

## Appendix A. Limit of Detection Table

The analytical limit of detection (LOD) for each of the different chemical measurements is presented in the table below. The LOD is the level at which the measurement has a 95% probability of being greater than zero (Taylor, 1987). For most chemicals, the LOD is constant for each sample analyzed. However, for dioxins, furans, PCBs, organochlorine pesticides, and some other pesticides, each individual sample has its own LOD. These analyses have an individual LOD for each sample, mostly because the sample volume available for analysis differed for each sample. A higher sample volume results in a lower LOD and a better ability to detect low levels.

For chemicals with sample-specific LODs, we report in the table the maximum LOD among the samples analyzed. In

general, the average LOD for these samples is about 40-50% of the maximum LOD. If a geometric mean or percentile estimate is less than the maximum LOD, it is noted in the results tables, and we do not report a number for that estimate. This conservative approach is to assure high confidence in all numbers reported in the results tables.

As analytical methods improve, LODs will often improve. For this reason, LOD results are reported by survey periods (e.g., 1999-2000, 2001-2002). Therefore, it is possible that the same chemical levels may be less than the LOD in 1999-2000 and greater than the LOD in 2001-2002.

**Table A1. Limit of Detection for Chemicals Measured in the Second and Third Reports**

Chemical	Matrix	Units	1999-2000	2001-2002
<b>Metals</b>				
Antimony	urine	µg/L	0.04	0.04
Barium	urine	µg/L	0.12	0.12
Beryllium	urine	µg/L	0.13	0.13
Cadmium	whole blood	µg/L	0.3	0.3
Cadmium	urine	µg/L	0.06	0.06
Cesium	urine	µg/L	0.14	0.14
Cobalt	urine	µg/L	0.07	0.07
Lead	whole blood	µg/dL	0.3	0.3
Lead	urine	µg/L	0.1	0.1
Mercury	whole blood	µg/L	0.14	0.14
Mercury	urine	µg/L	0.14	0.14
Molybdenum	urine	µg/L	0.8	0.8
Platinum	urine	µg/L	0.04	0.04
Thallium	urine	µg/L	0.02	0.02
Tungsten	urine	µg/L	0.04	0.04
Uranium	urine	µg/L	0.004	0.004
<b>Tobacco Smoke</b>				
Cotinine	serum	ng/mL	0.05	0.05
<b>Polycyclic Aromatic Hydrocarbons</b>				
1-Hydroxybenz[a]anthracene	urine	ng/L	4.7	3.9
3-Hydroxybenz[a]anthracene and 9-Hydroxybenz[a]anthracene	urine	ng/L	5.4	10.4
1-Hydroxybenzo[c]phenanthrene	urine	ng/L	5.7	3.4
2-Hydroxybenzo[c]phenanthrene	urine	ng/L	6.8	5.4
3-Hydroxybenzo[c]phenanthrene	urine	ng/L	4.9	5.4
1-Hydroxychrysene	urine	ng/L		5
2-Hydroxychrysene	urine	ng/L		5
3-Hydroxychrysene	urine	ng/L	9.9	8.3
4-Hydroxychrysene	urine	ng/L		2.8
6-Hydroxychrysene	urine	ng/L	3.4	2.4
3-Hydroxyfluoranthene	urine	ng/L	3.5	
2-Hydroxyfluorene	urine	ng/L	9.5	3.6
3-Hydroxyfluorene	urine	ng/L	15.1	2
9-Hydroxyfluorene	urine	ng/L		2.8
1-Hydroxyphenanthrene	urine	ng/L	15	3.5
2-Hydroxyphenanthrene	urine	ng/L	11.2	3.2
3-Hydroxyphenanthrene	urine	ng/L	15.3	3.6
4-Hydroxyphenanthrene	urine	ng/L		5.7
9-Hydroxyphenanthrene	urine	ng/L		3.1
1-Hydroxypyrene	urine	ng/L	2	3.3
3-Hydroxybenzo[a]pyrene	urine	ng/L		10.5
1-Hydroxynaphthalene	urine	ng/L		6.2
2-Hydroxynaphthalene	urine	ng/L		2.4

Chemical	Matrix	Units	1999-2000	2001-2002
<b>Polychlorinated Dibenzo-p-dioxins, Dibenzofurans, Coplanar and Mono-Ortho-Substituted Biphenyls</b>				
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	serum	pg/g of lipid	329*	319*
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	serum	pg/g of lipid	55.9*	10.3*
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	serum	pg/g of lipid		9.00*
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	serum	pg/g of lipid	20.1*	9.10*
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	serum	pg/g of lipid	20.3*	9.30*
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	serum	pg/g of lipid	14.2*	6.00*
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	serum	pg/g of lipid	12.1*	5.80*
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	serum	pg/g of lipid	35.6*	21.0*
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	serum	pg/g of lipid	13.5*	7.00*
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	serum	pg/g of lipid		7.00*
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	serum	pg/g of lipid	12.7*	6.50*
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	serum	pg/g of lipid	12.6*	6.10*
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	serum	pg/g of lipid	12.7*	6.00*
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	serum	pg/g of lipid	13.2*	5.80*
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	serum	pg/g of lipid	12.9*	5.80*
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	serum	pg/g of lipid	12.7*	5.50*
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	serum	pg/g of lipid	11.9*	5.20*
2,4,4'-Trichlorobiphenyl (PCB 28)	serum	ng/g of lipid	32.4*	
2,3',4,4'-Tetrachlorobiphenyl (PCB 66)	serum	ng/g of lipid	12.4*	12.4*
2,4,4',5-Tetrachlorobiphenyl (PCB 74)	serum	ng/g of lipid	12.4*	10.5*
3,4,4',5-Tetrachlorobiphenyl (PCB 81)	serum	pg/g of lipid	68.4*	26.8*
2,3,3',4,4'-Pentachlorobiphenyl (PCB 105)	serum	ng/g of lipid	12.4*	10.5*
2,3',4,4',5-Pentachlorobiphenyl (PCB 118)	serum	ng/g of lipid	12.5*	10.5*
3,3',4,4',5-Pentachlorobiphenyl (PCB 126)	serum	pg/g of lipid	23.2*	10.8*
2,3,3',4,4',5-Hexachlorobiphenyl (PCB 156)	serum	ng/g of lipid	12.5*	10.5*
2,3,3',4,4',5'-Hexachlorobiphenyl (PCB 157)	serum	ng/g of lipid	12.5*	10.5*
2,3',4,4',5,5'-Hexachlorobiphenyl (PCB 167)	serum	ng/g of lipid	12.4*	10.5*
3,3',4,4',5,5'-Hexachlorobiphenyl (PCB 169)	serum	pg/g of lipid	27.0*	11.0*
2,3,3',4,4',5,5'-Heptachlorobiphenyl (PCB 189)	serum	ng/g of lipid		10.5*
<b>Non-dioxin-like Polychlorinated Biphenyls</b>				
2,2',5,5'-Tetrachlorobiphenyl (PCB 52)	serum	ng/g of lipid	12.5*	12.4*
2,2',3,4,5'-Pentachlorobiphenyl (PCB 87)	serum	ng/g of lipid		10.5*
2,2',4,4',5-Pentachlorobiphenyl (PCB 99)	serum	ng/g of lipid	12.5*	10.5*
2,2',4,5,5'-Pentachlorobiphenyl (PCB 101)	serum	ng/g of lipid	25.7*	10.5*
2,3,3',4,6-Pentachlorobiphenyl (PCB 110)	serum	ng/g of lipid		10.5*
2,2',3,3',4,4'-Hexachlorobiphenyl (PCB 128)	serum	ng/g of lipid	12.4*	10.5*
2,2',3,4,4',5' and 2,3,3',4,4',6-Hexachlorobiphenyl (PCB 138&158)	serum	ng/g of lipid	41.1*	10.5*
2,2',3,4',5,5'-Hexachlorobiphenyl (PCB 146)	serum	ng/g of lipid	12.4*	10.5*
2,2',3,4',5,6-Hexachlorobiphenyl (PCB 149)	serum	ng/g of lipid		10.5*
2,2',3,5,5',6-Hexachlorobiphenyl (PCB 151)	serum	ng/g of lipid		10.5*
2,2',4,4',5,5'-Hexachlorobiphenyl (PCB 153)	serum	ng/g of lipid	55.6*	10.5*
2,2',3,3',4,4',5-Heptachlorobiphenyl (PCB 170)	serum	ng/g of lipid	17.2*	10.5*
2,2',3,3',4,5,5'-Heptachlorobiphenyl (PCB 172)	serum	ng/g of lipid	12.5*	10.5*
2,2',3,3',4,5,6'-Heptachlorobiphenyl (PCB 177)	serum	ng/g of lipid	12.5*	10.5*
2,2',3,3',5,5',6-Heptachlorobiphenyl (PCB 178)	serum	ng/g of lipid	12.4*	10.5*
2,2',3,4,4',5,5'-Heptachlorobiphenyl (PCB 180)	serum	ng/g of lipid	28.2*	10.5*
2,2',3,4,4',5,6-Heptachlorobiphenyl (PCB 183)	serum	ng/g of lipid	12.4*	10.5*
2,2',3,4',5,5',6-Heptachlorobiphenyl (PCB 187)	serum	ng/g of lipid	12.4*	10.5*
2,2',3,3',4,4',5,5'-Octachlorobiphenyl (PCB 194)	serum	ng/g of lipid		10.5*
2,2',3,3',4,4',5,6-Octachlorobiphenyl (PCB 195)	serum	ng/g of lipid		28.1*
2,2',3,3',4,4',5,6' and 2,2',3,4,4',5,5',6-Octachlorobiphenyl (PCB196&203)	serum	ng/g of lipid		10.5*
2,2',3,3',4,5,5',6'-Octachlorobiphenyl (PCB 199)	serum	ng/g of lipid		10.5*
2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl (PCB 206)	serum	ng/g of lipid		28.1*
<b>Phytoestrogens</b>				
Daidzein	urine	µg/L	0.5	1.6
Enterodiol	urine	µg/L	0.8	1.5
Enterolactone	urine	µg/L	0.6	1.9
Equol	urine	µg/L	3	3.3
Genistein	urine	µg/L	0.3	0.8
O-Desmethylangolensin	urine	µg/L	0.2	0.4

\* Maximum LOD. Each person's sample has its own LOD. See text at beginning of Appendix for details.

Chemical	Matrix	Units	1999-2000	2001-2002
<b>Phthalates</b>				
Mono-methyl phthalate	urine	µg/L		0.2
Mono-ethyl phthalate	urine	µg/L	1.2	0.9
Mono-n-butyl phthalate	urine	µg/L	0.9	1.1
Mono-isobutyl phthalate	urine	µg/L		1
Mono-benzyl phthalate	urine	µg/L	0.8	0.3
Mono-cyclohexyl phthalate	urine	µg/L	0.9	0.3
Mono-2-ethylhexyl phthalate	urine	µg/L	1.2	1
Mono-(2-ethyl-5-oxohexyl) phthalate	urine	µg/L		1.1
Mono-(2-ethyl-5-hydroxyhexyl) phthalate	urine	µg/L		1
Mono-n-octyl phthalate	urine	µg/L	0.9	1
Mono-(3-carboxypropyl) phthalate	urine	µg/L		0.4
Mono-isononyl phthalate	urine	µg/L	0.8	0.8
<b>Organochlorine Pesticides</b>				
Hexachlorobenzene	serum	ng/g of lipid	118*	31.4*
Beta-hexachlorocyclohexane	serum	ng/g of lipid	9.36*	6.76*
Gamma-hexachlorocyclohexane	serum	ng/g of lipid	14.5*	10.5*
Pentachlorophenol	urine	µg/L	0.25	0.5
2,4,5-Trichlorophenol	urine	µg/L	0.9	0.9
2,4,6-Trichlorophenol	urine	µg/L	1	1.3
<i>p,p'</i> -DDT	serum	ng/g of lipid	20.7*	17.4*
<i>p,p'</i> -DDE	serum	ng/g of lipid	18.6*	8.3*
<i>o,p'</i> -DDT	serum	ng/g of lipid	20.7*	17.4*
Oxychlorodane	serum	ng/g of lipid	14.5*	10.5*
<i>trans</i> -Nonachlor	serum	ng/g of lipid	14.5*	10.5*
Heptachlor Epoxide	serum	ng/g of lipid	14.6*	10.5*
Mirex	serum	ng/g of lipid	14.6*	10.5*
Aldrin	serum	ng/g of lipid		5.94*
Dieldrin	serum	ng/g of lipid		10.5*
Endrin	serum	ng/g of lipid		5.09*
<b>Organophosphate Insecticides: Dialkyl Phosphate Metabolites</b>				
Dimethylphosphate	urine	µg/L	0.58	0.5
Dimethylthiophosphate	urine	µg/L	0.18	0.4
Dimethyldithiophosphate	urine	µg/L	0.08	0.1
Diethylphosphate	urine	µg/L	0.2	0.2
Diethylthiophosphate	urine	µg/L	0.09	0.1
Diethyldithiophosphate	urine	µg/L	0.05	0.1
<b>Organophosphate Insecticides: Specific Metabolites</b>				
Malathion dicarboxylic acid	urine	µg/L	2.64*	
<i>para</i> -Nitrophenol	urine	µg/L	0.80*	0.1
3,5,6-Trichloro-2-pyridinol	urine	µg/L	0.4	0.4
2-Isopropyl-4-methyl-6-hydroxypyrimidine	urine	µg/L	7.21*	0.7
2-(diethylamino)-6-methylpyrimidin-4-ol/one	urine	µg/L		0.2
3-chloro-7-hydroxy-4-methyl-2H-chromen-2-one/ol	urine	µg/L		0.2
<b>Herbicides</b>				
2,4,5-Trichlorophenoxyacetic acid	urine	µg/L	1.20*	0.1
2,4-Dichlorophenoxyacetic acid	urine	µg/L	0.952*	0.2
2,4-Dichlorophenol	urine	µg/L	0.3	0.3
Alachlor mercapturate	urine	µg/L	1.18*	
Atrazine mercapturate	urine	µg/L	0.791*	0.3
Acetochlor mercapturate	urine	µg/L		0.1
Metolachlor mercapturate	urine	µg/L		0.2
<b>Pyrethroid Pesticides</b>				
4-Fluoro-3-phenoxybenzoic acid	urine	µg/L		0.2
Cis-3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropane carboxylic acid	urine	µg/L		0.1
Trans-3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropane carboxylic acid	urine	µg/L		0.4
Cis-3-(2,2-dibromovinyl)-2,2-dimethylcyclopropane carboxylic acid	urine	µg/L		0.1
3-Phenoxybenzoic acid	urine	µg/L		0.1
<b>Other Pesticides</b>				
N,N-diethyl-3-methylbenzamide	urine	µg/L	0.449	0.1
<i>ortho</i> -Phenylphenol	urine	µg/L	0.3	0.3
2,5-Dichlorophenol	urine	µg/L	0.1	0.1
<b>Carbamate Pesticides</b>				
2-Isopropoxyphenol	urine	µg/L	1.1	0.4
Carbofuranphenol	urine	µg/L	0.4	0.4

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