



Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000)

Draft Technical Support Document, Volume 3: Development of Site-Specific Bioaccumulation Factors

EPA has released for scientific views a draft of a third technical support document to accompany the *Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health*, published in 2000. The *Draft Technical Support Document, Volume 3: Development of Site-specific Bioaccumulation Factors* (Site-specific TSD) contains technical details on how states and tribes may develop site-specific bioaccumulation factors (BAFs) for use in deriving site-specific ambient water quality criteria for protecting human health. The first two technical support documents are entitled *Technical Support Document, Volume 1: Risk Assessment* and *Technical Support Document, Volume 2: Development of National Bioaccumulation Factors* (National TSD).

Background

Aquatic organisms can accumulate chemicals in their bodies when they are exposed to these chemicals through water, their diet, and sediment. This process is called bioaccumulation. The extent of bioaccumulation by aquatic organisms varies widely depending on the chemical and the species, but it can be extremely high for some highly persistent and lipid-soluble chemicals. For such highly bioaccumulative chemicals, concentrations in aquatic organisms may pose unacceptable human health risks from eating fish and shellfish even when concentrations in water are too low to cause unacceptable health risks from drinking the water.

In order to prevent harmful exposures to chemicals in water through eating contaminated fish and shellfish, Clean Water Act Section 304(a) national water quality criteria recommendations ("304(a) criteria") for protecting human health must address chemical bioaccumulation in aquatic organisms. *Technical Support Document, Volume 2: Development of National Bioaccumulation Factors* ("National TSD") describes how to calculate national bioaccumulation factors for use in 304(a) criteria.

In developing the National TSD, EPA envisioned the development of a second technical support document to address bioaccumulation and provide guidance on how to modify the national bioaccumulation factors (BAFs) to derive BAFs that are more representative of the bioaccumulation potential at a given location (i.e., site-specific BAFs). The draft Site-specific TSD provides guidance on different approaches that investigators can take to develop site-specific BAFs, and the factors that should be considered when selecting an approach for a given situation. Neither of the bioaccumulation TSDs should be used alone to derive BAFs, but rather should be used in conjunction with the 2000 Human Health Methodology. The intended audience for the draft Site-specific TSD includes state and tribal water quality staff scientists or risk assessors ("investigators") who are responsible for deriving state or tribal water quality standards, stakeholders interested in developing site-specific BAFs, and other users interested in site-specific bioaccumulation issues for other applications.

About this Technical Support Document

In 2000, EPA published the *Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health* ("2000 Human Health Methodology") that updated and revised the existing 1980 *Ambient Water Quality*

Criteria National Guidelines The 2000 Human Health Methodology incorporates scientific advancements made over the past two decades in chemical risk assessment, exposure assessment, and bioaccumulation

EPA developed detailed procedures and guidelines described in the 2000 Human Health Methodology for estimating BAF values for use in deriving or revising ambient water quality criteria. The National TSD discusses the technical basis for developing national BAFs, the underlying assumptions and uncertainties inherent to the approach, and applying the bioaccumulation component of the 2000 Human Health Methodology. The draft Site-specific TSD expands on the information presented in the National TSD by providing users specific information on how to calculate site-specific BAFs for use in modifying the national 304(a) criteria. The draft Site-specific TSD presents methods for states, tribes and other interested parties to calculate BAFs that are specific to their site. The goal in deriving site-specific BAFs is to determine the most accurate estimates of bioaccumulation feasible for each site. The draft Site-specific TSD follows the same methodology presented in National TSD.

Technical Information

Using the 2000 Human Health Methodology, water quality criteria are derived using a bioaccumulation factor to reflect the uptake and retention of a chemical by fish and shellfish from all sources (e.g., water, food, sediment). The National TSD and the draft Site-Specific TSD include a framework for selecting the appropriate procedure for deriving a BAF that is based on chemical properties, biological activity and scientific information. The draft Site-Specific TSD expands on this information by providing information on sampling and statistical techniques, modification of existing national BAFs for site-specific application, and empirical calculations of site-specific BAFs.

How do I get a copy of the draft technical support document?

EPA requests scientific views on all aspects of the draft Site-Specific TSD, including the soundness of the technical approaches described in the document, the usefulness of the document for states and tribes in calculating site-specific BAFs, and the document's clarity of presentation. You can get copies of "*Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health, Draft Technical Support Document, Volume 3: Development of Site-Specific Bioaccumulation Factors*" (EPA-822-B-08-001) by downloading the document from EPA's web site at www.epa.gov/waterscience/criteria/humanhealth/method/index.html