Revision and Combination of Ocean and Inland Manuals

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Overview

Problem:
• Currently ITM and OTM provide overlapping guidance
• Policy guidance sometimes conflicting or outdated
• Guidance does not include recent scientific and technical advances
Overview

Solution: Develop combined manual to provide consistent and updated guidance while recognizing the regulatory differences

- **Update policy:**
  - Sediment quality guidelines
  - TBP
  - When/how can TBP and SQGs be used?

- **Update technical**
  - Bioaccumulation interpretation
  - Chronic toxicity tests

Major Issues

- When is testing required?
- Use of TBP, SQGs
- Identifying contaminants of concern
- Method detection limit issues
- Statistical issues
- Chronic toxicity tests
- Confounding factors in bioassays
- Test organisms
- Bioaccumulation interpretation
- Risk Assessment approaches
Development of New Approach

- Risk-Based Conceptual Model
- Weight of evidence/lines of evidence
- Simplify tiers to two levels
  - Existing Information and Screening
  - Biological Assessment
- “Confine” changes to ensure compliance with existing regulations

Distinctions between MPRSA and CWA

- Role of chemical evaluations (SQGs)
  - Sediment chemistry, SQGs, and TBP cannot substitute for required bioassays under MPRSA.
- Management options
  - Capping cannot be used “to cure a flunk” under MPRSA.
- Toxicity and bioaccumulation tests
  - Required under MPRSA unless one of the exclusions is met or earlier testing is valid.
Technical Revision: Conceptual Model

- A generic conceptual model will be described for open water disposal
  - Guidance for making site-specific modifications
  - Establish linkage between exposure pathways and receptors and data collected during an evaluation
  - Direct evaluation process

General Conceptual Model for Assessing Risk of Contaminated Sediments (From Driscoll et al., 2002)
Technical Revision: Weight of Evidence (WOE) Approach

• Relies on multiple lines-of-evidence (LOE)
• Reach conclusions regarding the potential risks to receptors identified within the CM
• Three main lines-of-evidence

Lines of Evidence

LOE: Water Column Evaluation

• Replacement of 0.01 application factor (for determining no-effect level from elutriate LC50 value) with a range of values.
  – 0.01 used only for persistent compounds
  – 0.05 used for non-persistent compounds
  – 0.1 used for ammonia
• Original 0.01 factor from 1972 WQC derivation document
LOE: Water Column Evaluation

- Updating test species list and protocols.
  - Survey conducted in 2004
  - Identified organisms used/not used/potential
- Reduce elutriate test duration to 24 h
  - Current tests require feeding past 48 h
  - Long term (96 h) is not realistic exposure
- Inclusion of additional dilution in test design. 100%, 50%, 10% and 1% to bracket LC50 value

LOE: Radionuclides/Pathogens

- Guidance for assessment of radionuclides in dredged material.
  - International Atomic Energy Agency (IAEA) model for assessing *de minimis* levels of radionuclides (public and dredge worker) (IAEA, 2003).
  - Dept. of Energy Biota Dose Assessment model for assessing impacts on benthos, fish, and wildlife (U.S. DOE, 2002).
- Updated guidance for assessing pathogens
  - Most probable number (MPN)
  - Membrane filter (MF) techniques
LOE: Benthic Evaluation

• Recommendations for the use of chronic toxicity tests when there is a reason to believe chronic effects are a concern.
  – *Neanthes araneceodentata* 28-day
  – *Leptochirus plumulosus* 28-day
  – *Hyalaeella azteca* 42-day
  – *Chironomus tentans* 28-day tests.

• Currently determining
  – What additional information is gained?
  – Increased sensitivity?
  – How to interpret?
  – Additional costs?

LOE: Benthic Evaluation

• Use of sediment chemistry screening tools for rapid inexpensive analysis of chemicals
  – immunoassays
  – biomarkers
  – cell assays (dioxin assay)

• Expanded use of sediment quality guideline values as an additional line of evidence
  – Empirically based (ERL, ERM)
  – Theoretically based (AVS-SEM)
LOE: Bioaccumulation Evaluation

Bioaccumulation Assessment

• Expanded use of thermodynamically based bioaccumulation potential (TBP) to predict bioaccumulation of organic chemicals (Kow > 4.0).
• Additional guidance provided for bioaccumulation testing
  – Use of Corbicula fluminea
  – Consideration for metabolism
• Addition of more sophisticated food-web modeling to assess trophic transfer (e.g. TrophicTrace)

Bioaccumulation Interpretation

• Benthic Organisms
  – Elimination of use of bioaccumulation to predict benthic impacts.
  – Exceptions (Site specific considerations, TES)
• Fish and Wildlife
  – Tissue residue benchmarks (i.e., CBR values, probabilistic approaches, and TRVs)
• Humans
  – FDA fish advisory levels
  – cancer and non-cancer protection levels (IRIS database)
Conclusions

• WOE/LOE should allow additional information to be used to make informed decisions
• CSM will provide direction for evaluation and ensure data quality through iterative process
• New updated evaluation procedures will enhance our ability to describe the nature of sediment proposed for dredging