

**Workshop on
Assessment and Disposal of Arsenic-bearing Solid Residuals**

Draft(8) Agenda

This is a draft agenda for a Workshop to be held February 28 – March 1 in Washington, DC. The workshop will focus on the science and research-related issues surrounding assessment and disposal of the arsenic-bearing solid residuals of water treatment technologies. The goal is to identify the latest science that will support additional or alternative procedures to reduce or eliminate the potential public health hazards caused by disposal of these wastes. Participants will include representatives of EPA OSW, OW, OSWER, and ORD; select academicians; and NIEHS Superfund Basic Research Program staff and contractors.

Participants/Invitees:

Lee Hofmann, EPA OSWER
Patricia Erickson, EPA ORD
Souhail Al-Abed, EPA ORD
Greg Helms, EPA OSW
Rajiv Khera, EPA OW
Jeff Kempic, EPA OW
Chris Ryan, EPA Region 1

Wendell Ela, University of Arizona
Eduardo Sáez, University of Arizona
Jim Field, University of Arizona
David Kosson, Vanderbilt University
Janet Hering, Cal Tech
Tim Townsend, University of Florida

Steve Jones (or another representative), ATSDR
Beth Anderson, NIEHS
Claudia Thompson, NIEHS
Larry Reed, MDB, Inc.
Larry Whitson, MDB, Inc.

Proposed Workshop Agenda:

- 1) (9:00 – 10:00 Monday) Welcome/Intro/Scope of Problem
 - a. Welcome (Beth Anderson)
 - b. Introduction (Wendell Ela, Larry Reed)
 - c. Scope of the Issue (Larry Whitson, Erica Blumenschein)
 - d. How can we assist the EPA in providing alternative advice and/or guidance to prevent or minimize this potential public health/environmental threat?

- 2) (Mon 10:00 – 2:30, break for working lunch included) Residuals Assessment: Use of the TCLP and alternatives for assessment of arsenic-bearing solid residuals from treatment of drinking water (Greg Helms, Trish Erickson, David Kosson)
- a. What are the possible alternatives to the TCLP for arsenic residuals assessment? Potential options:
 - i. Are the use of state designated, alternative tests (CA WET) an option and, if so, how?
 - ii. Is the use of a comparable listing action as that done for chlorinated aliphatics an option and, if so, how?
 - iii. How must the short-term approaches be different from the long-term solutions and how can the former transition into the latter?
 - iv. What is the best administrative option, and the procedures/requirements for implementing it, keeping in mind that there are real practical limitations to what EPA can do in the short-term with regards to analytical testing of these wastes? What science is needed to support this option?
 - b. What scientific underpinnings would be needed to support an alternative leaching test and how much of this science is available or imminently available?
 - i. In light of the previous workshop discussion of the available alternatives, what are their shortcomings in terms of the science and engineering on which they are based? What are the paths for addressing those shortcomings?
 - ii. Are the conditions of the leaching tests (e.g., the landfill leachates and simulated leachates in the Ela paper) which challenge the TCLP applicability representative of actual landfills and, if not, do they over- or under-predict leaching under landfill conditions?
 - iii. How do we test a proposed assessment test?
 - iv. What must be known to practically judge whether an alternative test protocol is adequate and defensible?
 - v. What testing protocol might be made ready-for-use for the restricted case of arsenic residuals? If none are currently fully developed, what is needed to develop one and when could such a test protocol be reasonably expected to be ready for dissemination?
- 3) (Mon 2:30 – 4:30 and Tues 9-10:30) Residuals Disposal: Are certain residuals suitable for non-hazardous, MSW landfilling and, for those which are not, are there cost-effective alternatives to non-hazardous, MSW landfilling? (Rajiv Khara, Jeff Kempic, Souhail Al-Abed, Eduardo Sáez, Chris Ryan)
- a. Are there alternative treatment technologies to the iron- and alumina-based adsorbents that will affect the residuals assessment and disposal picture?

- b. What disposal conditions, alternative procedures or stabilization methods are there that would reasonably ensure the current Toxicity Characteristic Regulatory Level of 5 mg/L is not exceeded?
 - i. Would reduced sorbent loadings (say from shorter run lengths), such as use of the California total threshold limit concentration of 500 mg As/kg wet weight affect the leaching characteristics of the wastes?
 - ii. Can the wastes be stabilized so as to prevent or significantly reduce the leaching characteristics?
 - iii. Would separate cell disposal or segregation with selected (but not general) municipal waste significantly reduce arsenic leaching?
 - iv. Are there types of municipal wastes, if co-disposed with residuals, that would restrict arsenic mobility? What landfill conditions favor leaching from residuals and which favor re-adsorption/precipitation? Is there potential for landfill additives (e.g., sulfide compounds) to restrict arsenic mobility?

4) (Tue 10:30 – 12:30) Integrated Framework (Patricia Erickson, Wendell Ela)

- a. How can the EPA develop an integrated regulatory, research and implementation framework to address the hazards created by disposal of the arsenic-bearing residuals in MSW landfills? What are the optional approaches to such an integrated framework?
 - i. Implications from workshop agenda #2 and #3
 - ii. What actions can be taken regarding analytic methods? Pros and cons
 - iii. What actions can be taken regarding alternate remediation methods? Pros and cons
 - iv. What actions can be taken regarding additional steps in the adsorbent remedial technology? Pros and cons
 - v. What is the balance of analytic method changes and remedial method changes that will best protect the public's health from this threat?
- b. How can the academic community and researchers best support these efforts?
 - i. For each of the potential actions, what science is needed to support those alternatives?
 - ii. Can we say "We could/will soon have alternative remediation methods that are cost-competitive and less hazardous?"
- c. Keep the session dialogue on balancing the most appropriate actions to minimize this health threat (appropriate = protective of public health, administratively feasible, supported by sound science)
- d. In developing an integrated framework to deal with this issue, can we recommend a solution at this point? If not, can we narrow to the most

appropriate options? Also, the framework might include a specific additional research agenda.

- 5) (Tue 12:30 – 3:00 with break for working lunch included) Next Steps (Beth Anderson, Patricia Erickson, Wendell Ela)
- a. What are the immediate follow-on steps that need to be taken to integrate and move forward with the outcomes of the previous sessions? {This is a capstone of the previous four sessions, but is still focused on the narrow objective of defining what needs to be done with respect to assessment and disposal of arsenic residuals in the near term (i.e., next 12 months).}
 - i. How will these additional steps be funded, coordinated and evaluated and who should be involved?
 - ii. What will be the timetable for this strategy? How and when should results of these discussions be disseminated to the water and solid waste industry? How/when do we involve the states?
 - b. What are the longer-term efforts and decisions that should be initiated in parallel with the near term efforts defined in the previous sessions?
 - i. What are the broader, longer-term implications and needs, including other analogous contaminants to arsenic?