APPENDIX H

PCB CONGENERS AND HOMOLOG GROUP LIST (ATSDR, 1997a)

Table 3-2. Chemical Identity of Polychlorinated Biphenyl Congeners

IUPAC No.[a]	Compound/substituents	CAS No.[b]
Monochlorobiphenyl		27323-18-8
1	2	2051-60-7
2	3	2051-60-8
3	4	2051-60-9
Dichlorobiphenyl		25512-42-9
4	2,2′	13029-08-8
5	2,3	16605-91-7
6	2,3′	25569-80-6
7	2,4	33284-50-3
8	2,4′	34883-43-7
9	2,5	34883-39-1
10	2,6	33146-45-1
11	3,3′	2050-67-1
12	3,4	2974-92-7
13	3,4′	2974-90-5
14	3,5	34883-41-5
15	4,4′	2050-68-2
Trichlorobipheyl		25323-68-6
16	2,2′,3	38444-78-9
17	2,2′,4	37680-66-3
18	2,2′,5	37680-65-2
19	2,2′,6	38444-73-4
20	2,3,3′	38444-84-7
21	2,3,4	55702-46-0
22	2,3,4′	38444-85-8
23	2,3,5	55720-44-0
24	2,3,6	58702-45-9
25	2,3′,4	55712-37-3
26	2,3′,5	38444-81-4
27	2,3,6	38444-76-7
28	2,4,4′	7012-37-5
29	2,4,5	15862-07-4
30	2,4,6	35693-92-6
31	2,4′,5	16606-02-3
32	2,4′,6	38444-77-8
33	2′,3,4	38444-86-9
34	2′,3,5	37680-68-5
35	3,3′,4	37680-69-6

Table 3-2. Chemical Identity of Polychlorinated Biphenyl Congeners (continued)

IUPAC No.[a]	Compound/substituents	CAS No.[b]
36	3,3',5	38444-87-0
37	3,4,4'	38444-90-5
38	3,4,5	53555-66-1
39	3,4',5	38444-88-1
Tetrachlorobiphenyl		26914-33-0
40	2,2',3,3'	38444-93-8
41	2,2',3,4	52663-59-9
42	2,2',3,4'	36559-22-5
43	2,2',3,5	70362-46-8
44	2,2',3,5'	41464-39-5
45	2,2',3,6	70362-45-7
46	2,2',3,6'	41464-47-5
47	2,2',4,4'	2437-79-8
48	2,2',4,5	70362-47-9
49	2,2',4,5'	41464-40-8
50	2,2',4,6	62796-65-8
51	2,2',4,6'	64194-04-7
52	2,2',5,5'	35693-99-3
53	2,2',5,6'	41464-41-9
54	2,2',6,6'	15968-05-5
55	2,3,3',4	74338-24-2
56	2,3,3',4'	41464-43-1
57	2,3,3',5	70424-67-8
58	2,3,3',5'	41464-49-7
59	2,3,3',6	74472-33-6
60	2,3,4,4'	33025-41-1
61	2,3,4,5	33284-53-6
62	2,3,4,6	54230-23-7
63	2,3,4',5	74472-35-8
64	2,3,4',6	52663-58-8
65	2,3,5,6	33284-54-7
66	2,3',4,4'	32698-10-0
67	2,3',4,5	73575-53-8
68	2,3',4,5'	73575-52-7
69	2,3',4,6	60233-24-1
70	2,3',4',5	32598-11-1
71	2,3',4',6	41464-46-4
72	2,3',5,5'	41464-42-0

Table 3-2. Chemical Identity of Polychlorinated Biphenyl Congeners (continued)

IUPAC No.[a]	Compound/substituents	CAS No.[b]
73	2,3',5',6	743338-23-1
74	2,4,4',5	32690-93-0
75	2,4,4',6	32598-12-2
76	2',3,4,5	70362-48-0
77	3,3',4,4'	32598-13-3
78	3,3',4,5	70362-49-1
79	3,3',4,5'	41464-48-6
80	3,3',5,5'	33284-52-5
81	3,4,4',5	70362-50-4
Pentachlorobiphenyl		25429-29-2
82	2,2',3,3',4	52663-62-4
83	2,2',3,3',5	60145-20-2
84	2,2',3,3',6	52663-60-2
85	2,2',3,4,4'	65510-45-4
86	2,2',3,4,5	55312-69-1
87	2,2',3,4,5'	38380-02-8
88	2,2',3,4,6	55215-17-3
89	2,2',3,4,6'	73575-57-2
90	2,2',3,4',5	68194-07-0
91	2,2',3,4',6	58194-05-8
92	2,2',3,5,5'	52663-61-3
93	2,2',3,5,6	73575-56-1
94	2,2',3,5,6'	73575-55-0
95	2,2',3,5',6	38379-99-6
96	2,2',3,6,6'	73575-54-9
97	2,2',3',4,5	41464-51-1
98	2,2',3',4,6	60233-25-2
99	2,2',3',4',5	38380-01-7
100	2,2',4',4',6	39485-83-1
101	2,2',4,5,5'	37680-73-2
102	2,2',4,5,6'	68194-06-9
103	2,2',4,5',6	61045-21-3
104	2,2',4,6,6'	56558-16-8
105	2,3,3',4,4'	32598-14-4
106	2,3,3',4,5	70424-69-0
107	2,3,3',4',5	70424-68-9
108	2,3,3',4,5'	70362-41-3
109	2,3,3',4,6	74472-35-8

Table 3-2. Chemical Identity of Polychlorinated Biphenyl Congeners (continued)

IUPAC No.[a]	Compound/substituents	CAS No.[b]
110	2,3,3',4',6	38380-03-9
111	2,3,3',5,5'	39635-32-0
112	2,3,3',5,6	74472-36-9
113	2,3,3',5',6	68194-10-5
114	2,3,4,4',5	74472-37-0
115	2,3,4,4',6	74472-38-1
116	2,3,4,5,6	18259-05-7
117	2,3,4',5,6	68194-11-6
118	2,3',4,4',5	31508-00-6
119	2,3',4,4',6	56558-17-9
120	2,3',4,5,5'	68194-12-7
121	2,3',4,5',6	56558-18-0
122	2',3,3',4,5	76842-07-4
123	2',3,4,4',5	65510-44-3
124	2',3,4,5,5'	70424-70-3
125	2',3,4,5,6'	74472-39-2
126	3,3',4,4',5	57465-28-8
127	3,3',4,5,5'	39635-33-1
Hexachlorobiphenyl		26601-64-9
128	2,2',3,3',4,4'	38380-07-3
129	2,2',3,3',4,5	55215-18-4
130	2,2',3,3',4,5'	52663-3-66-8
131	2,2',3,3',4,6	61798-70-7
132	2,2',3,3',4,6'	38380-05-1
133	2,2',3,3',5,5'	35694-04-3
134	2,2',3,3',5,6	52704-70-8
135	2,2',3,3',5,6'	52744-13-5
136	2,2',3,3',6,6'	38411-22-2
137	2,2',3,4,4',5	35694-06-5
138	2,2',3,4,4',5'	35065-28-2
139	2,2',3,4,4',6	56030-56-9
140	2,2',3,4,4',6'	59291-64-4
141	2,2',3,4,5,5'	52712-04-6
142	2,2',3,4,5,6	41411-61-4
143	2,2',3,4,5,6'	68194-15-0
144	2,2',3,4,5',6	68194-14-9
145	2,2',3,4',6,6'	74472-40-5
146	2,2',3,4',5,5'	51908-16-8

Table 3-2. Chemical Identity of Polychlorinated Biphenyl Congeners (continued)

IUPAC No.[a]	Compound/substituents	CAS No.[b]
147	2,2′,3,4′,5,6	68194-13-8
148	2,2′,3,4′,5,6′	74472-42-7
149	2,2′,3,4′,5′,6	38380-04-0
150	2,2′,3,4′,5,6′	68194-08-1
151	2,2′,3,5,5′,6	52663-63-5
152	2,2′,3,5,6,6′	68194-09-2
153	2,2′,4,4′,5,5′	35065-27-1
154	2,2′,4,4′,5,6′	60145-22-4
155	2,2′,4,4′,6,6′	33979-03-2
156	2,3,3′,4,4′,5	38380-08-4
157	2,3,3′,4,4′,5′	69782-90-7
158	2,3,3′,4,4′,6	74472-42-7
159	2,3,3′,4,5,5′	39635-35-3
160	2,3,3′,4,5,6	41411-62-5
161	2,3,3′,4,5′,6	74472-43-8
162	2,3,3′,4′,5,5′	39635-34-2
163	2,3,3′,4′,5,6	74472-44-9
164	2,3,3′,4′,5′,6	74472-45-0
165	2,3,3′,5,5′,6	74472-46-1
166	2,3,4,4′,5,6	41411-63-6
167	2,3′,4,4′,5,5′	52663-72-6
168	2,3′,4,4′,5′,6	59291-65-5
169	3,3′,4,4′,5,5′	32774-16-6
Heptachlorobiphenyl		28655-71-2
170	2,2′,3,3′,4,4′,5	35065-30-6
171	2,2′,3,3′,4,4′,6	52663-71-5
172	2,2′,3,3′,4,5,5′	52663-74-8
173	2,2′,3,3′,4,5,6	68194-16-1
174	2,2′,3,3′,4,5,6′	38411-25-5
175	2,2′,3,3′,4,5′,6	40186-70-7
176	2,2′,3,3′,4,6,6′	52663-65-7
177	2,2′,3,3′,4′,5,6	52663-70-4
178	2,2′,3,3′,5,5′,6,	52663-67-9
179	2,2′,3,3′,5,6,6′	52663-64-6
180	2,2′,3,4,4′,5,5′	35065-29-3
181	2,2′,3,4,4′,5,6	74472-47-2
182	2,2′,3,4,4′,5,6′	60145-23-5
183	2,2′,3,4,4′,5′,6	52663-69-1

Table 3-2. Chemical Identity of Polychlorinated Biphenyl Congeners (continued)

IUPAC No.[a]	Compound/substituents	CAS No.[b]
184	2,2',3,4,4',6,6'	74472-48-3
185	2,2',3,4,5,5',6	52712-05-7
186	2,2',3,4,5,6,6'	74472-49-4
187	2,2',3,4',5,5',6	52663-68-0
188	2,2',3,4',5,6,6'	74487-85-7
189	2,3,3',4,4',5,5'	39635-31-9
190	2,3,3',4,4',5,6	41411-64-7
191	2,3,3',4,4',5',6	74472-50-7
192	2,3,3',4,5,5',6	74472-51-8
193	2,3,3',4',5,5',6	69782-91-8
Octachlorobiphenyl		31472-83-0
194	2,2',3,3',4,4',5,5'	35694-08-7
195	2,2',3,3',4,4',5,6	52663-78-2
196	2,2',3,3',4,4',5,6'	42740-50-1
197	2,2',3,3',4,4',6,6'	33091-17-7
198	2,2',3,3',4,5,5',6	68194-17-2
199	2,2',3,3',4,5,5',6'	52663-75-9
200	2,2',3,3',4,5,6,6'	52663-73-7
201	2,2',3,3',4,5',6,6'	40186-71-8
202	2,2',3,3',5,5',6,6'	2136-99-4
203	2,2',3,4,4',5,5',6	52663-76-0
204	2,2',3,4,4',5,6,6'	74472-52-9
205	2,3,3',4,4',5,5',6	74472-53-0
Nonachlorobiphenyl		53742-07-7
206	2,2',3,3',4,4',5,5',6	40186-72-9
207	2,2',3,3',4,4',5,6,6'	52663-79-3
208	2,2',3,3',4,5,5',6,6'	52663-77-1
Decachlorobiphenyl		2051-24-3
209	2,2',3,3',4,4',5,5',6,6'	2051-24-3

[a] Ballschmiter and Zell 1980
[b] Erickson 1985

Table 3-4. Approximate Weight Percent of Chlorobiphenyl in Some Aroclors

Empirical Formula	Aroclor 1016	Aroclor 1221	Aroclor 1232[a]	Aroclor 1242	Aroclor 1248[a]
$C_{12}H_{10}$	Not detected	10	Not detected	Not detected	Not detected
$C_{12}H_9Cl$	2	50	26	1	Not detected
$C_{12}H_8Cl_2$	19	35	29	13	1
$C_{12}H_7Cl_3$	57	4	24	45	2
$C_{12}H_6Cl_4$	22	1	15	31	49
$C_{12}H_5Cl_5$	Not detected	Not detected	Not detected	10	27
$C_{12}H_4Cl_6$	Not detected	Not detected	Not detected	Not detected	2
$C_{12}H_3Cl_7$	Not detected	Not detected	Not detected	Not detected	Not detected
$C_{12}H_2Cl_8$	Not detected	Not detected	Not detected	Not detected	Not detected
$C_{12}H_1Cl_9$	Not detected	Not detected	Not detected	Not detected	Not detected
Average molecular mass	257.9	200.7	232.2	266.5	299.5

Empirical formula	Aroclor 1254[a]	Aroclor 1260	Aroclor 1262	Aroclor 1268
$C_{12}H_{10}$	Not detected	Not detected	No data	No data
$C_{12}H_9Cl$	Not detected	Not detected	No data	No data
$C_{12}H_8Cl_2$	Not detected	Not detected	No data	No data
$C_{12}H_7Cl_3$	1	Not detected	No data	No data
$C_{12}H_6Cl_4$	15	Not detected	No data	No data
$C_{12}H_5Cl_5$	53	12	No data	No data
$C_{12}H_4Cl_6$	26	42	No data	No data
$C_{12}H_3Cl_7$	4	38	No data	No data
$C_{12}H_2Cl_8$	Not detected	7	No data	No data
$C_{12}H_1Cl_9$	Not detected	1	No data	No data
Average molecular mass	328.4	375.7	389	453

[a] Compounds that contributed the remaining composition were not given.

Source: derived from Ballschmiter et al. 1989

Table 3-5. PCB Congener Compositions (in mol%) in Aroclors[a]

IUPAC No.	Chlorine substitution pattern	Aroclor				
		1242	1016	1248	1254	1260
	BP	0.01	0.50	—[b]	—	—
1	2	0.68	0.80	—	—	—
2	3	0.04	0.10	—	—	—
3	4	0.22	1.00	—	—	—
4	2,2′	3.99	4.36	0.25	—	—
6	2,3′	1.24	1.37	0.69	0.07	—
7	2,4	1.04	1.16	—	—	—
8	2,4′	8.97	10.30	0.18	—	—
9	2,5	0.31	0.34	trace	—	—
10	2,6	0.13	0.20	—	—	—
12	3,4	0.09	0.11	—	—	—
13	3,4′	0.12	0.12	—	—	—
14	3,5	0.35	0.37	—	—	—
15	4,4′	0.99	1.07	—	—	—
16	2.3,2′	3.25	3.50	0.84	—	—
17	2,4,2′	2.92	3.14	0.19	—	—
18	2,5,2′	9.36	10.87	9.95	0.07	—
19	2,6,2′	0.97	1.08	—	—	—
20	2,3,3′	3.64	3.99	—	—	—
22	2,3,4′	2.64	2.80	1.24	trace	trace
25	2,4,3′	1.68	1.79	—	—	—
26	2,5,3′	0.55	0.62	0.75	—	—
27	2,6,3′	0.54	0.58	—	—	—
28	2,4,4′	13.30	14.48	trace	—	—
31	2,5,4′	4.53	4.72	9.31	0.72	—
32	2,6,4′	2.15	2.31	1.46	—	—
33	3,4,2′	2.83	3.08	—	—	—
35	3,4,3′	0.66	0.38	—	—	—
37	3,4,4′	1.62	1.89	1.28	0.20	0.09
39	3,5,4′	1.03	1.08	—	—	—
40	2,3,2′,3′	0.15	0.18	1.12	0.26	0.04
41	2,3,4,2′	1.67	2.00	—	—	—
42	2,3,2′,4′	—	—	7.05	2.18	0.66
43	2,3,5,2′	0.44	0.47	—	—	—
44	2,3,2′,5′	1.06	1.14	—	—	—

Table 3-5. PCB Congener Compositions (in mol%) in Aroclors[a] (continued)

IUPAC No.	Chlorine substitution pattern	Aroclor 1242	Aroclor 1016	Aroclor 1248	Aroclor 1254	Aroclor 1260
45	2,3,6,2′	0.90	1.00	5.73	0.15	—
46	2,3,2′,6′	0.31	0.33	—	—	—
47	2,4,2′,4′	1.65	1.8	3.18	0.52	0.88
48	2,4,5,2′	1.33	1.41	—	—	—
49	2,4,2′,5′	3.28	3.48	3.81	1.63	0.44
52	2,5,2′,5′	4.08	4.35	8.36	4.36	1.91
53	2,5,2′,6′	0.97	1.07	6.30	0.13	—
54	2,6,2′,6′	0.17	0.19	—	—	—
55	2,3,4,3′	—	—	0.11	0.43	0.12
56	2,3,3′,4′	0.60	trace	0.18	0.03	—
60	2,3,4,4′	0.21	—	—	—	—
66	2,4,3′,4′	0.81	0.14	4.95	2.24	0.22
70	2,5,3′,4′	1.11	—	6.38	4.75	0.85
71	2,6,3′,4′	—	—	0.65	—	—
72	2,5,3′,5′	0.33	—	2.10	1.01	0.28
74	2,4,5,4′	2.02	1.35	0.25	0.30	0.09
75	2,4,6,4′	2.18	2.40	—	—	—
76	3,4,5,2′	trace	—	trace	0.18	0.01
77	3,4,3′,4′	0.34	—	0.47	0.12	0.04
78	3,4,5,3′	0.52	—	—	—	—
79	3,4,3′,5′	0.24	—	trace	0.23	0.04
80	3,5,3′,5	—	—	trace	trace	trace
81	3,4,5,4′	0.28	—	—	—	—
83	2,3,5,2′,3′	—	—	trace	0.32	0.09
84	2,3,6,2′,3′	0.38	0.01	0.71	1.72	0.69
85	2,3,4,2′,4′	0.40	—	0.55	2.15	0.31
87	2,3,4,2′,5′	0.09	—	1.05	3.81	1.10
91	2,3,6,2′,4′	trace	—	1.78	5.00	3.22
92	2,3,5,2′,5′	0.12	0.20	0.63	0.21	—
95	2,3,6,2′,5′	0.53	0.18	—	—	—
97	2,4,5,2′,3′	—	—	0.78	2.59	0.63
98	2,4,6,2′,3′	0.13	0.04	—	—	—
99	2,4,5,2′,4′	0.55	—	2.52	6.10	0.82
101	2,4,5,2′,5′	0.27	—	1.50	6.98	5.04
102	2,4,5,2′,6′	—	—	trace	trace	trace
105	2,3,4,3′,4′	0.25	—	—	—	—

Table 3-5. PCB Congener Compositions (in mol%) in Aroclors[a] (continued)

IUPAC No.	Chlorine substitution pattern	Aroclor				
		1242	1016	1248	1254	126(
106	2,3,4,5,3′	—	—	—	0.40	0.0
108	2,3,4,3′,5′	0.46	0.16	0.02	0.55	0.1
110	2,3,6,3′,4′	—[c]	—	1.69	8.51	3.5
113	2,3,6,3′,5′	0.39	0.01	3.10	trace	0.01
114	2,3,4,5,4′	—	—	—	0.25	0.0
118	2,4,5,3′,4′	—[c]	—	—[c]	8.09	2.0
120	2,4,5,3′,5′	0.31	—	trace	0.15	3.01
121	2,4,6,3′,5′	0.92	—	4.32	3.51	0.57
122	3,4,5,2′,3′	—	—	trace	0.76	1.88
123	3,4,5,2′,4′	0.36	—	—	—	—
126	3,4,5,3′,4′	0.03	—	—	0.16	1.59
127	3,4,5,3′,5′	0.05	—	—	—	—
128	2,3,4,2′,3′,4′	—	—	—	1.31	0.47
131	2,3,4,6,2′,3′	—	—	—	0.14	0.01
132	2,3,4,2′,3′,6′	—	—	trace	2.00	2.77
133	2,3,5,2′,3′,5′	—	—	1.13	0.03	0.06
134	2,3,5,6,2′,3′	—	—	0.11	0.38	1.01
135	2,3,5,2′,3′,6′	—	trace	0.20	0.29	—
136	2,3,6,2′,3′,6′	—	—	0.20	0.34	1.12
138	2,3,4,2′,4′,5′	0.08	—	0.19	4.17	5.01
143	2,3,4,5,2′,6′	0.07	—	—	—	—
148	2,3,5,2′,4′,6′	—	—	0.12	0.07	0.06R
149	2,4,5,2′,3′,6′	—	—	0.77	3.59	9.52
151	2,3,5,6,2′,5′	—	—	trace	0.33	0.06
153	2,4,5,2′,4′,5′	0.02	—	0.13	3.32	8.22
154	2,4,5,4′,6′	—	—	—	0.14	—
156	2,3,4,5,3′,4′	—	—	—	—	0.41
157	2,3,4,3′,4′,5′	—	—	—	0.18	0.03
158	2,3,4,6,3′,4′	—	—	—	0.46	0.18
159	2,4,5,2′,3′,5′	—	—	—	0.75	1.48
163	2,3,5,6,3′,4′	—	—	—	—	trace
167	2,4,5,3′,4′,5′	—	—	—	0.21	0.17
168	2,4,6,3′,4′,5′	—	—	0.56	4.23	0.59
170	2,3,4,5,2′,3′,4′	—	—	—	0.43	0.62
171	2,3,4,6,2′,3′,4′	—	—	—	0.30	4.31
174	2,3,4,5,2′,3′,6′	—	—	—	trace	0.09

Table 3-5. PCB Congener Compositions (in mol%) in Aroclors[a] (continued)

IUPAC No.	Chlorine substitution pattern	Aroclor 1242	1016	1248	1254	1260
176	2,3,4,6,2′,3′,6′	—	—	0.09	trace	0.57
177	2,3,5,6,2′,3′,4′	—	—	—	—	trace
179	2,3,5,6,2′,3′,6′	—	—	—	0.56	0.83
180	2,3,4,5,2′,4′,5′	—	—	—	0.76	7.20
181	2,3,4,5,6,2′,4′	—	—	—	0.28	2.72
182	2,3,4,5,2′,4′,6′	—	—	—	trace	0.47
183	2,3,4,6,2′,4′,5′	—	—	—	1.16	2.58
185	2,3,4,5,6,2′,5′	—	—	—	1.11	5.65
186	2,3,4,5,6,2′,6′	—	—	trace	trace	0.37
187	2,3,5,6,2′,4′,5′	—	—	—	0.48	1.12
189	2,3,4,5,3′,4′,5′	—	—	—	—	0.13
190	2,3,4,5,6,3′,4′	—	—	—	—	0.02
192	2,3,4,5,6,3′,5′	—	—	—	0.20	0.97
193	2,3,5,6,3′,4′,5′	—	—	—	2.30	—
194	2,3,4,5,2′,3′,4′,5′	—	—	—	—	2.21
195	2,3,4,5,6,2′,3′,4′	—	—	—	—	trace
196	2,3,4,5,2′,3′,4′,6′	—	—	—	—	0.79
197	2,3,4,6,2′,3′,4′,6′	—	—	—	—	0.30
198	2,3,4,5,6,2′,3′,5′	—	—	—	1.00	0.15
199	2,3,4,5,6,2′,3′,6′	—	—	—	—	0.38
200	2,3,4,6,2′,3′,5′,6′	—	—	—	trace	0.15
201	2,3,4,5,2′,3′,5′,6′	—	—	—	—	1.54
202	2,3,5,6,2′,3′,5′,6′	—	—	—	—	0.31
203	2,3,4,5,6,2′,4′,5′	—	—	—	—	0.08
204	2,3,4,5,6,2′,4′,6′	—	—	—	trace	0.13
205	2,3,4,5,6,3′,4′,5′	—	—	—	—	0.01
206	2,3,4,5,6,2′,3′,4′,5′	—	—	—	—	0.51
207	2,3,4,5,6,2′,3′,4′,6′	—	—	—	—	1.15
208	2,3,4,5,6,2′,3′,5′,6′	—	—	—	—	0.18

[a] WHO 1993; the congener 169 (3,4,5,3′,4′,5′) was not found in Aroclors; Albro and Parker 1979; Albro et al. 1981

[b] — Not detected

[c] Presence of these congeners has been reported by other investigators (see Section 3.2)