Appendix H: Data Management

Data Management

LABORATORY REPLICATES AND FIELD DUPLICATES

Chemical concentrations obtained from the analysis of laboratory replicates (two or more analyses done on the same sample). Results for replicates were averaged according to the following rules.

Averaging rules were dependent on whether the result was a "detect" or "non-detect." If all concentrations were detects for a given parameter, the values were simply averaged arithmetically. If all concentrations were undetected for a given parameter, the minimum detection limit was reported as the "average." If the concentrations are a mixture of detects and non-detects, only the detected concentrations are averaged and the result is considered a detected concentration. The following table illustrates the three cases with example data.

Table D-1.   Example calculations

CHEMICAL	CONCENTRATION 1	CONCENTRATION 2	AVERAGE CONCENTRATION
Lead	50	40	45
Hexachlorobenzene	10 U	20 U	10 U
Mercury	0.50	0.60 U	0.50

U represents a non-detect concentration

SIGNIFICANT FIGURES AND ROUNDING

The laboratory typically reports results with 2 or 3 significant figures depending on the instrument. Examples:

Table D-2.   Examples of different numbers of significant figures

2 SIGNIFICANT FIGURES	3 SIGNIFICANT FIGURES
19	19.1
120	122
3,600	3,550

When a calculation involves addition, such as totaling PCBs or PAHs, the calculation can only be as precise as the least precise number that went into the calculation. Example (assuming 2 significant figures):

> 210+19=229, but this would be reported as 230 because the trailing zero in the number 210 is not significant.

When a calculation involves multiplication or division, such as when carbon normalizing, all significant figures are carried through the calculation and then the

total result is rounded at the end of the calculation to reflect the value used in the calculation with the fewest significant figures. Example:

59.9 x 1.2 = 71.88, but this would be reported as 72 because there are only 2 significant figures in the number 1.2

When rounding, if the number following the last significant figure is less than 5, the digit is left unchanged. If the number following the last significant figure is equal to or greater than 5, the digit is increased by 1.

CALCULATING TOTALS

Concentrations for several analyte sums were calculated as follows:

◆ **Total PCBs** were calculated using only detected values for 7 Aroclor mixtures[1] in accordance with Ecology's Sediment Management Standards (SMS). For individual samples in which none of the 7 Aroclor mixtures were detected, total PCBs were given a value equal to the highest detection limit of the seven Aroclors and assigned a "U" qualifier indicating the lack of detected concentrations.

◆ **Total LPAHs, HPAHs, and benzofluoranthenes** were also calculated in accordance with SMS. Total LPAHs are the sum of detected concentrations for naphthalene, acenaphthylene, acenaphthene, fluorene, phenanthrene, and anthracene. Total HPAHs are the sum of detected concentrations for fluoranthene, pyrene, benzo(a)anthracene, chrysene, total benzofluoranthenes, benzo(a)pyrene, indeno(1,2,3,-c,d)pyrene, dibenzo(a,h)anthracene, and benzo(g,h,i)perylene. Total benzofluoranthenes are the sum of the b (i.e., benzo(b)fluoranthene) and k isomers. For samples in which all individual compounds within any of the three groups described above were undetected, the single highest detection limit for that sample represents the sum.

ORGANIC CARBON NORMALIZATION

Organic carbon normalization was conducted for many organic compounds for the purposes of comparing to SMS. Because of the significant figure and rounding algorithms described above, the organic carbon normalized totals may not be exactly equal to the sum of the organic carbon normalized individual compounds. For example, the organic carbon normalized total LPAH concentration was calculated using the dry weight total LPAH concentration and the organic carbon percentage, not by summing the organic carbon normalized concentrations for the individual LPAH compounds.

On figures with sample locations with field duplicates, each value was organic carbon normalized and then averaged.

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[1] Aroclors 1016, 1221, 1232, 1242, 1248, 1254, 1260