State Perspective on Attenuation Processes for Metals and Radionuclides

Federal Remediation Technologies Roundtable

November 15, 2007

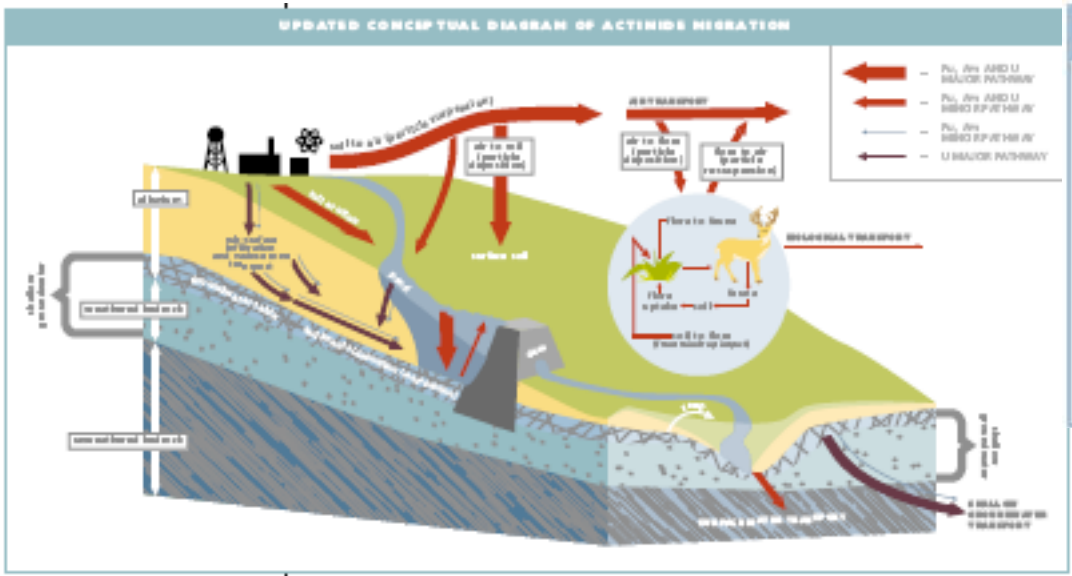
Carl Spreng (CO)

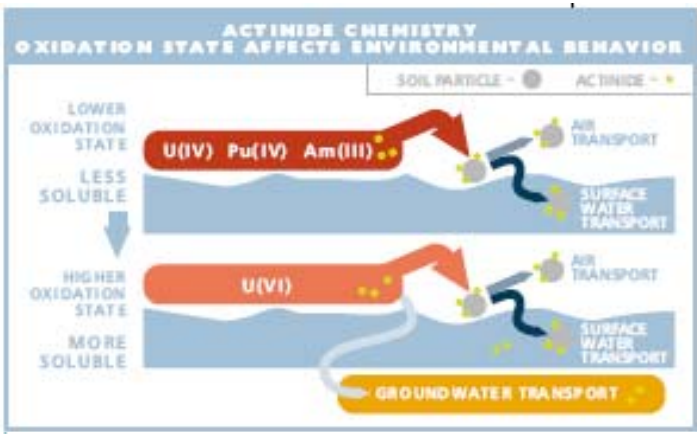
Legacy of Rocky Flats

Legacy of Rocky Flats

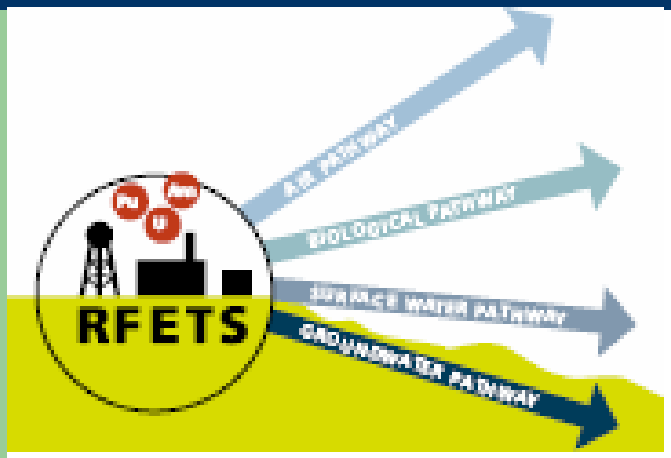
Rocky Flats:
Actininde Migration Evaluation

ACTINIDE MIGRATION EVALUATION PATHWAY ANALYSIS SUMMARY REPORT





Rocky Flats: Actininde Migration Evaluation



PATHWAYS:

- Air
- Biological
- Surface Water
- Ground Water

Rocky Flats Cleanup Agreement

RADIONUCLIDE	ACTION LEVEL (pCi/g)
Americium-241	76
Plutonium-239/240	116 (50)
Uranium-234	300
Uranium-235	8
Uranium-238	351

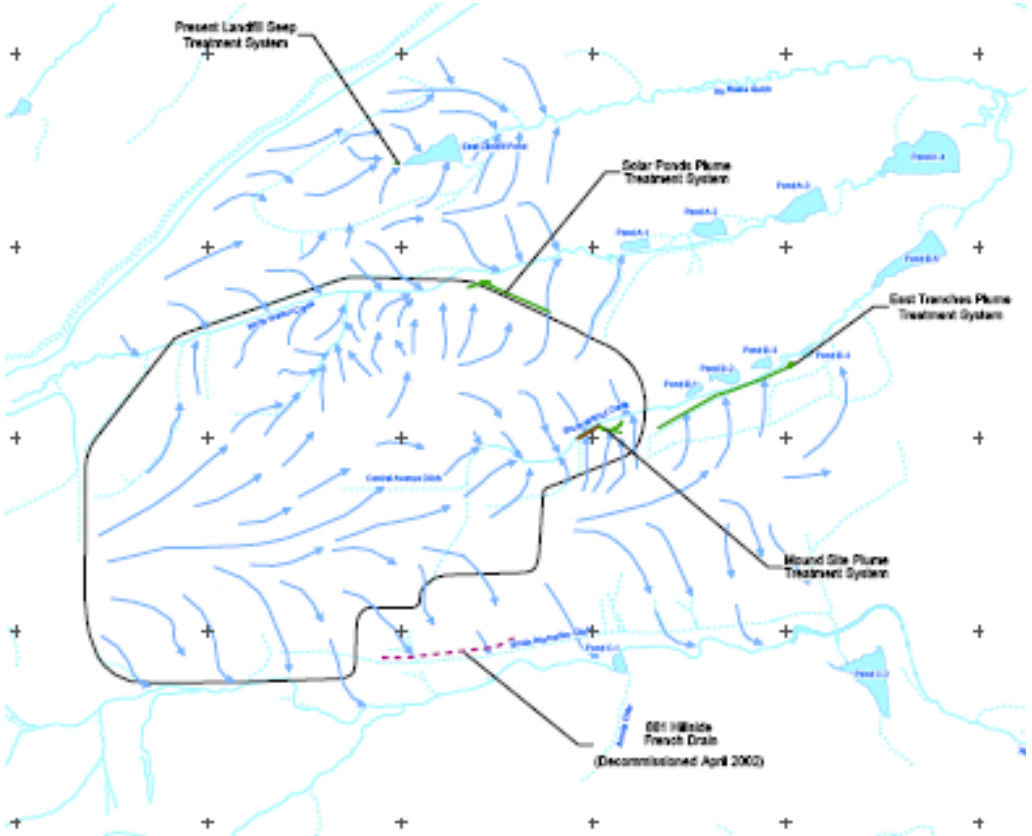
Rocky Flats Cleanup Agreement

AME→ justification for cleanup concepts

- Surface soil:
  more extensive cleanup
- Subsurface soil:
  some residual contamination

Rocky Flats Cleanup Agreement

AME→ Emphasis on surface water (0.15 pCi/L)



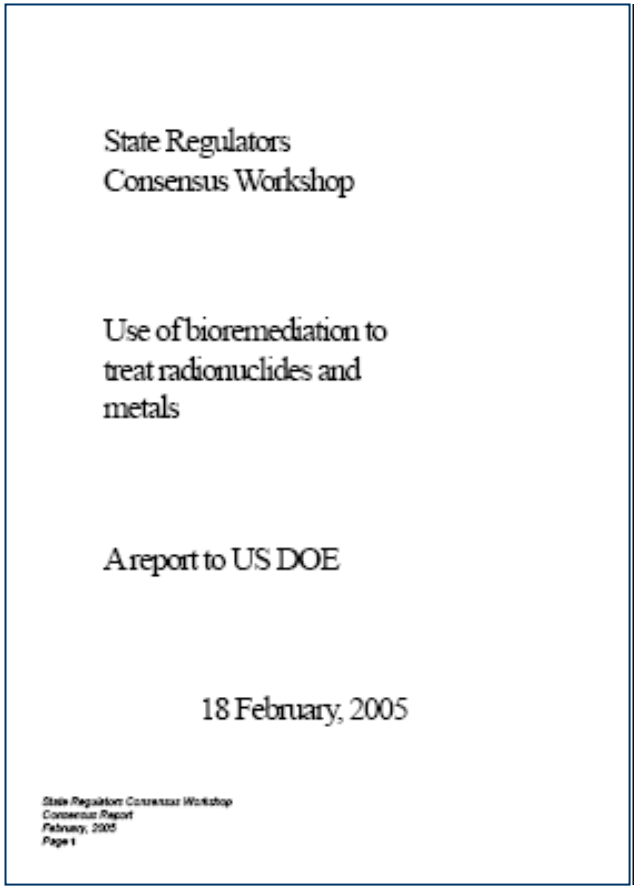
Consensus Workshop (Jan-Feb 2005)

- *Regulators from 7 states*
- *Oregon State University*
- *Taught basics by national experts from DOE Labs and academia*
- *NABIR Primer*

Consensus Workshop (Jan-Feb 2005)

State Regulators:

- ***Bioremediation is a viable option***
- ***Few completed field studies; even fewer large-scale applications***
- ***More promising/Less promising implementation opportunities***
- ***Specific deployment aspects must be addressed***
- ***Monitoring/maintenance considerations***



State Regulators
Consensus Workshop

Use of bioremediation to treat radionuclides and metals

A report to US DOE

18 February, 2005

State Regulators Consensus Workshop
Consensus Report
February, 2005
Page 1

Consensus Workshop (Jan-Feb 2005)

Deployment / Implementation Issues:

- Adequate hydrogeological characterization
- Adequate geochemistry characterization
- Using bioremediation as a secondary or polishing technique for in-place disposal
- Using bioremediation to mobilize a contaminant for extraction
- Using bioremediation to stabilize a contaminant

EPA Workshop on Monitored Natural Attenuation for Inorganic Contaminants

OSWER Directive 9200.4-17P

- Definition
- Concept that many inorganic contaminants will persist in the subsurface.
- Primary MNA processes for inorganics:
  - transformation
  - immobilization
  - radioactive decay

EPA Workshop on Monitored Natural Attenuation for Inorganic Contaminants

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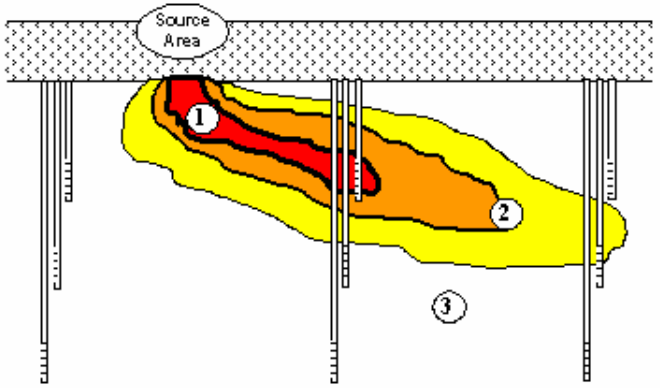
EPA Workshop on Monitored Natural Attenuation for Inorganic Contaminants

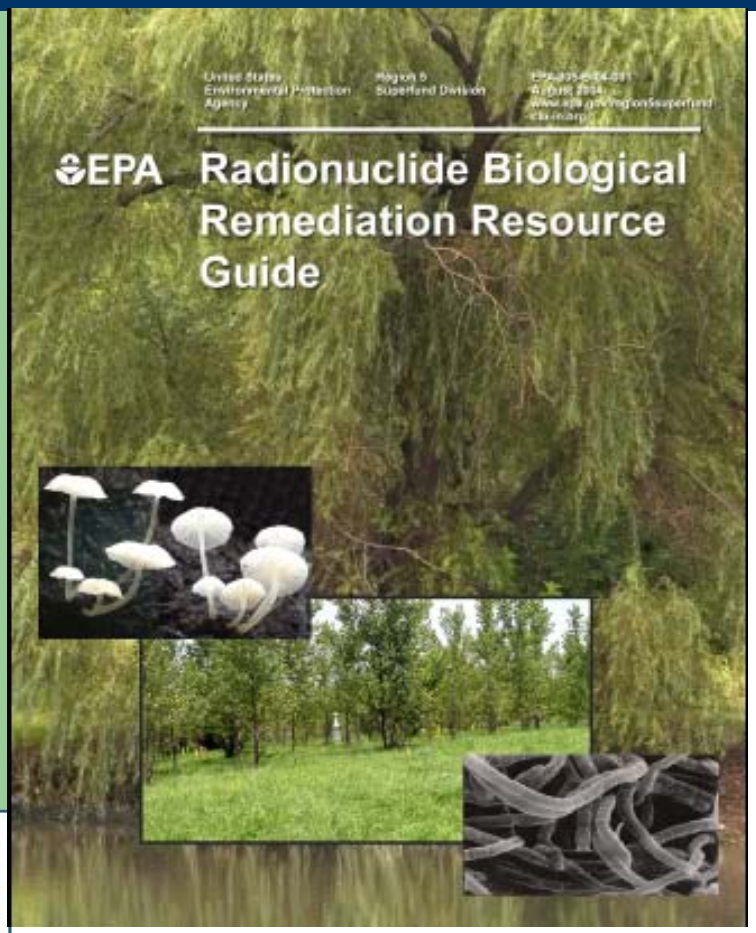
- Existing protocols do not include metals
- MNA techniques will likely be used in conjunction with other remediation technologies and institutional controls
- Few “complete” case studies exist
- Specific attenuation mechanisms have been identified for common metal contaminants of concern

EPA Workshop on Monitored Natural Attenuation for Inorganic Contaminants

- Need to know where the groundwater is moving to understand where the contaminant is being attenuated (hydrology)
- Mobility will depend on the interaction between contaminant properties and groundwater chemistry (geochemistry)

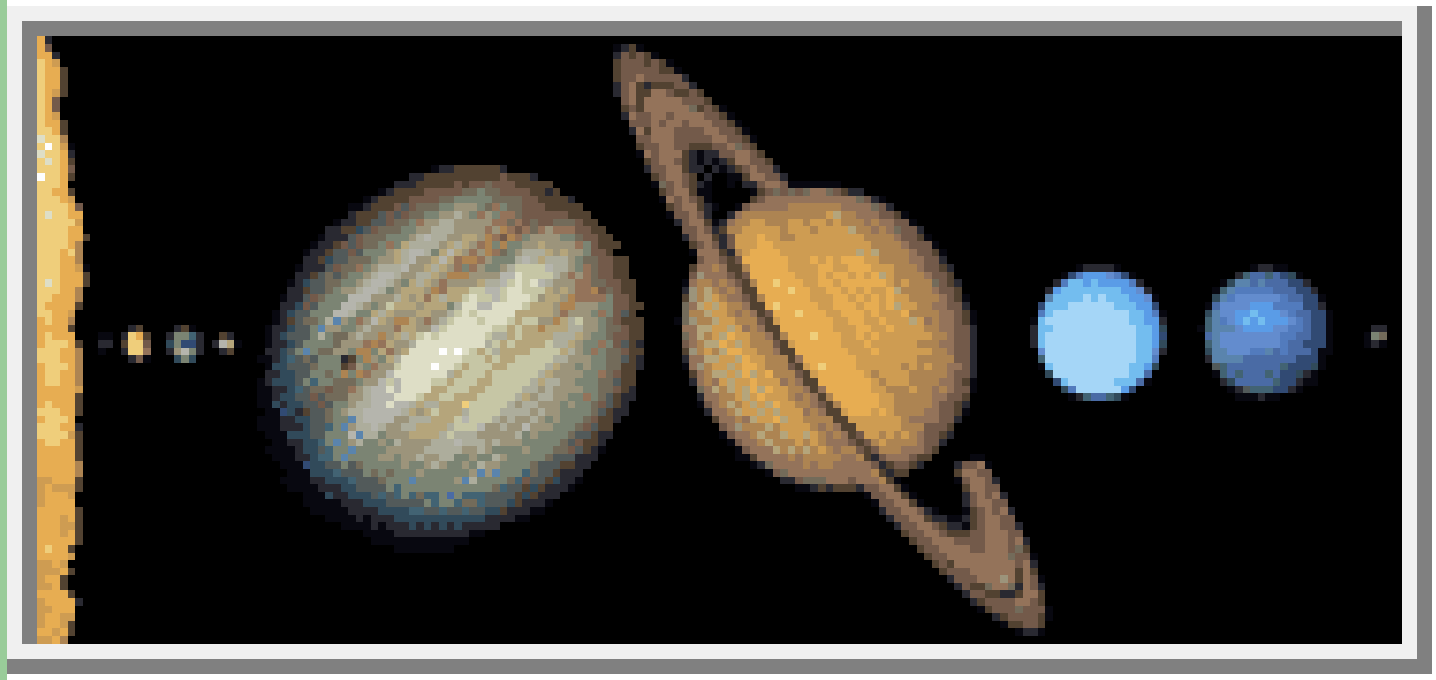


EPA Resource Guide (2005)



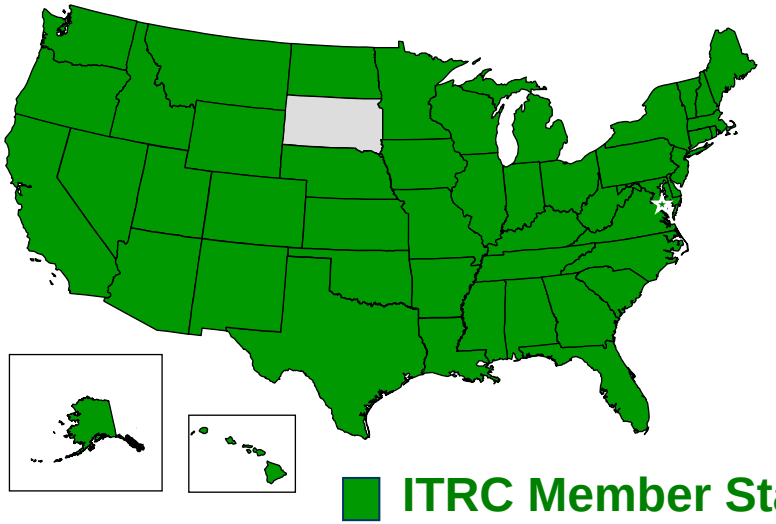
"Presently, excavation and shipping to a distant waste disposal site is the most commonly used method for handling soil contaminated with radionuclides. …This excavation and shipping of soils is very expensive and can be disruptive to the environment in which the contamination is found."

The planets have aligned



New ITRC Project

- Project Name: **Attenuation Processes for Metals and Radionuclides**



ITRC Member State

Federal Partners

Problem Statement

A lack of regulatory guidance for attenuation–based remedies for radionuclide and metals contamination contributes to inconsistent approaches and application of those remedies and generally discourages their consideration. The net result is that many sites face “intractable” closure problems.

Potential Team Membership

- State Regulators
  (CO, OH, NJ, NM, SC, TN, WA, et al)
- EPA (ORD; OSWER/OSRTI; OAR/ORIA;…)
- DOE National Laboratories
- DoD (Army Corps of Engineers, Navy, AFCEE)
- IAP Partners (industry)
- Academia
- Tribal
- Stakeholders

Overall Project Life Cycle Schedule

Dec 2008 → Web-based Resource Guide

June 2009 → Case Studies Forum

Dec 2009 → Case Studies Document

Fall 2010 → Technology & Regulatory Guidance

Dec 2010 → Internet-based training (series)