

3/4/69
March 4, 1969

Mr. Leon A. Woods
Department of Fish and Game
Pesticides Investigations
987 Jedsmith Drive
Sacramento, California 95819

Dear Mr. Woods:

In reply to your letter of February 27, I have enclosed a table showing the general physical properties of our Aroclors. At the bottom of this table I have added the results determined in oral toxicity studies with rats and the minimum lethal dose of the Aroclors when applied to the shaven skin of rabbits. You will notice that there is a difference in the manner in which the sample is administered due to the physical form of the sample, its viscosity, solubility, etc.

We believe that these data show that the Aroclors are not seriously toxic from the standpoint of acute single exposures.

A second enclosure is a reprint describing the results of chronic inhalation experiments on two of the Aroclors. This work has led to the establishment of a threshold limit value of 1.0 milligrams per cubic meter for Aroclor 1242 and 0.5 milligram per cubic meter for Aroclor 1254.

Perhaps I should point out that our designation of the Aroclors by numbers indicates the parent material and the degree of chlorine. For example the 1200 series are biphenyls chlorinated to various percentages. Thus, Aroclor 1242 is biphenyl chlorinated to the extent of 42%; Aroclor 1254 is biphenyl chlorinated to 54%. The series beginning with the numerals 24 and 44 are

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blends of chlorinated biphenyls and chlorinated triphenyls.
The 54 series are chlorinated triphenyls.

All of the Aroclors are practically insoluble in water. For example Aroclor 1242 is soluble in water at 25°C only to the extent of 293 plus or minus 10 parts per billion; Aroclor 1248 106 plus or minus 14 ppt and Aroclor 1254 50 plus or minus 2 ppt. Obviously increasing the chlorine content decreases the solubility of the material.

If I can be of any further assistance, please let me know.

Sincerely,

Elmer P. Wheeler
Manager, Environmental Health

EPW:cjs

Enclosures

cc: W. R. Richard
P. C. Burgen
R. E. Keller
S. Tucker
J. E. Springgate
L. H. Payton

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General Physical Properties of the Aroclor® Chlorinated Compounds

Form.....	Aroclor 1221 Colorless mobile oil	Aroclor 1232 Practically colorless mobile oil	Aroclor 1242 Practically colorless mobile oil	Aroclor 1248 Colorless to light yellow- green, clear, mobile oil	Aroclor 1254 Light yellow viscous oil	Aroclor 1260 Light yellow soft sticky resin	Aroclor 1252 Light yellow sticky clear resin	Aroclor 1268 White to off-white powder	Aroclor 4465 Light-yellow, clear, brittle resin	Aroclor 5442 Yellow trans- parent sticky resin	Aroclor 5460 Clear, yellow- to-amber, brittle resin	Aroclor 2565 Black, opaque, brittle resin
Color.....	50 Max. (APHA)	50 Max. (APHA)	50 Max. (APHA)	50 Max. (APHA)	50 Max. (APHA)	50 max. (APHA)	50 Max. (APHA)	1.5 Max. NPA (molten)	2 Max. NPA (molten)	2 Max. NPA (molten)	2 Max. NPA (molten)	—
Acidity — Maximum (Mgm. KOH per Gm.)....	0.014	0.014	0.010	0.010	0.010	0.014	0.014	0.05	0.05	0.05	0.05	1.4
Average Coefficient of Expansion.....cc/cc/°C	0.00071 (15°-40°C)	0.00073 (25°-100°C)	0.00068 (25°-65°C)	0.00070 (25°-65°C)	0.00066 (25°-65°C)	0.00067 (20°-100°C)	0.00064 (25°-65°C)	0.00067 (20°-100°C)	0.00061 (25°-65°C)	0.00123 (25°-99°C)	0.00179 (25°-124°C)	0.00055 (25°-65°C)
Typical Density Specific Gravity..... Pounds per gallon — 25°C(77°F).....	1.182-1.192 (25°/15.5°C) 9.85	1.270-1.280 (25°/15.5°C) 10.55	1.381-1.392 (25°/15.5°C) 11.50	1.405-1.415 (65°/15.5°C) 12.04	1.495-1.505 (65°/15.5°C) 12.82	1.555-1.565 (90°/15.5°C) 13.50	1.572-1.583 (90°/15.5°C) 13.72	1.804-1.811 (25°/25°C) 15.09	1.570 (25°/25°C) 13.91	1.470 (25°/25°C) 12.24	1.670 (25°/25°C) 13.91	1.734 (25°/25°C) 14.44
Distillation Range — ASTM D-20 (Mod.) Corr. °C.....	275°-320°	290°-325°	325°-365°	340°-375°	365°-395°	385°-420°	395°-425°	435°-450°	230°-320° at 4 mm. Hg.	215°-300° at 4 mm. Hg.	280°-335° at 5 mm. Hg.	—
Evaporation Loss — % — ASTM D-5 Mod. 163°C..... 100°C.....	— 1.0 to 1.5	— 1.0 to 1.5	3.0 to 3.6 0.0 to 0.4	3.0 to 4.0 0.0 to 0.3	1.1 to 1.3 0.0 to 0.2	0.5 to 0.8 0.0 to 0.1	0.5 to 0.6 0.0 to 0.1	0.1 to 0.2 0.0 to 0.06	0.2 to 0.3 0.0 to 0.02	0.2 0.01	0.03 1.5 to 1.7 (at 260°-5 hrs.)	0.2 to 0.3 —
Flash Point — Cleveland Open Cup.....°C °F.....	141°-150° 286°-302°	152°-154° 305°-310°	176°-180° 348°-356°	193°-196° 379°-384°	None	None	None	None	None	247° 477°	None	None
Fire Point — Cleveland Open Cup.....°C °F.....	176° 349°	238° 460°	None*	None	None	None	None	None	None	> 350° > 662°	None	None
Pour Point — ASTM D-97.....°C °F.....	Crystals at 1°C Crystals at 34°F	-35.5° -32°	-19° 2°	-7° 19.4°	10° 50°	31° 85°	35°-38° 99°	— —	— —	46° 115°	— —	— —
Softening Point — ASTM E-28.....°C °F.....	— —	— —	— —	— —	— —	— —	— —	150° to 170° (hold pt.) 302° to 338° (hold pt.)	60° to 66° 140° to 151°	46° to 52° 115° to 126°	98° to 105.5° 208° to 222°	66° to 72° 149° to 162°
Refractive Index — D-line — 20°C.....	1.617-1.618	1.620-1.622	1.627-1.629	1.630-1.631	1.639-1.640	1.647-1.649	1.6501-1.6517	—	1.664-1.667	—	1.660-1.665	—
Viscosity — Saybolt Universal 210°F (98.9°C) Sec. (ASTM — D-88) 130°F (54.4°C) 100°F (37.8°C)	30-31 35-37 38-41	31-32 39-41 44-51	34-35 49-56 82-92	36-37 73-80 185-240	44-48 260-340 1800-2500	72-78 3200-4500 —	85-100 600-850 (160°F or 71°C)	— — —	90-150 (260°F or 130°C) — —	300-430 — —	— — —	— — —
Oral LD ₅₀ -rats (approx.) Skin MLD-rabbits-mg/kg administered	3980* >2000* <3160*	4470* >1250* <2000*	8650* >794* <1260*	11,000* >794* <1260*	11,900* >1260* <2000*	10,000** 1260** 2000**	11,300** >1260** <3160**	10,900** >2510*** 3160**	16,000** >2000** <3160**	10,600** >1260** <2000**	19,200# >7940#	6,310## >2000## <3160

*undiluted ** administered as 50% soln. in corn oil # 33/35 in corn oil 20% soln. in corn oil ### 10% soln. in corn oil