17 7.3

The Commonwealth of Massachusetts

Executive Office of Manpower Affairs

Department of Labor and Industries

Division of Occupational Hygiene

39 Boylston Street, Boston 02116

NICHOLAS ROUSSOS
COMMISSIONER

IN YOUR REPLY
REFER TO FILE

C-281

December 17, 1976

Mr. Norman Butterworth
Manager of Industrial Engineering
Aerovox Industries
740 Belleville Avenue
New Bedford, Massachusetts 02741

Dear Mr. Butterworth:

Enclosed please find a copy of a report by our Chief of Chemical Services, Mr. Leonard D. Pagnotto, on his visit to your plant on December 2, accompanied by Safety Consultant Peter F. Noles of the Division of Industrial Safety, to evaluate the potential health hazard from polychlorinated biphenyls (Arochlor 1016) being used in your operations.

Atmospheric tests for Arochlor 1016 taken at the time of this visit were not indicative of a hazardous exposure. The results of the tests and the locations of testing are contained in the attached air analysis table.

The original chromatograms are being included with this report.

If you have any questions on the methods of air testing, analysis or other procedures, kindly advise us.

We appreciate your co-operation and the courtesy extended to the employees of this Department at the time of their visit.

Very truly yours,

Harold Bavley

Harold Bavley, P.E.
DIRECTOR

HB:BL
Enclosures

REPORT OF INDUSTRIAL HYGIENE STUDY
FOR
AEROVOX INDUSTRIES, INC.
NEW BEDFORD, MASSACHUSETTS

This report covers an industrial hygiene study conducted at the above plant on August 25, 1976. The purpose of this study was to evaluate potential employee exposures to chlorodiphenyls (aroclor No. 1016) during various plant operations.

SUMMARY OF RESULTS

Three samples were taken for a 2-hour period, and two samples in the tank room for approximately 1 hour and 45 minutes. With these relatively short sample times, a proper evaluation of an 8-hour time-weighted average cannot be made. However, it appears that the employees performing soldering operations and the employee loading the basket are exposed to aroclor vapors within the allowable limit of 1 milligram per cubic meter. The two employees working in the tank room who were sampled indicate somewhat higher exposures, but still below the allowable limit of 1 milligram per cubic meter.

RECOMMENDATIONS

IMPORTANT

76-8-1 Since many of the employees have been working with aroclor for a period of 15 years of more, it is recommended that all employees working with aroclors be given a complete physical which would include appropriate tests in order to determine if any of these employees have developed any liver disorders.

76-8-2 Since the unloading of tanks in the tank room is an intermittent operation, it is recommended that strict supervision be maintained to see to it that employees wear the approved type respirators available during these unloading operations.

76-8-3 The employees performing soldering operations many times position the parts in such a manner that it causes the local exhaust ventilation to be ineffective because the parts are located too far from the exhaust hood. Strict supervision should be maintained to see to it that employees perform the soldering operations directly in line with an under-the-exhaust hood so that any smoke given off during the soldering operations will be properly exhausted.

EQUIPMENT AND STUDY PROCEDURES

The MSA model G pumps were used in conjunction with preweighed filters. The pumps were worn by the employees, and the filters were positioned at the breathing zone of the workers during sampling. The Brooks No. 5 Rotometer was used in order to properly calibrate the flow rate on the pumps. Upon completion of sampling, the millepore filters were sent to the Industrial Hygiene Laboratory for accurate weighing. The Industrial Hygiene Laboratory is accredited by AIHA and licensed by the Department of HEW.

DISCUSSION OF RESULTS

The results of this study are indicated in the attached Table I. As was mentioned under STUDY PROCEDURES, samples were taken utilizing preweighed filters. This type of sampling is not specific for the aroclor vapors, as it is quite possible that other dusts could be involved on the filter weights. Excellent local exhaust ventilation is available in the area where soldering operations are performed, and local exhaust ventilation and general dilution ventilation is also available in the tank room where higher temperatures are involved. There is a definite odor of the aroclor in the areas where it is used. However, it is not offensive, nor does it produce any irritation of the eyes or upper respiratory passages.

In order to properly evaluate employee exposures to aroclor, longer samples should be taken at the breathing zone of the workers. Our Industrial Hygiene Laboratory is looking into the possibility of sampling methods which would be specific for the aroclor, and in the event a satisfactory method can be found, it will be utilized in further studies in your plant.

Respectfully submitted,

LUMBERMENS MUTUAL CASUALTY COMPANY

Ernest Neukuckatz

Ernest Neukuckatz
Senior Industrial Hygienist
Certified/Comprehensive Practise

The investigations which form the [illegible] report were made in accordance with [illegible] accepted industrial [illegible] limited to those [illegible] [illegible] federal regulations which may be applicable to such conditions.

TABLE I

ATMOSPHERIC AROCLOR VAPOR CONCENTRATIONS
AUGUST 25, 1976

AEROVOX INDUSTRIES, INC.
NEW BEDFORD, MASSACHUSETTS

SAMPLE NUMBER	LOCATION	TIME	CONCENTRATION mg/M^3[a] AROCLOR
[b] OSHA Allowable Limit (42% chlorine)			1
OSHA Allowable Limit (54% chlorine)			0.5
WORKER'S BREATHING ZONE			
H-404	Soldering operation (Lottie)	0940-1040	0.46
H-405	Soldering operation (Eliza)	0941-1041	0.33
H-406	Loading baskets (Judith)	0942-1042	0.26
H-407	Tank room worker (Dave)	0953-1140	0.76
H-408	Tank room worker (Tony)	0953-1140	0.67

[a] mg/M^3 - Atmospheric concentrations expressed in terms of milligrams of aroclor per cubic meter of air.

[b] The above allowable limits apply to chlorodiphenyls in general. The aroclor #1016 used in your plant is 41% chlorine.

C-281 December 17, 1976

TO: Mr. Bavley
FROM: Mr. Pagnotto
SUBJECT: Aerovox Industries, 740 Belleville Avenue, New Bedford
PERSON INTERVIEWED: Mr. Norman Butterworth, Manager of Industrial Engineering
DATE OF VISIT: December 2, 1976

This visit was made with Ins. Peter Noles of the Division of Industrial Safety in order to measure the concentration of polychlorinated biphenyls (Arochlor 1016) in the work environment. Arochlor 1016 is a product of Monsanto and contains 41% chlorine. It is used to impregnate capacitors.

The impregnating room houses thirty tanks (approximately 200-gallon capacity) into which assembled capacitors are introduced. The tanks are locked, heated to about 150° F., and brought under vacuum to remove all moisture from the capacitors. Arochlor 1016 is then pumped into the tanks (26 contained Arochlor and 4 were filled with mineral oil at the time of this visit), and the impregnation process is carried on for 24 to 60 hours. At the end of this period, the Arochlor is pumped out, passed through a filtering system located in the basement of the plant, and returned to storage until re-used. The impregnating tanks are then opened, unloaded, cleaned, and reloaded. The production cycle is arranged so that one or two impregnating tanks are opened on each shift (the department usually operates on three shifts).

After impregnation, the capacitors are taken to the fill-hole soldering department where the impregnation hole is sealed by soldering or introducing a silicone rubber plug. Excess oil is removed from the capacitors in a trichlorethylene degreaser, after which they are prepared for shipment.

There are currently 460 employees, 18 of which are in the impregnation department and 12 in the fill-hole soldering department.

Ventilation in the impregnating room is provided by nine 2' and two 4' ceiling fans. In addition, 8"-exhaust trunk lines are provided to each of the thirty impregnating tanks.

In addition to general ventilation, local exhaust ventilation is provided at six soldering stations in the fill-hole soldering department.

Air samples were collected on silica gel and bubblers (two in series) containing iso-octane. The iso-octane samples were analyzed directly by by gas chromatography; the silica gel samples were first extracted with a 20% ethyl ether-petroleum ether solution.

A Perkin-Elmer 3920B Gas Chromatograph, equipped with an electron capture Ni^{60} detector, and a 180 cm by 4 mm Pyrex 1.5% OV-17, 1.95% QF1 column were used under the following operating conditions:

Oven temperature	200° C.
Injector temperature	195° C.
Detector temperature	295° C.
Chart speed	1 cm/minute
Nitrogen flow	60 ml/minute

The chromatograms and a summary of our air analyses findings are enclosed. A comparison of the standard with the samples clearly identifies the presence of Arochlor. For quantitation the heights of five pronounced peaks were measured. Some of the reported results were recalculated and are somewhat higher than those reported to Mr. Butterworth by telephone earlier. Nevertheless, all of our findings are below the current maximum allowable concentration for polychlorinated biphenyls containing 42% chlorine. No recommendations are made. Exposures were controlled.

As you know, the use of polychlorinated biphenyls will be discontinued in 1977.

LP s

AIR ANALYSIS

LAB I.D.	MINUTES TIME	LITER/ MINUTE	LOCATION	COMMENT	AROCHLOR 1011 mg/m.3
6-780	8:45-10:30 a.m. (105)	3.0	IMPREGNATING ROOM	Sampler on David Fumo who unloaded one impregnator for 30 minutes. Rest of the time performed other duties.	.60
6-781	10:30-11:55 a.m. (85)	3.0	IMPREGNATING ROOM	Sampler on David Fumo who loaded one impregnator and performed other related work.	.82
6-782	9:07-10:28 a.m. (81)	1.5	IMPREGNATING ROOM	Near B and F, and 15-20' from tank that was opened at 10:15 a.m. and unloaded.	.50
6-783	9:25-10:30 a.m. (65)	1.3	IMPREGNATING ROOM	Over impregnating tank #4 and 30-40' away from tank opened at 10:15 a.m.	.36
6-784	9:48-10:52 a.m. (64)	3.0	FILL-HOLE SOLDERING DEPARTMENT	Sampler on Judith Fonseca who removed capacitors from baskets.	.40
6-785	9:52-11:04 a.m. (72)	3.0	FILL-HOLE SOLDERING DEPARTMENT	Sampler on Claudia Baptista who was soldering.	.41
6-786	10:05-11:04 a.m. (59)	1.0	FILL-HOLE SOLDERING DEPT	On post D207.	.27
6-787	12:25-1:25 p.m. (60)	3.0	FILL-HOLE SOLDERING DEPT	Sampler on Thelma Costa who was operating silicone bun machine.	.52
6-788	12:27-1:20 p.m. (53)	3.0	FILL-HOLE SOLDERING DEPT.	Sampler on Liza Dantis who was soldering.	.74
6-789	10:04-11:15 a.m. (71)	3.0	ASSEMBLY OFFICE	On desk in office.	.10
6-790	11:05 am-1:25 pm (140)	3.0	ASSEMBLY AREA	On cabinet.	.30
6-791	11:25 am-1:37 pm (132)	3.0	B-5B PUMP ROOM	On post.	.39
	MAXIMUM ALLOWABLE CONCENTRATION				1.0

Kemper Insurance Companies

150 Newport Avenue
North Quincy, MA 02171

617 | 328-2000

September 14, 1976

Mr. Norman Butterworth
Aerovox Industries, Inc.
740 Belleville Avenue
New Bedford, Massachusetts

Dear Mr. Butterworth:

The attached report covers the industrial hygiene study conducted in your plant on August 25, 1976. I believe the report to be self-explanatory. However, if there are any questions in regard to the report, please contact me.

Very truly yours,

LUMBERMENS MUTUAL CASUALTY COMPANY

Ernest Neukuckatz

Ernest Neukuckatz
Senior Industrial Hygienist
Certified/Comprehensive Practise

52