
AWRA 2011 ANNUAL WATER RESOURCES CONFERENCE
Albuquerque, New Mexico

November 7-10, 2011

Copyright © 2011 AWRA

**UNCERTAINTY ESTIMATES OF USEPA'S ACUTE AMBIENT
AQUATIC LIFE WATER QUALITY CRITERION FOR ACROLEIN**

Douglas McLaughlin*, Hemant Bohra

ABSTRACT: Acute and chronic aquatic life criteria for acrolein were finalized by USEPA in 2009 using methods described in USEPA's "Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses (the "1985 Guidelines"). Procedures in this document generally yield final criteria that are single-point, deterministic estimates of the concentration of a chemical substance that is intended to protect 95% of aquatic species from adverse impacts due to exposure to the chemical of interest. Recently, a method combining the 1985 Guidelines procedure for deriving an acute criterion (Final Acute Value, FAV) with Monte Carlo simulation was used to derive probabilistic estimates of the FAV resulting from variation and uncertainty in laboratory acute toxicity test results (McLaughlin and Jain 2011). In this paper, the Monte Carlo method is applied to the acute toxicity data used to derive the acute criterion for acrolein. Results are compared with the deterministic FAV of 6 ug/L, from which the criterion maximum concentration of 3 ug/L is obtained. The effect of various assumptions used in Monte Carlo simulations is explored, such as the magnitude of the variance of species mean acute values (SMAVs) when only one test result is available, and the nature of the distribution of SMAV estimates. The 10th and 90th percentile FAV estimates are roughly 4 ug/L and 8 ug/L, respectively, with these values being affected more by variance assumptions than by distribution assumptions.

* Principal Research Scientist, NCASI Inc., Western Michigan University, A 114 Parkview Campus Mail Stop 5436, Kalamazoo, MI 49008 USA, Phone: 269-276-3545, Email: douglas.mclaughlin@wmich.edu