

Attachment 4.3  
Anniston Community Health Survey: Follow up Study and Dioxin Analyses  
**Reportable Reference Ranges for PCBs, Dioxins, and Other Chemicals**

**Table 1.** Reference ranges for polychlorinated biphenyls (PCB)<sup>1</sup> (ng/g lipid).

IUPAC No.	Test Name	NHANES Reference Range <sup>2</sup> (Units)
	<b>Polychlorinated biphenyls (PCBs)</b>	<b>(ng/g lipid)</b>
PCB 28	2,4,4'-trichlorobiphenyl	4.98 - 11.1
PCB 44	2,2',3,5-tetrachlorobiphenyl	2.00 - 5.44
PCB 49	2,2',4,5'-tetrachlorobiphenyl	1.33 - 3.36
PCB 52	2,2',5,5'-tetrachlorobiphenyl	2.70 - 7.15
PCB 66	2,3',4,4'-tetrachlorobiphenyl	1.40 - 4.20
PCB 74	2,4,4',5-tetrachlorobiphenyl	5.00 - 24.1
PCB 87	3,4,4',5-tetrachlorobiphenyl	<LOD - 13.1
PCB 99	2,2',3,4,5'-pentachlorobiphenyl	0.90 - 2.60
PCB 101	2,2',4,4',5-pentachlorobiphenyl	4.08 - 18.6
PCB 105	2,2',4,5,5'-pentachlorobiphenyl†	1.67 - 5.51
PCB 110	2,3,3',4,4'-pentachlorobiphenyl	1.15 - 6.82
PCB 118	2,3,3',4',6-pentachlorobiphenyl†	1.20 - 4.18
PCB 128	3,3',4,4',5-pentachlorobiphenyl	16.0 - 74.8
PCB 138-158	2,2',3,3',4,4'-hexachlorobiphenyl	<LOD - 0.62
PCB 146	2,2',3,4,4',5'and 2,3,3',4,4',6-hexachlorobiphenyl	17.6 - 77.4
PCB 149	2,2',3,4',5,5'-hexachlorobiphenyl	2.60 - 12.7
PCB 151	2,2',3,4',5',6-hexachlorobiphenyl	0.60 - 1.89
PCB 153	2,2',3,5,5',6-hexachlorobiphenyl	<LOD - 1.02
PCB 156	2,2',4,4',5,5'-hexachlorobiphenyl†	24.2 - 101
PCB 157	2,3,3',4,4',5-hexachlorobiphenyl †	4.10 - 16.8
PCB 167	2,3,3',4,4',5'-hexachlorobiphenyl †	0.98 - 3.97
PCB 170	3,3',4,4',5,5'-hexachlorobiphenyl	<LOD - 43.2
PCB 172	2,2',3,3',4,4',5-heptachlorobiphenyl	7.83 - 29.5
PCB 177	2,2',3,3',4,5,5'-heptachlorobiphenyl	1.08 - 4.38
PCB 178	2,2',3,3',4',5,6-heptachlorobiphenyl	1.50 - 7.80
PCB 180	2,2',3,3',5,5',6-heptachlorobiphenyl	1.46 - 6.50
PCB 183	2,2',3,4,4',5,5'-heptachlorobiphenyl	21.5 - 88.0
PCB 187	2,2',3,4,4',5',6-heptachlorobiphenyl	1.88 - 8.40
PCB 189	2,2',3,4',5,5',6-heptachlorobiphenyl†	5.71 - 25.9
PCB 194	2,3,3',4,4',5,5'-heptachlorobiphenyl	<LOD - 1.50
PCB 195	2,2',3,3',4,4',5,5'-octachlorobiphenyl	4.95 - 20.1
PCB 196-203	2,2',3,3',4,4',5,6-octachlorobiphenyl	1.10 - 4.68
PCB 199	2,2',3,3',4,4',5,6'and 2,2',3,4,4',5,5',6-octachlorobiphenyl	4.07 - 15.9
PCB 206	2,2',3,3',4,5,5',6'-octachlorobiphenyl	4.60 - 20.6
PCB 209	2,2',3,3',4,4',5,5',6'-nonachlorobiphenyl	2.80 - 14.2
PCB 28	2,2',3,3',4,4',5,5',6,6'-decachlorobiphenyl	1.40 - 12.3

<sup>1</sup> Dioxin like coplanar PCB congeners results (PCBs 81, 126, and 169) are shown in Table 2.

<sup>2</sup> CDC. 2009. 2003-2004 NHANES 50<sup>th</sup> to 95<sup>th</sup> percentiles among adults 20+ years old from the Fourth National Report on Human Exposure to Environmental Chemicals (<http://www.cdc.gov/exposurereport/pdf/FourthReport.pdf>).

<LOD - Below the limit of detection. †Mono-ortho substituted PCB congeners.

**Table 2.** Reference ranges for dioxins (PCDDs), dibenzofurans (PCDFs), coplanar PCBs, chlorinated pesticides and polybrominated diphenyl ethers (PBDEs).

Serial or IUPAC No.	Test Name	NHANES Reference Range <sup>1</sup> (Units)
<b>Polychlorinated dibenzo-<i>p</i>-dioxins (PCDDs)</b>		<b>(pg/g lipid)</b>
1	2,3,7,8-tetrachlorodibenzo- <i>p</i> -dioxin (TCDD)	<LOD - 5.30
2	1,2,3,7,8-pentachlorodibenzo- <i>p</i> -dioxin (PeCDD)	<LOD - 11.3
3	1,2,3,4,7,8-hexachlorodibenzo- <i>p</i> -dioxin (HxCDD)	< LOD - < LOD
4	1,2,3,6,7,8-hexachlorodibenzo- <i>p</i> -dioxin (HxCDD)	23.8 - 70.8
5	1,2,3,7,8,9-hexachlorodibenzo- <i>p</i> -dioxin (HxCDD)	< LOD - < LOD
6	1,2,3,4,6,7,8-heptachlorodibenzo- <i>p</i> -dioxin (HpCDD)	27.3 - 95.0
7	1,2,3,4,6,7,8,9-octachlorodibenzo- <i>p</i> -dioxin (OCDD)	223 - 794
<b>Polychlorinated dibenzo-<i>p</i>-furans (PCDFs)</b>		<b>(pg/g lipid)</b>
1	2,3,7,8-tetrachlorodibenzofuran (TCDF)	<LOD - <LOD
2	1,2,3,7,8-pentachlorodibenzofuran (PeCDF)	<LOD - <LOD
3	2,3,4,7,8-pentachlorodibenzofuran (PeCDF)	<LOD - 13.0
4	1,2,3,4,7,8-hexachlorodibenzofuran (HxCDF)	<LOD - 9.50
5	1,2,3,6,7,8-hexachlorodibenzofuran (HxCDF)	<LOD - 9.00
6	2,3,4,6,7,8-hexachlorodibenzofuran (HxCDF)	<LOD - <LOD
7	1,2,3,7,8,9-hexachlorodibenzofuran (HxCDF)	<LOD - <LOD
8	1,2,3,4,6,7,8-heptachlorodibenzofuran (HpCDF)	<LOD - 18.0
9	1,2,3,4,7,8,9-heptachlorodibenzofuran (HpCDF)	<LOD - <LOD
10	1,2,3,4,6,7,8,9-octachlorodibenzofuran (OCDF)	<LOD - <LOD
<b>Coplanar Polychlorinated Biphenyls (co-PCBs)</b>		<b>(pg/g lipid)</b>
PCB 81	2,4,4',5-tetrachlorobiphenyl	0.006 - 0.17
PCB 126	2,3',4,4',5-pentachlorobiphenyl †	5.56 - 34.3
PCB 169	2,3',4,4',5,5'-hexachlorobiphenyl †	0.86 - 4.30
<b>Chlorinated Pesticides</b>		<b>(ng/g lipid)</b>
1	Hexachlorobenzene (HCB)	15.1 - 29.0
2	β-Hexachlorocyclohexane (HCH)	<LOD - 62.2
3	<i>p,p'</i> -Dichlorodiphenyltrichloroethane (DDT)	<LOD - 20.7
4	<i>p,p'</i> -Dichlorodiphenyldichloroethene (DDE)	233 - 1,990
5	Oxychlorane	11.4 - 39.2
6	<i>trans</i> -Nonachlor	17.3 - 74.7
7	Heptachlor epoxide	<LOD - 20.6
8	Mirex	<LOD - 15.4
9	Dieldrin	<LOD - 19.5
<b>Polybrominated diphenyl ethers (PBDEs)</b>		<b>(ng/g lipid)</b>
BDE 17	2,2',4-tribromodiphenyl ether	<LOD - <LOD
BDE 28	2,4,4'-tribromodiphenyl ether	1.10 - 8.20
BDE 47	2,2',4,4'-tetrabromodiphenyl ether	18.0 - 163
BDE 66	2,3',4,4'-tetrabromodiphenyl ether	<LOD - 1.30
BDE 85	2,2',3,4,4'-pentabromodiphenyl ether	<LOD - 4.10
BDE 99	2,2',4,4',5-pentabromodiphenyl ether	<LOD - 41.6
BDE 100	2,2',4,4',6-pentabromodiphenyl ether	3.30 - 36.6
BDE 153	2,2',4,4',5,5'-hexabromodiphenyl ether	4.40 - 73.3
BDE 154	2,2',4,4',5,6'-hexabromodiphenyl ether	<LOD - 4.20
BDE 183	2,2',3,4,4',5',6-heptabromodiphenyl ether	<LOD - <LOD

<sup>1</sup> CDC. 2009. 2003-2004 NHANES 50<sup>th</sup> to 95<sup>th</sup> percentiles among adults 20+ years old from the Fourth National Report on Human Exposure to Environmental Chemicals (<http://www.cdc.gov/exposurereport/pdf/FourthReport.pdf>).  
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