

INDUSTRIAL HYGIENE REPORT

1984

CHLORINATED SOLVENTS PLANT

LOUISIANA DIVISION

BY

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DO 010901
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CHLORINATED ORGANICS SURVEY

1984

CHLORINATED SOLVENTS PLANT

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INTRODUCTION

Chlorinated organics monitoring was conducted on four jobs and seven areas during 1984. The OT sampleman job was emphasized. The personnel and area samples were analyzed for carbon tetrachloride, perchloroethylene, propylene dichloride, ethylene dichloride, 2,3 dichloropropene and 1,1,2-trichloroethane.

MONITORING PROCEDURE

Calibrated Sipin SP-1 Personal sampler pumps were employed to monitor Solvents Block personnel. A pre-packaged 600 millimeter dual section activated charcoal glass tube* was attached to each pump by a 2' length of Tygon tubing. The charcoal sampler tube was then attached to the lapel of the worker to monitor his breathing zone.

SAMPLE PREPARATION

Samples were desorbed by transferring the activated charcoal from the front section of each tube into a 25 ml glass vial with a mininert valved top containing 10 ml carbon disulfide. Vials were then shaken ~~periodically~~ for ~~one hour~~ ^{2 minutes} prior to analysis.

SAMPLE ANALYSIS

A Perkin-Elmer, Model 3920 B, gas chromatograph equipped with a flame ionization detector was used for the analysis. This chromatograph was interfaced to a Hewlett-Packard, Model 21 MX computer which determined concentrations based on the integrated peak area.

Chromatographic constants are as follows:

Column: 6' x 1/8" ss 20% tricreasol phosphate on Chromasorb P, 60/80 mesh.

Temperature:	Oven	85°C
	Injector	150°C
	Detector	150°C

Carrier Gas: Helium

Range: X1

Sample Size: 2 microliters

Elution Times:	CS ₂	1.92 minutes
	Carbon Tetrachloride	3.62 minutes
	Ethylene Dichloride	6.60 minutes
	Propylene Dichloride	7.81 minutes
	2,3 Dichloropropene	8.51 minutes
	Perchloroethylene	10.61 minutes
	1,1,2 Trichloroethane	19.66 minutes

* SKC, Lot 107 charcoal tubes, 400 mg front section, 200 mg back section.

CALCULATIONS

The parts per million of each chlorinated hydrocarbon were calculated by the Hewlett-Packard computer. The accuracy of these calculations was verified by daily calibration with known external standards. The parts per million by weight were then converted to parts per million time weighted average exposures by volume using a separate computer program which utilized the following equation.

$$\text{ppm (v) air} = \frac{(\text{wt. of CS}_2(\text{g})) (.0821)(^{\circ}\text{K}) (\text{ppm from chromatogram})}{(\text{MW}) (\text{L})}$$

Where: CS₂ = used for desorption in grams.

.0821 = gas constant (converts grams to liters).

°K = degrees Kelvin (°C + 273) predominant ambient temperature during monitoring period.

MW = molecular weight of the specific chlorinated hydrocarbon.

L = liters of air sampled.

RESULTS AND DISCUSSION

The area and personnel time-weighted 8-hour average monitoring data indicated acceptable levels well below the established threshold limit values. More emphasis on excursion monitoring is recommended to better define problem areas and to insure that we are employing proper protective equipment. The data also would serve to encourage the proper use of the protective equipment.

CHLORINATED ORGANICS

	PER 50 ppm	TET 5 ppm	PDC 75 ppm	B-T 10 ppm	EDC 10 ppm	2-3 1 ppm	Comments
Mac McCraine	N/D	N/D	N/D	N/D	N/D	N/D	8 hours Warehouse office area
Huey White	.338	.218	.302	N/D	N/D	N/D	8 hours D-8C area
John Diaz	.257	.122	N/D	N/D	N/D	N/D	8 hours Sampleman
Rusty Carpenter	.107	N/D	N/D	N/D	N/D	N/D	8 hours Sampleman
Mike Didier	.083	N/D	N/D	N/D	.073	N/D	8 hours Maintenance by acid system
Craig Landry	.112	N/D	N/D	N/D	N/D	N/D	8 hours Sampleman

Areas

Washing Machine	.065	.012	N/D	N/D	N/D	N/D	8 hours
Boot Rack	.113	.073	N/D	N/D	N/D	N/D	8 hours
C5B BTMS Pump	3.02	.674	N/D	N/D	N/D	N/D	8 hours
D-67C	.572	.220	N/D	N/D	N/D	N/D	8 hours
T-4A&B	.161	.052	N/D	N/D	N/D	N/D	8 hours
D-15	.461	.103	N/D	N/D	N/D	N/D	8 hours
D-13	.364	.072	N/D	N/D	N/D	N/D	8 hours

N/D = Not Detected

Data results reported in ppm(v)

HEXACHLORINATED ORGANICS SURVEY

1984

CHLORINATED SOLVENTS PLANT

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INTRODUCTION

During 1984, area and personnel samples were collected for hexachlorinated organics-in-air. Eleven different areas and six operators were monitored with special emphasis being placed on the sampleman job.

Two hex wipe sampling surveys were conducted during the year. The first survey was conducted to compare results with surveys prepared during the previous two years and to determine if there was a continued favorable trend. The second survey was centered on five locations (four in the lunchroom and one in the red tag office). Three sets of samples were collected during a one-month period. The purpose of the survey was to see how consistent the results were, to gauge housekeeping and to determine if this area was a significant route of entry for personnel exposures.

ANALYTICAL PARAMETERS

A Varian, Model 4600, gas chromatograph equipped with a N_i 63 electron capture detector was used for the analyses. Chromatographic conditions were as follows:

Column: 30 meters, 1 micron film, 0.32 millimeter DB-5 Capillary Column

Temperatures: Oven: 120°C (5 minutes) programmed at 25°/min to 195°C

Detector: 300°C

Injector: 200°C

Carrier Gas: Helium

Make up Gas: Nitrogen

Injection Sample: 1 microliter

MONITORING PROCEDURE

SP-1 personal sampler pumps were worn by the employees while performing their normal duties. A 4" x 0.25" glass tube, prepacked with Poropak QS chromatographic column packing was attached to the end of a 2' length of Tygon tubing connected to the sample pump inlet. The tube assembly was attached to the employee's lapel as close as possible to the the person's breathing zone.

SAMPLE PREPARATION

Samples were desorbed by placing the Poropak packing into 10 ml of hexane and shaking periodically for one hour. Analysis was then performed by electron capture detector gas chromatography. The resulting peaks were measured via integrator computer. (Equipment is calibrated on a daily basis.)

CALCULATIONS

$$\text{ppb(v)} = \frac{\mu\text{g} \times 24.45 \times 1000}{\text{L} \times \text{MW} \times \text{RR}}$$

Where: μg = microgram from integrator data

24.45 = liters occupied by 1 mole of gas at
standard conditions

L = liters of air sampled

MW = molecular weight of component

RR = recovery rate of component

RESULTS AND DISCUSSION

Overall, the area and personnel hex-in-air monitoring results were satisfactory and indicated acceptable levels (see Table 1).

The hex area monitoring around the per tet reactor during the pre-heat procedure indicated the highest potential exposure levels. The 16.5 ppb(v) HCBd level recorded approaches the threshold limit value of 20 ppb(v).

The hex storage tanks monitoring results were in the 3 to 5 ppb(v) range for HCE and 0.9 to 1.4 ppb(v) for HCBd. The chlorine stripper column bottoms registered 2.6 ppb(v) HCE while the heavies feed evaporator indicated 1.5 ppb(v) HCE.

The remaining hex-in-air area monitoring results were all below 1 ppb(v).

The personnel sampling indicated that all monitoring results were well below the established threshold limit values (see Table 2).

Comparison of the hex wipe sampling data collected over the last three years revealed a favorable trend. Levels have been decreasing each year. The highest level recorded in 1984 was 320 nanograms per wipe which compares very favorably to 4340 nanograms per wipe in 1982 (see Table 3).

The follow-up hex wipe sampling survey, in which five locations were monitored, indicated very low levels with one exception. One monitored microwave oven averaged 150 nanograms per wipe for three samples. This was discussed with supervision and corrective action was taken (see Table 4).

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TABLE 1

HEXES

1984

	TLV 10 ppm HCE	TLV 20 ppb HCBZ	BLV* 150 ppb (Blood) HCBZ		Comments
<u>Area</u>					
Washing Machine	0.220	0.081	0.153	8 hours	
Boot Rack	0.460	0.170	0.200	8 hours	
C5B Bottoms	2.600	0.718	0.443	8 hours	
D-67-C	1.480	0.116	0.242	8 hours	
T-4A&B	0.715	0.091	0.316	8 hours	
D-15	3.414	0.940	0.380	8 hours	
D-13	4.650	1.370	0.130	8 hours	
R-1C North	3.000	0.088	0.081	8 hours	
South	104.000	16.500	5.516	8 hours	Samples collected during reactor preheat
East	4.000	0.098	0.090	8 hours	
West	11.000	0.119	0.109	8 hours	

TABLE 2

HEXES

1984

	TLV 10 ppm HCE	TLV 20 ppb HCBZ	BLV* 150 ppb (Blood) HCBZ		Comments
<u>Personnel</u>					
Huey White	1.115	0.875	0.585	8 hours	Working in DC-8 Area
John Diaz	1.200	0.515	0.310	8 hours	Sampleman
Rusty Carpenter	0.760	0.106	0.082	8 hours	Sampleman
Mike Didier	0.560	N/D	0.016	8 hours	Performaing maintenance on HCl system
Craig Landry	0.990	N/D	0.885	8 hours	Sampleman
"Mac" McCraine	0.027	N/D	0.195	8 hours	Material Controller

*Data results reported in ppb(v)

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TABLE 3
LOUISIANA DIVISION
WIFE SAMPLING RESULTS FOR CHLORINATED HEXES
CHLORINATED SOLVENTS PLANT

LOCATION	1982 HCBZ NG/WIPE	1983 HCBZ NG/WIPE	1984 HCBZ NG/WIPE
Bench top in work clothes side locker room	22	295	BLD
Floor near boot puller-boot rack	2960	334	120
Bench top on street clothes side locker room	183	98	BLD
Floor just inside street clothes side outside door	207	BLD	N/D
Inside refrigerator - bottom door shelf	280	282	260
Ledge inside drawer for sugar/spoons (lunchroom)	133	N/D	N/D
Floor in doorway from CR/offices to lunchroom	4276	127	320
Lunchroom table top (at 12:30 P.M.)	70	N/D	N/D
Microwave handle	134	144	BLD
Top of conduit on wall behind coffee counter	356	300	110
Blank	BLD	N/D	N/D
EDO Desk Top	211	97	N/D
Top of decwriter in control room	229	BLD	90
Drinking fountain in control room (where left hand would rest)	1470	BLD	BLD
Intercom handle in center of control room	87	N/D	N/D
Counter where mail is sorted (by Xerox)	BLD	N/D	N/D
Floor inside front door to offices	4340	742	100
C.R. Lab- keys on the 2621 & the calculator	173	107	BLD
Back hood in C.R. lab - front of ledge	851	BLD	N/D
Chair seat edge in control room	2840	N/D	N/D
P/T intercom handle at roadway intersection east of the shop	1390	195	N/D
Inside microwave		382	90

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TABLE 4

HEX WIPE SAMPLES (HCBZ) NANOGRAMS/WIPE

<u>Blank</u>	<u>Microwave North</u>	<u>Microwave South</u>	<u>Red Tag Office</u>	<u>Table Top South</u>	<u>Table Top North</u>
N.D	BLD	120	100	BLD	BLD
	100	170	BLD	BLD	BLD
	Removed	160	BLD	BLD	BLD

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CRAIG LANDRY
RALPH BUTLER
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At the meeting

Present
John H. Thibodeaux
[illegible]

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