MIDNITE MINE METHYLMERCURY TRANSLATOR STUDY

Cindi Godsey

EPA Region 10

NPDES Permit Writer

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2001 Mercury Criterion Fact Sheet
How can this criterion help control mercury pollution?

- The United States needs to establish effective source control and management programs in the coming years to begin to recover from the widespread mercury contamination in our aquatic environments
- Such actions will hopefully reduce mercury contamination so that fish consumption advisories can be removed.
- EPA expects the criterion recommendation to be used as a guide by States, authorized Tribes, and EPA in establishing or updating water quality standards that may serve as a basis for pollutant source control and for fish and shellfish consumption

2001 Mercury Criterion Fact Sheet
How is the methylmercury criterion derived?

- To assess health risks, EPA developed a reference dose that is a scientifically justifiable maximum level of exposure to protect public health from all toxic effects EPA based the methylmercury criterion on a new reference dose that protects all exposed populations.
- EPA also updated the exposure assessment and relative source contribution following the 2000 Human Health Methodology
- The resulting criterion of 0.3 mg methylmercury/kg in fish tissue should not be exceeded to protect the health of consumers of noncommercial freshwater/estuarine fish.
- EPA has taken into account the fact that consumers of freshwater/estuarine fish are also consumers of marine fish.

2001 Mercury Criterion Fact Sheet **Deriving the Criterion** (cont)

- EPA suggests three approaches that can be used to translate fish tissue methylmercury concentrations into concentrations of methylmercury found in the water column:
  - Calculate site-specific bioaccumulation factors based on data collected from a specific waterbody
  - Calculate site-specific bioaccumulation factors based on computer models, and
  - Use experimentally-derived bioaccumulation factors that are based on field data published in the criteria.
- EPA developed a set of empirically-derived bioaccumulation factors in the initial efforts to derive a revised ambient water quality criteria for methylmercury EPA has also derived factors to translate methylmercury in water to its total mercury equivalent.

Midnite Mine NPDES Permit Requirements

- After STI has adopted a methylmercury fish tissue criterion and it has been approved by EPA:
  - STI will contact the permittee to begin conferring and coordination with STI Department of Natural Resources (STI-DNR)
  - Together develop and execute the Study Plan for the Methylmercury Translator Study
- The permittee must design and implement a Study Plan, within 180 days of EPA's approval of the methylmercury fish tissue criterion, to collect the data necessary to develop a site-specific bioaccumulation factor (BAF) and from that, **a fish tissue criterion to water column criterion translator.**

The required formulas:

- **BAF = Ct/Cw**

  Where BAF is the bioaccumulation factor

  Ct = concentration of methylmercury in fish tissue (mg/kg, wet weight)

  and Cw = concentration of methylmercury in water (mg/L)

- **WQC = TRC/BAF**

  Where WQC = water column criterion (mg/L)

  TRC = fish tissue criterion (mg/kg)

  and BAF = bioaccumulation factor (L/kg)

Methylmercury Translator Study Plan

- Fish need to be collected from the geographic area that represents an average exposure to those who eat fish from the waterbody
- Sampling must occur when the target species is most frequently harvested
- The sampling should target tropic level 4 fish (larger, carnivorous fish) and be a commonly consumed [by humans] aquatic organism with a preference for resident over migratory species
- Evaluation of the best method of tissue collection should be done for the Study Plan

Methylmercury Translator Study Plan (cont)

- Methylmercury water sampling from an area where the fish being analyzed live and where they are harvested shall be done biannually, changing the time of year (e.g. first year: spring/fall, second year: summer/winter, third year: fall/winter, fourth year: spring/summer) but establishing a schedule that allows for at least two samples from each season to be considered in the Translator Report
- Sampling of fish tissue will occur every 2 years establishing a schedule that allows for at least two samples to be considered in the Translator Report
- The fish should be relatively the same size with the smallest being at least 75% the length of the largest

For more information on NPDES:

Cindi Godsey
Environmental Engineer
1200 Sixth Avenue, Suite 155
Seattle, WA 98101
(206) 553-1676/(800) 424-4372
godsey.cindi@epa.gov