

# Waste Management at Uranium Recovery Facilities Regulatory Perspective

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# Uranium Recovery Regulations

- Atomic Energy Act of 1954
- Uranium Mill Tailings Radiation Control Act of 1978 (UMTRCA)
- EPA Standards - 40 CFR Part 192
- NRC Regs - 10 CFR Part 40, Appendix A
- National Environmental Policy Act of 1969

# Uranium Recovery

- What is Regulated:
  - Milling – any activity that produces byproduct material (10 CFR 40.4).
  - Byproduct Material – tailings or wastes produced by the extraction or concentration of U or Th for its source material content
  - NRC DOES NOT Regulate MINING
  - Types of Milling – Conventional, in-situ recovery (ISR), Heap Leach

# Waste Management at Uranium Recovery Sites

- Conventional Mills
  - Tailings management
  - long term care
- ISR sites
  - Liquid effluent
    - Class I Deep disposal wells
    - Evaporation ponds
    - Surface water discharge
    - Land application
    - Class IV injection wells
  - Solid waste
- Heap Leach sites

# License Application Review Process

- In depth review of proposed waste management methods
  - Change in approach would require an amendment and environmental review
- Waste management alternatives evaluated under environmental review
- State/EPA UIC Permits

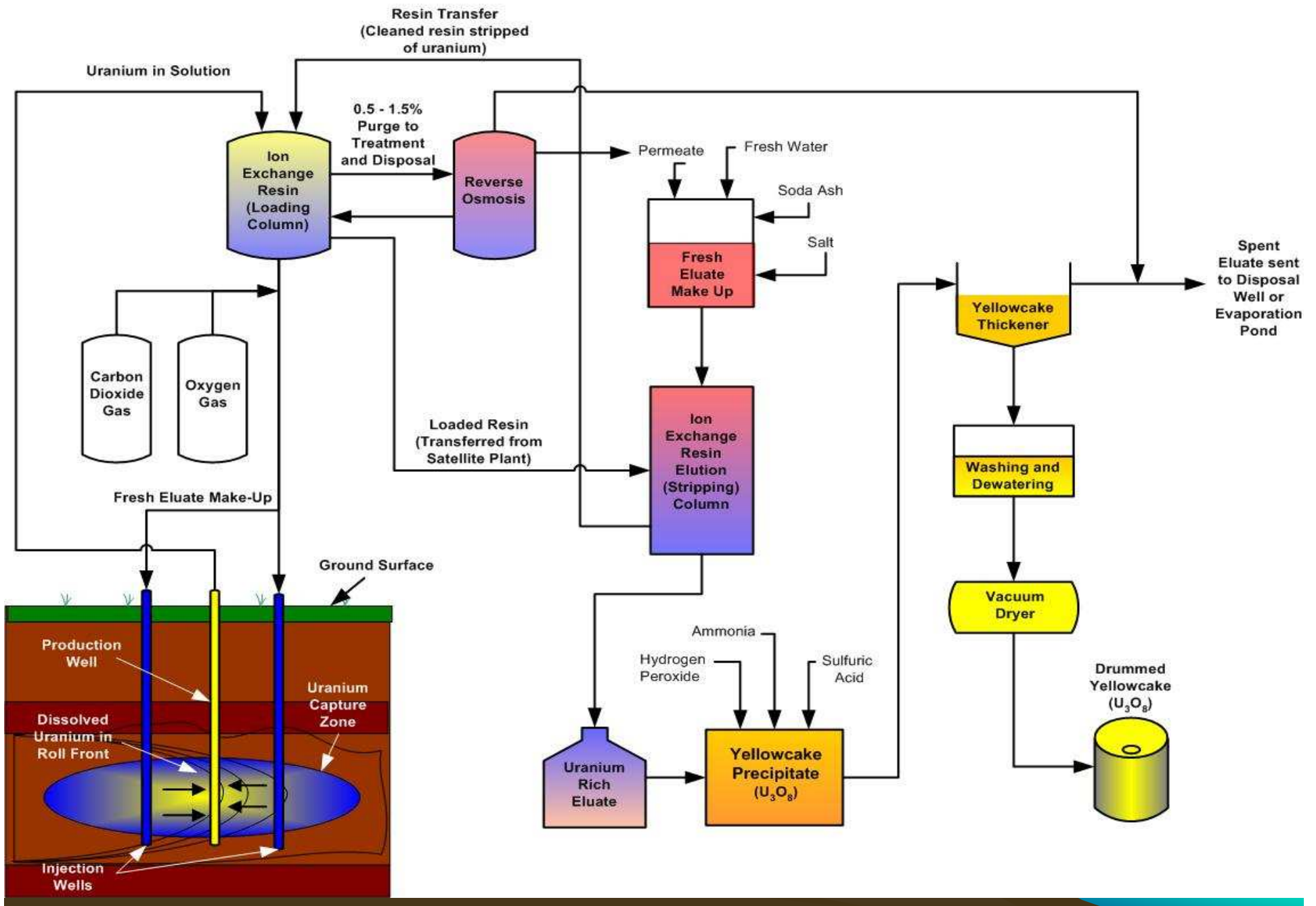
# Primary Guidance Documents

- NUREG-1620, Revision 1, Conventional Mill Reclamation Plans
- NUREG-1569 Standard Review Plan for in situ leach [recovery] Extraction License Applications
- Developing a Standard Review Plan for the Review of Conventional and Heap Leach License Applications

# Emerging Issues

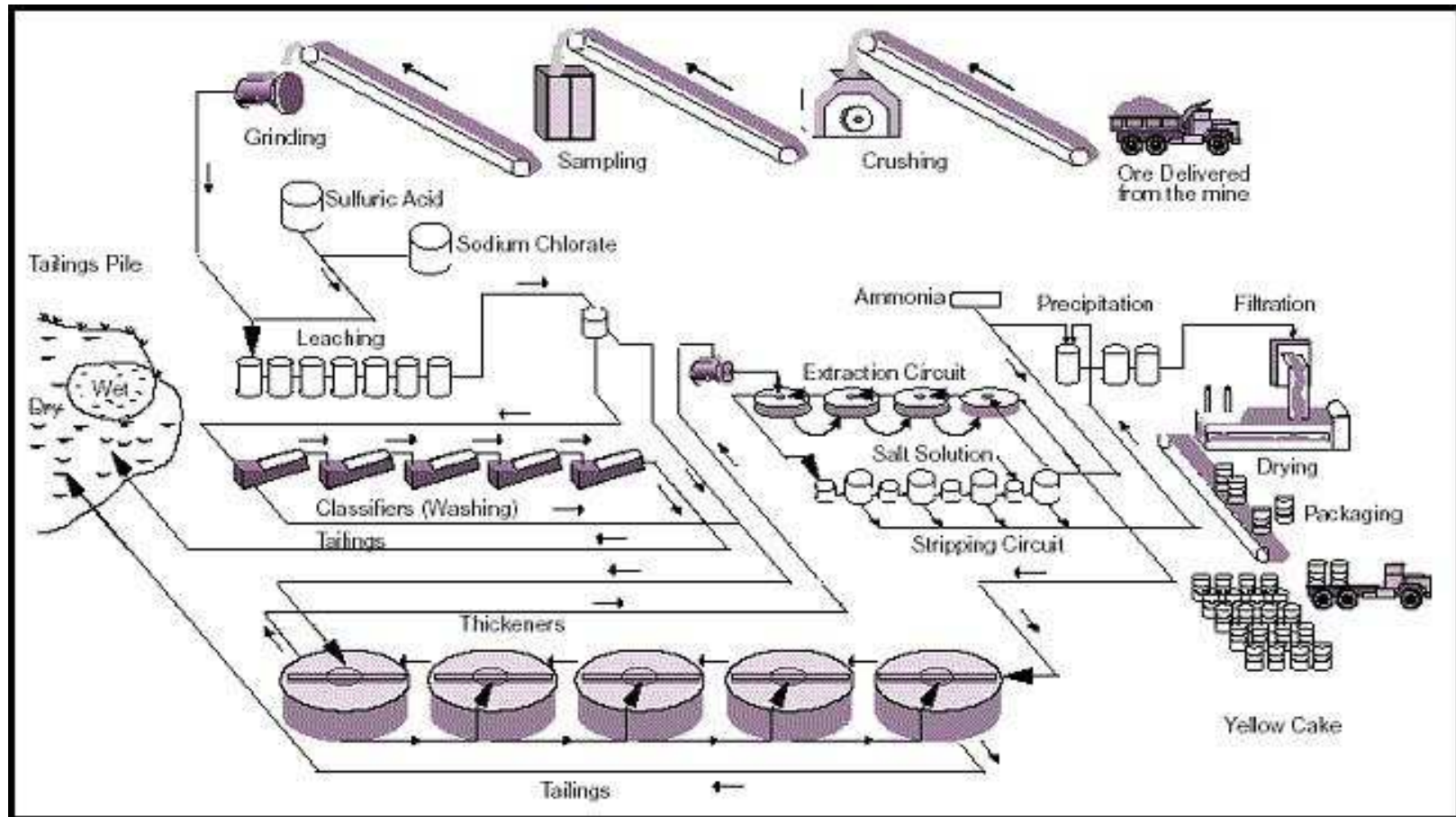
- Evaporation ponds at ISR sites
- Adequate capacity for ISR solid waste disposal
- Adequate analysis of waste disposal alternatives at application phase
- Land application of liquid effluent
- Deep disposal wells
- Water usage concerns

# In-situ Uranium Recovery - Process Flow Diagram





# Typical Conventional Uranium Mill



Source: Energy Information Administration, Office of Coal, Nuclear, Electric and Alternate Fuels.

# Mill and Tailings Site White Mesa, Blanding, Utah





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Imagery Date: Apr 18, 2004

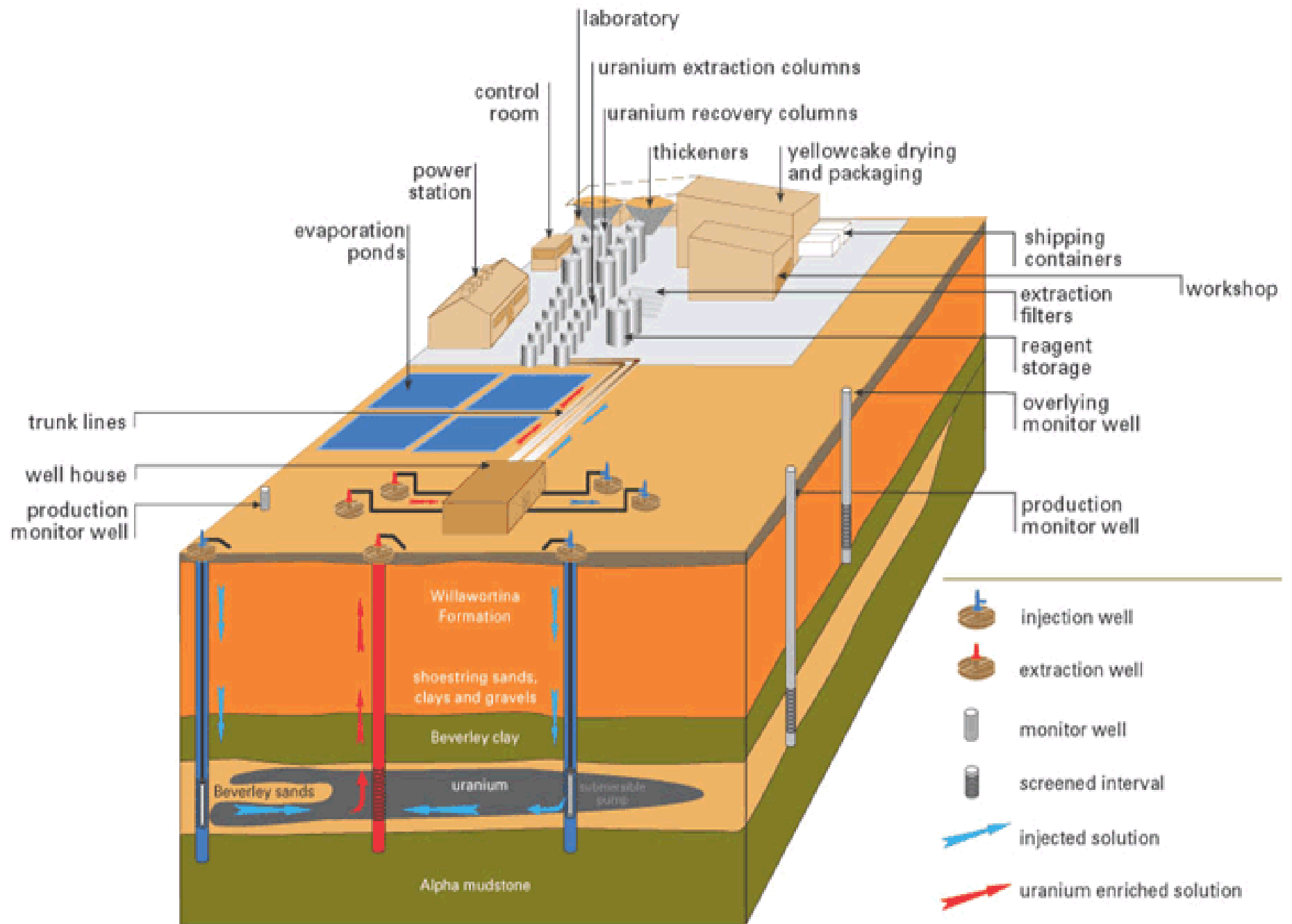
37°32'10.00" N 109°30'09.91" W elev 5638 ft

Eye alt 6896 ft

# Tailings Disposal



Source - WMA



B-10

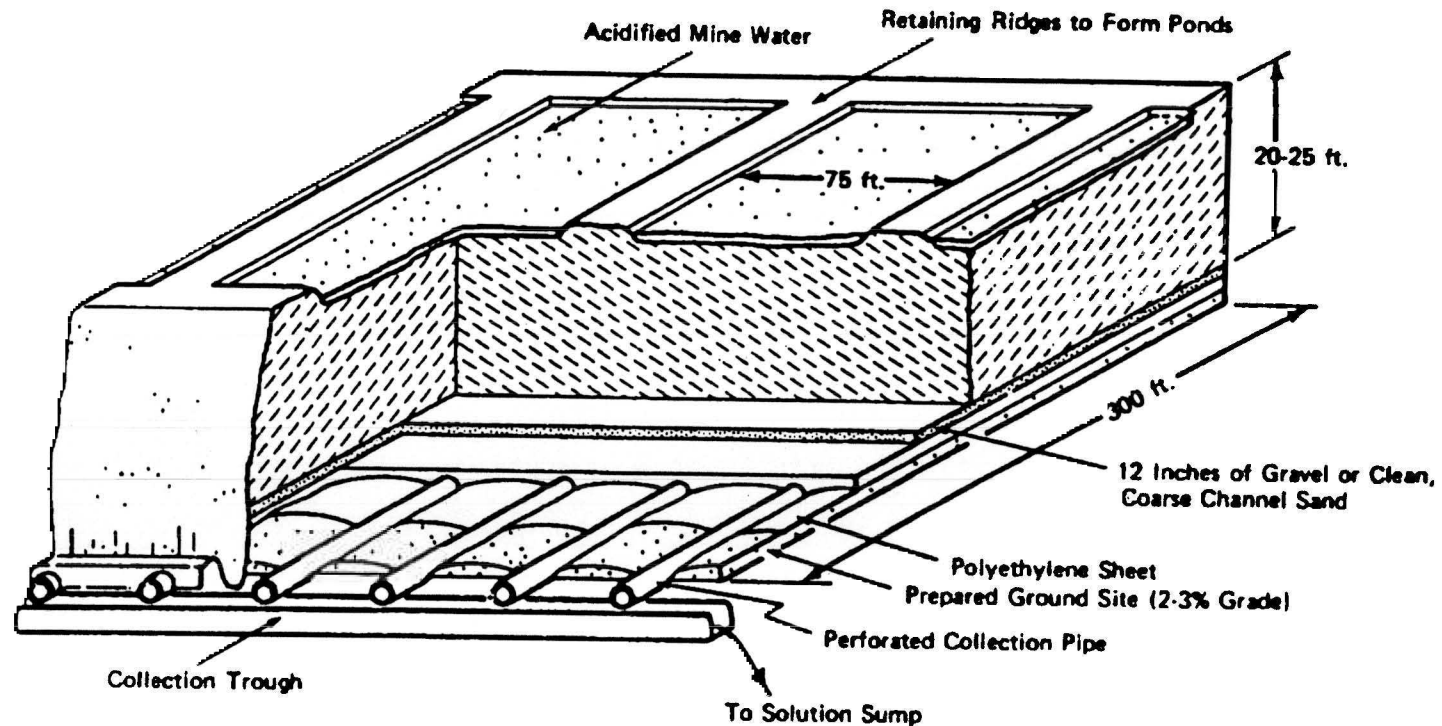


Fig. B.4. Schematic Diagram of Typical Heap Leach Pile. (After R. C. Merritt, "The Extractive Metallurgy of Uranium," Colorado School of Mines, Research Institute, 1971.)

**Schematic Diagram of Typical Heap Leach Pile.**

**Source: Final Generic Environmental Impact Statement on Uranium Milling, Project M-25, NUREG-0706, Vol. 1, Sept. 1980**



**Gold Heap Leach Facility, West Archimedes Pit and Heap Leach Facility at Ruby Hill, Eureka County, Nevada, March, 2005, Photo Provided Courtesy of Dave Schumacher**  
Source: [Geomineinfo.com](http://Geomineinfo.com)

# Questions?

