

ARCHIVE: Archived due to the 2009 rule revision. Refer to VA30007.09.028 for the updated document.

TITLE: Guidance for Computing the 95% UCL of an Environmental Data Set

DATE EFFECTIVE: January 2005

HISTORY: Update of VA30007.03.016 - Revision was necessary to reflect new guidance from U.S. EPA.

KEYWORDS: Sampling; field data; environmental data sets; lognormal distributions; skewed distributions; data analysis; non-parametric; 95% UCL; EPC

RULE/ AUTHORITY: OAC 3745-300-07(D)(6)(c)(i) and (G)(2)(b)

QUESTION: What tools are available to calculate the exposure point concentration term for environmental data sets?

ANSWER: OAC 3745-300-07(D)(6) describes procedures to determine the concentration of chemicals of concern in environmental media. This rule allows the use of a representative concentration by calculating a 95% upper confidence limit (UCL) of the arithmetic mean of the data set, provided the data set is comprised of a sufficient number and quality of samples to derive a frequency distribution that can reliably estimate a 95% UCL value. The rule specifically references *Supplemental Guidance to RAGS: Calculating the Concentration Term, U.S. EPA, May 1992* as effective guidance for calculating an appropriate concentration. However, U.S. EPA has updated the May 1992 guidance with new guidance entitled *Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites, December 2002, OSWER 9285.6-10*. In addition, a software tool and user's guide, *ProUCL, Version 3.0 User Guide, April 2004* has been developed to perform many of the calculations described in the updated guidance. Please note that ProUCL is periodically updated and this technical decision compendium document is meant to direct the reader to the most current software version.

OAC 3745-300-07(G)(2)(b) requires the volunteer to demonstrate that statistical methods used are appropriate and valid for their intended use. The use of the ProUCL software and guidance can help ensure

that 95% UCLs are appropriately calculated when applied correctly. Therefore, the VAP recommends use of this publicly available software and accompanying user's guide (download available at <http://www.epa.gov/nerlesd1/tsc/form.htm>) to calculate an appropriate 95% UCL. ProUCL tests for normality, lognormality, and gamma distribution of a data set, provides goodness-of-fit plots, and computes a conservative and stable 95% UCL of the population mean. In addition to computing the 95% UCL using five parametric methods, the program also computes the 95% UCL using ten non-parametric methods. The program will recommend the use of a method based on the statistical properties of the data set. Use of the recommended method is not required, but the use of a different method should be justified in the Phase II or Risk Assessment Report.

SUMMARY:

The VAP recommends the use of U.S. EPA's ProUCL software application and accompanying user's guide and guidance documents to calculate the 95% upper confidence limit of an environmental data set.

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For any questions concerning this issue, please contact the VAP central office at (614) 644-2924.