Office of Legacy Management Land and Site Management

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Office of Legacy Management Established December 2003

- Offices in
 - Grand Junction, Colorado
 - Pittsburgh, Pennsylvania
 - Morgantown, West Virginia
 - Washington, DC
 - Rocky Flats, Mound, Fernald, Las Vegas

Legacy Management Goals

Goal 1 - Protect Human Health and the Environment – Long Term Stewardship

Goal 4 - ...Real Property Reuse – alternate energy

Legacy Management Program

- Management of remedies involves ground water and surface water
 - ◆ Sampling according to *Ground Water*Compliance Action Plan − similar to a ROD
 - Variety of methods

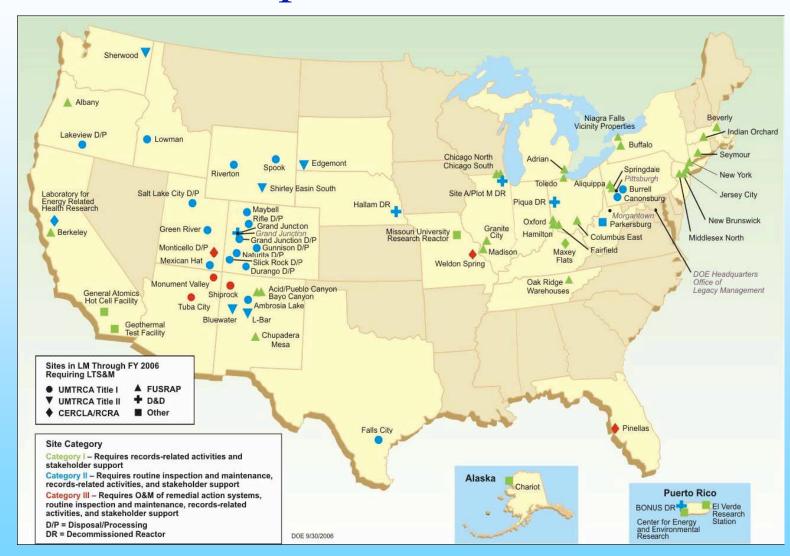
Site Remediation

- Ground water cleanup
 - Natural flushing
 - UMTRA standards set by U.S. Environmental Protection Agency
 - Model-based time limits and alternate concentration limits
 - Bioremediation
 - Phytoremediation
 - Nutrient enhancements for biological remediation

Site Remediation

- Ground water cleanup (continued)
 - Monitored natural attenuation
 - Sampling and modeling
 - Relies upon natural processes, such as ion exchange and precipitation
 - Active Treatments
 - Evaporation
 - Resin IX at Fernald
 - ♦ Zero Valent Iron

LM Site Map



LM Site Inventory

- 22 Title I sites specified in Uranium Mill Tailings
 Radiation Control Act
 - Resulted in creation of 19 disposal cells
 - Contain approximately 40 million cubic yards of encapsulated uranium mill tailings

Old and New Rifle, Colorado, UMTRA Sites

- Surface remedial action completed in 1996
 - Involved relocating tailings and other contaminated materials to alternative disposal site
 - ◆ Surface remediation was decoupled from groundwater some source remains below groundwater surface at some locations



Ground Water Cleanup

- Two water-bearing zones
 - Alluvium/colluvium
 - Wasatch Formation
- Contamination mostly limited to alluvium
 - Alluvium relatively shallow
 - Complex inter-mixture of fine and coarse grain materials

Ground Water Cleanup (continued)

- Wells installed at Old and New Rifle Sites
- Chemical analyses 1996 to present
- Contaminants of concern (COCs) identified
 - \bullet U, V, Se, As, Mo, NO₃
- Flow-and-transport modeling performed for COCs

Ground Water Cleanup (continued)

- Natural flushing selected as compliance strategy for both sites, with
 - Continued monitoring
 - Institutional controls
- Documents produced
 - ◆ Site Observational Work Plan (SOWP)
 - ♦ Like RI/FS
 - Ground Water Compliance Action Plans (GCAPs)
 - Like ROD

Status of Old and New Rifle Sites

 Old Rifle: Received NRC and CDPHE concurrence on GCAP

Continued monitoring

New Rifle: GCAP under final review
 Continued monitoring

LM needs

- Improved contaminant transport modeling
 - ◆ Key to remedial actions under UMTRA
 - ◆ 100 year clock predictions must be defensible
 - Understanding of uranium transport processes
 - How does bio affect retardation?
 - ◆ Is it predictable?

LM Needs

- If bio-treatments can work to stabilize uranium, how long will it last without nutrient source?
 - Microcosm relation to redox conditions
 - Buffering of reducing conditions
 - Stable mineral forms
 - ◆ In-situ bio coatings

LM Needs

- ◆ All LM sites long term monitoring
 - Telemetry for remote sites
 - Optimization of network
 - How many wells, how often sampled
 - Surrogates for difficult contaminants
 - Interpretation of data
 - Seasonality
 - Frequency of sampling
- Sites under remediation
 - Contaminant transport modeling