

U.S. DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
CENTER FOR DISEASE CONTROL
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH
CINCINNATI, OHIO 45226

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HAZARD EVALUATION AND TECHNICAL ASSISTANCE REPORT
TA 79-58

MONTANA STATE DEPARTMENT OF HEALTH
PIERCE PACKING COMPANY
BILLINGS, MONTANA

JANUARY 1980

I. SUMMARY

On September 14, 1979 the National Institute for Occupational Safety and Health (NIOSH) and the Center for Disease Control (CDC) received a request to assist the Montana State Department of Health and Environmental Sciences in determining if any employees at the Pierce Packing Company, Billings, Montana, received a significant exposure to polychlorinated biphenyl (PCB) after an accidental spill of PCB had occurred in June 1979.

To evaluate the potential past exposure the following were accomplished on September 18 and 19: 1) the 16 exposed workers were interviewed and their skin was examined for chloracne; 2) blood samples were drawn from the 16 exposed workers and 16 control (non-exposed workers) and analyzed for PCB; and 3) a full biochemical profile, including liver function tests and blood lipids was done on the 16 exposed workers. Air samples were collected to evaluate the present air concentration of PCB.

The 16 exposed men (5 in the inedible department and 11 who worked there for short periods of time) showed no evidence of PCB poisoning by interview, skin examination and blood biochemical analyses. PCB air concentration showed no inhalation hazard existed at the time of sampling which was approximately 3 months after the spill. The blood tests did not reveal evidence of PCB related disease.

II. EVALUATION

A. Process and Conditions of Use

Sometime in June 1979 a spare electrical transformer stored in a covered area next to the Pierce Packing plant was accidentally ruptured. An estimated 140 to 200 gallons of the PCB transformer fluid leaked out and across a concrete pad into a drain. The drain fed into a temporary storage pit along with inedible pork waste from the packing plant. This material is pumped to the inedible department where it is processed into a poultry feed. The grease is skimmed off, and the residue is cooked. After cooking additional grease is squeezed out and the residue is dried. The resultant feed is then either bagged or loaded in bulk in a truck.

The 16 employees who were potentially exposed to PCB were the persons working in the area where the leak occurred, those working in the inedible department and the maintenance men who spent some time in the inedible department.

B. Environmental Methods

Air sampling for PCB consisted of collection of the vapors by drawing the air through a small sorbent tube containing Florisil at a rate of 1 lpm. The tube was preceded by a glass fiber filter which collected the particulates. The samples were analyzed for PCB by gas chromatographic techniques according to NIOSH method P&CAM 253.

C. Medical Methods

Blood samples were drawn from each individual and serum PCB levels were measured using gas chromatographic techniques. For exposed men only a serum sample was analyzed for a "chem-screen" profile (metpath laboratories) including calcium, phosphorus, blood urea nitrogen, creatinine, uric acid, total protein, albumin, globulin, total bilirubin, transaminase, alkaline phosphatase, lactic dehydrogenase, Iron, electrolytes, triglycerides, cholesterol and glucose.

The interviews consisted of a symptom questionnaire which related to a person's general health condition. The skin of the face and hands was examined for chloracne by a physician.

D. Results and Discussion

The 5 men who worked in the inedible section and the 11 potentially exposed men who worked there for short periods of time showed no evidence of PCB poisoning by interview or limited physical examination.

Two of the 5 men who may have been exposed showed a possible abnormality of serum triglycerides, which is probably not significant, since all participants did not fast properly before the samples were collected. The triglyceride test for the other 11 showed no abnormalities.

The PCB concentration in the blood of the 16 potentially exposed workers ranged from 4 to 11 parts of PCB per billion parts of blood (ppb) with a mean of 6.44, while in the control (non-exposed) workers the range was 2 to 30 ppb with a mean of 7.50 (table 1). The non-exposed group had a higher mean PCB blood concentration than the exposed group.

The blood test did not reveal evidence of PCB-related disease.

The PCB airborne vapor concentrations in the inedible department, collected approximately 3 months after the spill, were less than 1 ug cu m and the PCB particulate concentrations were less than 4 ug cu m (Table 2). The samples all contained less than the minimum detectable concentration of 0.5 ug for vapors and 2 ug for particulates.

The above results are what would be expected in this situation. The spill was a one-time occurrence. Once it got into the process chain the greatest portion would pass through the process in the first few days and would continually decrease after that until the equipment cleansed itself. It is expected this would decrease at an exponential rate, hence, any major inhalation or skin contact exposure would occur during the first few days. In addition, the process is basically an enclosed process that requires very little contact with the materials being processed.

On the basis of the data obtained in this investigation, NIOSH determined that the potentially exposed employees did not and are not now receiving a significant exposure to PCB by inhalation, ingestion or skin absorption. There are no recommendations offered at this time, as a firm specializing in clean-up of environmental spills has completed clean-up operations.

III. DISTRIBUTION AND AVAILABILITY OF DETERMINATION REPORT

Copies of this Determination report are currently available upon request from NIOSH Division of Technical Services, 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, Publications Office at the Cincinnati address.

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TABLE 1

PCB BLOOD CONCENTRATIONS
 PIERCE PACKING COMPANY
 BILLINGS, MONTANA

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Blood specimens were obtained from 16 out of 17 workers potentially exposed to PCB and matched for age, sex, race and skill classification (skilled manual, semi-skilled, and unskilled laborers), with 16 non-exposed workers. The results were as follows; workers are identified by survey numbers and results are totals as Aroclor 1260 (ppb).

<u>EXPOSED</u>		<u>NON-EXPOSED</u>	
<u>No.</u>	<u>PCB (ppb)</u>	<u>No.</u>	<u>PCB (ppb)</u>
1	5	26	3
2	8	31	12
3	4	34	9
4	11	21	4
6	4	25	10
7	9	23	6
8	4	22	8
9	9	24	7
10	4	30	4
11	4	29	4
12	7	35	30
13	7	36	2
14	5	27	2
15	9	33	10
16	6	32	6
<u>17</u>	<u>7</u>	<u>28</u>	<u>3</u>
MEAN (SD)	6.44 (2.28)	MEAN (SD)	7.50 (6.75)

"Normal" Mean: 8-10 ppb

Upper "Normal" Limit: 20 ppb

Coefficient of Variation of Method: 15%

TABLE 2
PCB AIR CONCENTRATIONS
PIERCE PACKING COMPANY
BILLINGS, MONTANA

TA 79-58
SEPTEMBER, 1979

6/11/89

LOCATION	SAMPLE NO.	SAMPLE TIME MIN.	SAMPLE VOLUME LITERS	ug PCB VAPOR per cu m	ug PCB PARTICULATES per cu m
Area Sample by Cooker	1	517	517	< 1*	< 4**
Breathing Zone of Cooker and Bagger Operation	2	517	517	< 1	< 4
Area Sample Next to Bagging Operation	3	529	529	< 1	< 4

* Less than detectable limits of 0.5 ug/sample

**Less than detectable limits of 2 ug/sample

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