



February 26 – March 1, 2012 ♦ Phoenix, Arizona

A Summary of In Situ Mining Waste Products

John W. Cash, V.P. Regulatory Affairs, Exploration and Geology

Ur-Energy USA Inc.

Session #

What is In Situ Mining?

- In situ mining uses injection wells to introduce lixiviant into the uranium ore body.
- The lixiviant dissolves the mineralization which is then pumped to the surface by a recovery well.
- The pregnant lixiviant is piped to a processing plant where the uranium is typically removed by ion exchange.
- The barren lixiviant is refortified with chemicals and recycled back to the ore body.

Types of In Situ Waste

- Liquid
- Solid

Liquid Wastes

- Liquid waste is generated from mining bleed, groundwater restoration, plant processes and the laboratory.
- Generally a continuous waste flow rate of 50 to 200 gpm.
- Disposal methods include UIC Class I Injection wells, evaporation ponds, and treatment followed by land application.

Liquid Waste Challenges

- Difficulty permitting Class I UIC Wells.
- Difficulty finding a reasonably shallow receiving aquifer.
- Technical challenges of treating before land application.
- Operational and permitting issues with evaporation ponds.

Solid Wastes

- During ops, waste is generally composed of expendable materials including PPE and filters and contaminated soils. Around 90 to 200 cubic yards per year.
- During decommissioning, the waste is made up of building material, tankage, piping and contaminated soils. A small mine may have as little as 1,000 cubic yards of waste during decommissioning. A large mine could have several times more.

Solid Waste Continued

- Solid waste is generally shipped in roll-off containers to a facility licensed by the NRC to receive 11(e)2 byproduct material.
- Such facilities include Dennison's White Mesa Mine and Pathfinder's Shirley Basin Mine.
- The solid waste is buried in tailings impoundments.

Solid Waste Challenges

- Limited disposal sites.
- Disposal sites have unknown life expectancies.
- Characterization of waste is difficult so often times more waste than necessary is sent to disposal.