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)1 (ng/g lipid).

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| **IUPAC No.** | **Test Name** | **NHANES Reference Range2 (Units)** |
|  | ***Polychlorinated biphenyls (PCBs)*** | ***(ng/g lipid)*** |
| 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’-tetrachlorobipheny | 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 |

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

2 CDC. 2009. 2003-2004 NHANES 50th to 95th 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).

|  |  |  |
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| **Serial or IUPAC No.** | **Test Name** | **NHANES Reference Range1 (Units)** |
|  | ***Polychlorinated dibenzo-p-dioxins (PCDDs)*** | ***(pg/g lipid)*** |
| 1 | 2,3,7,8-tetrachlorodibenzo-*p*-dioxin (TCDD) | <LOD – 5.30 |
| 2 | 1,2,3,7,8-pentachlorodibenzo-*p*-dioxin (PeCDD)  | <LOD – 11.3 |
| 3 | 1,2,3,4,7,8-hexachlorodibenzo-*p*-dioxin (HxCDD) | < LOD – < LOD |
| 4 | 1,2,3,6,7,8-hexachlorodibenzo-*p*-dioxin (HxCDD)  | 23.8 – 70.8 |
| 5 | 1,2,3,7,8,9-hexachlorodibenzo-*p*-dioxin (HxCDD) | < LOD – < LOD |
| 6 | 1,2,3,4,6,7,8-heptachlorodibenzo-*p*-dioxin (HpCDD) | 27.3 – 95.0 |
| 7 | 1,2,3,4,6,7,8,9-octachlorodibenzo-*p*-dioxin (OCDD) | 223 – 794 |
|  | ***Polychlorinated dibenzo-p-furans (PCDFs)*** | ***(pg/g lipid)*** |
| 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-hexchlorodibenzofuran (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 |
|   | ***Coplanar Polychlorinated Biphenyls (co-PCBs)*** | ***(pg/g lipid)*** |
| 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 |
|  | ***Chlorinated Pesticides*** | ***(ng/g lipid)*** |
| 1 | Hexachlorobenzene (HCB) | 15.1 – 29.0 |
| 2 | *β-*Hexachlorocyclohexane (HCH) | <LOD – 62.2 |
| 3 | *p,p'*-Dichlorodiphenyltrichloroethane (DDT) | <LOD – 20.7 |
| 4 | *p,p'*-Dichlorodiphenyldichloroethene (DDE) | 233 – 1,990 |
| 5 | Oxychlordane | 11.4 – 39.2 |
| 6 | *trans*-Nonachlor | 17.3 – 74.7 |
| 7 | Heptachlor epoxide | <LOD – 20.6 |
| 8 | Mirex | <LOD – 15.4 |
| 9 | Dieldrin | <LOD – 19.5 |
|  | ***Polybrominated diphenyl ethers (PBDEs)*** | ***(ng/g lipid)*** |
| 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 |

1 CDC. 2009. 2003-2004 NHANES 50th to 95th 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.