

## Topic WQ-1

### White Paper Topic: Manganese Treatment Standard

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#### **Problem Definition:**

Describe the nature of the issues or problems:

- Is Mn truly a surrogate for other trace & heavy metals?
- Is Mn biologically toxic and if so, at what concentrations?
- Treatment for Mn results in substantially increased treatment costs.
- Treatment for Mn results in increased sludge volume and subsequent sludge disposal issues.
- Treatment for Mn results in discharging high concentrations of Na and Ca.
- At the moment Mn concentration limits are specified by regulation. Could EPA modify its regulations to be more flexible in terms of effluent limits and use site-specific in-stream limits as an option?

Why is it an ADTI priority:

It is expensive to treat for Mn and the environmental benefit, at least in terms of aquatic life, is questionable. Additionally there are some negative aspects to Mn treatment (in addition to direct treatment costs), such as additional sludge handling and discharge of treatment chemicals to streams (e.g., Na). States with limited resources may be better off spending limited resources treating a greater number of sites to a pH sufficient to remove iron and aluminum, rather than taking that same pool of money and treating to a pH sufficient to achieve Mn removal. Industry may benefit economically from being able to treat specifically for the other contaminants that Mn is allegedly the surrogate for.

What are the technical issues?

- At what level is Mn toxic to aquatic organisms?
  - US EPA does not have a freshwater aquatic toxicity standard for Mn
- Should there be one? If so, what are the criteria and what is the science behind the number?
- Can other metals (e.g., Zn, Ni, Cd) be removed at a pH less than required for Mn removal?
  - If these metals are a problem it may be cheaper to simply treat to remove them at a lower pH than to treat for Mn at a high pH.

## **Potential Approaches to Solving the Problem:**

OSM held a Workshop in the spring of 2005 to bring together Federal, State, Industry and outside experts to examine the manganese water treatment issue. Aspects that were examined are:

- the regulatory history of Mn, including preamble discussions;
- relationship between trace metal precipitation and Mn precipitation (surrogate issue);
- the cost of treating for manganese;
- aquatic impacts of Mn;
- state experience with Mn treatment; and
- industry experience with Mn treatment.

The U.S. Environmental Protection Agency is currently reviewing the effluent guidelines for manganese and additional research needs may arise from that process.

## **Cost of Project:**

Provide a cost estimate for project scenarios: To be determined.

## **Time Required:**

Provide a schedule/timeline to complete project scenarios. To be developed

## **Selected References**

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