

APPENDIX A

**INTERIM COEFFICIENTS OF VARIATION OBSERVED
WITHIN LABORATORIES
FOR REFERENCE TOXICANT SAMPLES ANALYZED
USING EPA'S PROMULGATED
WHOLE EFFLUENT TOXICITY METHODS**

This page intentionally left blank.

INTERIM COEFFICIENTS OF VARIATION OBSERVED WITHIN LABORATORIES FOR REFERENCE TOXICANT SAMPLES ANALYZED USING EPA'S PROMULGATED WHOLE EFFLUENT TOXICITY METHODS

Tables A-1 and A-2 identify interim coefficients of variation for each promulgated WET method. The Agency identifies these as “interim” because EPA may revise some or all of these estimates based on between-laboratory studies currently underway to evaluate some of the test methods. For the acute toxicity methods, only “primary” organisms identified in the EPA method manuals (USEPA 1994a, 1994b) are reported in the tables. The primary data used to calculate these CVs were estimated effect concentrations (EC25, LC50, and NOEC) in units of concentration (e.g., mg/L of toxicant). Most CVs in Tables A-1 and A-2 come directly from Tables 3-2 through 3-4. Those data were supplemented as necessary with data from EPA publications (USEPA 1991, 1994a, 1994b). In Table 3-2, the NOEC values are reported separately for each test endpoint. In Tables A-1 and A-2, however, the NOEC values are reported as the most sensitive test endpoint. The data for a given method represent a variety of toxicants. In general, laboratories reported data for only one toxicant for a given method. Some of the data taken from EPA publications involved tests using different toxicants but conducted at one laboratory. In such cases, CVs were calculated separately for each toxicant.

Tables A-1 and A-2 report a default value when results were available from fewer than three laboratories and a similar species could be used as a basis for the default value of the CV. The sources of default values are identified in the footnotes to Tables A-1 and A-2. For methods and endpoints represented by fewer than three laboratories, the interim CV should be regarded as highly speculative.

Coefficients of variation are used as descriptive statistics for NOECs in this document. Because NOECs can take on only values that correspond to concentrations tested, the distribution (and CV) of NOECs can be influenced by the selection of experimental concentrations, as well as additional factors (e.g., within-test variability) that affect both NOECs and point estimates. This makes CVs for NOECs more uncertain than those of point estimates, and the direction of this uncertainty is not uniformly toward larger or smaller CVs. Despite these confounding issues, CVs are used herein as the best available means of expressing the variability of interest in this document and for general comparisons among methods. Readers should be cautioned, however, that small differences in CVs between NOECs and point estimates may be artifactual; large differences are more likely to reflect real differences in variability (a definition of what is “small” or “large” would require a detailed statistical analysis and would depend upon the experimental and statistical details surrounding each comparison).

These results are based on tests conducted using reference toxicants. These CVs may not apply to tests conducted on effluents and receiving waters unless the effect concentration (i.e., the EC25, LC50, or NOEC) happens to fall in the middle of the range of concentrations tested. More often, tests of effluents and receiving waters show smaller effects at the middle concentrations. Many effluent tests also demonstrate that the effect concentration equals or exceeds the highest concentration tested. In such cases, the sample standard deviation and CV tend to be smaller than reference toxicant CVs.

Table A-1. Interim Coefficients of Variation for EPA’s Promulgated Whole Effluent Toxicity Methods for Acute Toxicity

Test Method No. ^a	Test Organism	Estimate	CV	No. of Laboratories
2002.0	<i>Ceriodaphnia dubia</i>	LC50	0.19 ^b	23
2021.0	<i>Daphnia magna</i>	LC50	0.22 ^b	5
2022.0	<i>Daphnia pulex</i>	LC50	0.21 ^b	6
2000.0	<i>Pimephales promelas</i>	LC50	0.16 ^b	21
2019.0	<i>Oncorhynchus mykiss</i>	LC50	0.16 ^c	na ^c
NA	<i>Salvelinus fontinalis</i>	LC50	0.16 ^c	na ^c
2004.0	<i>Cyprinodon variegatus</i>	LC50	0.14 ^b	5
2006.0	<i>Menidia beryllina</i>	LC50	0.16 ^b	5
2007.0	<i>Mysidopsis bahia</i>	LC50	0.25 ^b	3

^a These codes for acute methods were developed specifically for this document.

^b From Table 3-3.

^c Default values. These values are identified for methods represented by fewer than three laboratories. Default values for the trout (*Salvelinus fontinalis*) are based on Method 2000.0. Default values for *Menidia menidia* and *M. peninsulae* (not shown) are based on the median for *M. beryllina*.

NOTE: CVs represent the median coefficient of variation observed within laboratories for WET tests conducted on reference toxicant samples. The test endpoint is survival.

Table A-2. Interim Coefficients of Variation for EPA’s Promulgated Whole Effluent Toxicity Methods for Short-Term Chronic Toxicity

Test Method No.	Test Organism	Endpoint	Estimate	CV	No. of Laboratories
1000.0	<i>Pimephales promelas</i>	Growth	EC25	0.26 ^a	19
		Survival	LC50	0.23 ^a	19
		Most sensitive	NOEC	0.31 ^a	19
1001.0	<i>Pimephales promelas</i> Embryo-larval	Mortality + Teratogenicity	EC01	0.52 ^b	1
		Mortality + Teratogenicity	LC50	0.07 ^c	na
		Mortality + Teratogenicity	NOEC	0.22 ^c	na
1002.0	<i>Ceriodaphnia dubia</i>	Reproduction	EC25	0.27 ^a	33
		Survival	LC50	0.16 ^a	33
		Most sensitive	NOEC	0.35 ^a	33
1003.0	<i>Selenastrum capricornutum</i> ^d	Cell count	EC25	0.26 ^a	6
		Cell count	NOEC	0.46 ^a	9
1004.0	<i>Cyprinodon variegatus</i>	Growth	EC25	0.13	5
		Survival	LC50	0.08	5
		Most sensitive	NOEC	0.38 ^c	5
1005.0	<i>Cyprinodon variegatus</i> Embryo-larval	Mortality + Teratogenicity	EC10	0.19 ^c	1
		Mortality + Teratogenicity	LC50	0.07 ^c	1
		Mortality + Teratogenicity	NOEC	0.22 ^e	1
1006.0	<i>Menidia beryllina</i>	Growth	EC25	0.27 ^a	16
		Survival	LC50	0.28 ^a	16
		Most sensitive	NOEC	0.46 ^a	16
1007.0	<i>Mysidopsis bahia</i>	Growth	EC25	0.28 ^a	10
		Survival	LC50	0.26 ^a	10
		Most sensitive	NOEC	0.40 ^a	10
1008.0	<i>Arbacia punctulata</i>	Fertilization	EC25	0.36 ^c	2
		Fertilization	NOEC	0.50 ^c	na
1009.0	<i>Champia parvula</i>	Cystocarp production	EC25	0.59 ^{a, e}	3
		Cystocarp production	NOEC	0.85 ^{a, e}	3

^a Tables 3-2 through 3-4.

^b USEPA 1994b, USEPA 1991.

^c Default values. These values are identified, when possible, for methods represented by fewer than three laboratories. The default value for *Cyprinodon* is based on *Pimephales*. Default values for *Menidia menidia* and *M. peninsulae* (not shown) are based on the median for *Menidia beryllina*. Default values for Method 1001.0 were based on Method 1005.0. The default value for Method 1008.0 was based on Method 1016.0 of Table B-3 in Appendix B.

^d Genus and species recently changed to *Raphidiopsis subcapitata*.

^e USEPA 1994a, USEPA 1991.

NOTE: CVs represent the median coefficient of variation observed within laboratories for WET tests conducted on reference toxicant samples. NOEC estimates are reported for the most sensitive endpoint. This means that, for each test, the NOEC value was recorded for the endpoint that produced the lowest NOEC test result.

This page intentionally left blank.