

Sediment Toxicity Identification (TIE) Phases I, II and III Guidance Document

This document was developed by EPA's Atlantic Ecology Division and Mid-Continent Ecology Division. Its objective is to provide guidance on the performance of sediment TIE for both interstitial water and whole sediments in marine and freshwater environments.

Background:

Sediment contamination in the United States has been amply documented and, in order to comply with the 1972 Clean Water Act, the U.S. Environmental Protection Agency must address the issue of toxic sediments. Contaminated sediments from a number of freshwater and marine sites have demonstrated acute and/or chronic toxicity to a variety of test species, as well as adverse ecological effects such as population declines and changes in community structure. However, simply knowing that a sediment is toxic has limited use. This document provides guidance on the performance of sediment Toxicity Identification and Evaluation (TIE). TIE methods allow for the identification of toxic chemicals or chemical classes causing observed toxicity. The identification of pollutants responsible for toxicity of contaminated sediments has a broad application in a number of EPA programs as the methods can be used within a total maximum daily load (TMDL) framework, to link sediment toxicity to specific dischargers, to design cost-effective remediation programs, and to identify environmentally protective options for dredged material disposal. In addition, the identification of specific problem contaminants in sediments could prove to be very useful to EPA programs involved in the development of water or sediment guidelines, and the registration of new products such as pesticides. Finally, knowledge of the causes of toxicity that influence ecological changes such as community structure would be useful in performing ecological risk assessments not only for the Agency but also for the scientific community as a whole.

Charge:

In your review, please provide written responses to the following questions. Additional comments and recommendations for improving the document are welcome.

Overall questions:

- 1) Are the concepts and assumptions laid out in the document sufficiently developed and clearly articulated? If you identify deficiencies, please recommend ways to remedy them.
- 2) Are the scientific bases for the manipulations conceptually sound/valid?
- 3) Are the methods and logic clearly explained and scientifically justified? Please indicate any modifications that would improve upon the methodology.

Sections 1-5: *Introduction; Health and Safety; Quality Assurance; Equipment, Supplies and Facilities; Statistical Methods*

Do these series of brief sections provide an acceptable opening to the document and provide the reader with sufficient preliminary information for understanding the material that follows? What specific additions or deletions to this section would you suggest?

Section 6: *Designing the TIE approach*

Does this section describe the differences between interstitial and whole sediment TIEs and contain logic for which approach to use, and how the approaches can be combined to help the researcher identify the cause of toxicity?
Is this section internally consistent with the other sections?

Section 7: Phase I Overview and Methods: Whole Sediments

Does this section clearly explain the Phase I methods we have developed for whole sediments?
Is this section internally consistent with the other sections?
Are there other methods that should be referenced in this section?

Section 8: Phase I Overview Methods Interstitial Waters

Does this section clearly explain the Phase I methods we have developed for interstitial waters?
Is this section internally consistent with the other sections?
Are there other methods that should be referenced in this section?

Section 9: Phase II Sediment TIE Methods

Does this section clearly explain the Phase II methods we have developed for whole sediments and interstitial waters?
Does the section explain how procedures performed in the different manipulations can be supportive of the identification of the toxicant?
Is this section internally consistent with the other sections?
Are there other methods that should be referenced in this section?

Section 10: Phase III Sediment TIE Methods

Does this section clearly explain the Phase III methods we have developed for whole sediments and interstitial waters?
Does the section explain how procedures performed in the different manipulations can be supportive of the final identification of the toxicant?
Is this section internally consistent with the other sections?
Are there other methods that should be referenced in this section?

Please provide your written comments to me no later than **September 25, 2006**. If you have any questions concerning the draft document or the charge, please contact me at 919.541.2815 or hok.virginia@epa.gov. We sincerely thank you for your input to our peer review process.

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