluation Methods

Methyl chloroform samples were taken on organic vapor sampling tubes. Iron, manganese, lead, cadmium, and tin samples were taken on HA filters. Both personal and general room samples were collected.

D. Evaluation Criteria

The occupational health standards relevant to the substances of this evaluation, as promulgated by the U.S. Department of Labor (Federal Register, June 27, 1974), are as follows:

Substance	8-Hour Time Weighted Average mg/M^3	ACGIH 1973 TLVs mg/M^3	NIOSH Recommended Standard mg/M^3
Cadmium (fume)	0.1	0.05	
Lead	0.2	0.15	0.15
Tin	2.0	2.0	
Iron	10.0	5.0	
Manganese	5.0 "C"	5.0 "C"	
Methyl Chloroform	1900.0 (or 350 ppm)	1900.0 (or 350 ppm)	

mg/M^3 - milligrams of contaminant per cubic meter of air
ppm - parts of vapor or gas per million parts of contaminated air by volume
"C" - ceiling concentration and shall never be exceeded for any length of time

Occupational health standards are established at levels designed to protect individuals occupationally exposed to individual toxic substances on an 8-hour per day, 40-hour per week basis over a normal working lifetime.

E. Evaluation Results and Discussion

This evaluation was begun on January 28, 1974, and was finished on April 30, 1974. Two and one-half days were used for environmental sampling and one day for medical evaluation. Samples were taken on workers in the vicinity of a degreaser, using methyl chloroform, and on workers doing hand soldering in areas where workers were performing abrasive sanding and polishing and on welders. All concentrations were well below established Federal standards and also the 1973 TLVs. Methyl chloroform concentrations ranged from 12 to 118 ppm. Iron concentrations ranged from 0.01 to 0.47 mg/M^3. Cadmium concentrations were all less than 0.01 mg/M^3. Lead concentrations were all less than 0.02 mg/M^3. Manganese concentrations ranged from 0.001 to 0.04 mg/M^3. Tin ranged from less than 0.01 to 0.9 mg/M^3.

It is the opinion of the industrial hygienist and two physicians that there was no health hazard present at the time of this evaluation.

F. Medical Results and Discussion

On April 30, 1974, a NIOSH physician, accompanied by a consulting physician, performed physical examinations of workers in Pioneer No. 1 Plant of the Docutel Corporation, Irving, Texas. Workers in the area of hand soldering had previously complained of nasal irritation. Workers around the automatic soldering machines, as well as workers in the manual soldering area, were interviewed and asked non-directed and then directed questions about eye, nose, throat, skin, and lower respiratory tract symptoms. A physical examination, including examination of eye, nose, and throat, was performed. The subject was also asked if he knew of anyone working in the plant having physical problems.

Six women were interviewed, three of whom worked around the automatic soldering and degreasing machines and three who were working in the other room doing manual soldering. Symptomatology was elicited from only one worker who complained of a dry nose. A physical examination, including exam with a nasal speculum, found no abnormality. At the time of this survey, Docutel Corporation did not require pre-employment or periodic physical examinations. It was also observed that women were using a hand degreaser without hand or eye protection.

Medical Recommendation: From the medical observation, there appeared to be no health hazard from the hand soldering operation at Pioneer No. 1 Plant. NIOSH does recommend that pre-employment and annual physical examinations be performed. We also recommend that gloves and safety glasses always be worn when handling solvents.

G. Recommendations

1. Pre-employment and periodic physical examinations should be given to people working in this type of industry.

2. Environmental monitoring of the automatic soldering machine and degreaser should be an integral part of Docutel's safety and health program.

V. AUTHORSHIP AND ACKNOWLEDGMENT

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TABLE I
Breathing Zone and General Room Concentrations of Methyl Chloroform

DOCUTEL CORPORATION

Irving, Texas

January 28, 1974

Pioneer No. 1 Financial Systems Division

Job	Sample Vol/Ft.^{3}	Sample Number	Methyl Chloroform ppm
Flow Solderer	1.5	2 C	23
Group Leader 1	2.5	3 C	17
Group Leader 2	2.0	4 C	12
General Room	1.5	5 C	78
Supervisor	1.0	6 C	63
Electric Assembly	0.5	7 C	118
General Room	1.75	8 C	99
Electric Assembly	2.0	9 C	53
-----	BLANK	10 C	--
	Federal Standard		350

C - organic vapor sampling tube

TABLE II
Breathing Zone and General Room
Concentrations of Cadmium, Lead, and Tin

DOCUTEL CORPORATION
Irving, Texas

January 29, 1974

Pioneer No. 1 Financial Systems Division

Job	Sample Vol/Liters	Sample Number	Cadmium (Cd) mg/M^3	Tin (Sn) mg/M^3	Lead (Pb) mg/M^3
Flow Solderer	62.26	21 HA	< 0.001	0.4	< 0.01
Group Leader 2	46.70	31 HA	< 0.01	0.9	< 0.02
Supervisor	77.85	30 HA	< 0.002	0.5	< 0.03
General Room	360.0	32 HA	< 0.001	< 0.01	< 0.001
Electric Assembly	56.6	33 HA	< 0.002	< 0.05	< 0.01
----	BLANK	13 HA	---	---	---
Federal Standards			0.1	2.0	0.2

TABLE III
Breathing Zone and General Room Concentrations of Iron

DOCUTEL CORPORATION
Irving, Texas

January 29, 1974

Pioneer No. 2 Financial Systems Division

Job	Sample Vol/Liters	Sample Number	Iron (Fe_2O_3) mg/M^3
Sander	600	29	0.061
General Room	590	27	0.013
Federal Standard			10.0

TABLE IV
Breathing Zone and General Room Concentrations of
Cadmium, Lead, Iron, and Manganese

DOCUTEL CORPORATION

Irving, Texas

January 29, 1974

Tarna Drive Plant
Automated Banking and Baggage Handling Systems

Job	Sample Vol/Liters	Sample Number	Cadmium (Cd) mg/M^3	Lead (Pb) mg/M^3	Iron (Fe_2O_3) mg/M^3	Manganese (Mn) mg/M^3
Welder 1	404	24 HA	0.001	< 0.001	0.47	0.04
Welder 2	394	25 HA	< 0.001	< 0.001	0.09	0.005
Welder 3	384	23 HA	< 0.001	< 0.001	0.04	0.001
	Federal Standards		0.1	0.2	10.0	5.0