

Example of “Improving Sustainability” in Uranium Mining – In Situ Recovery / Leach



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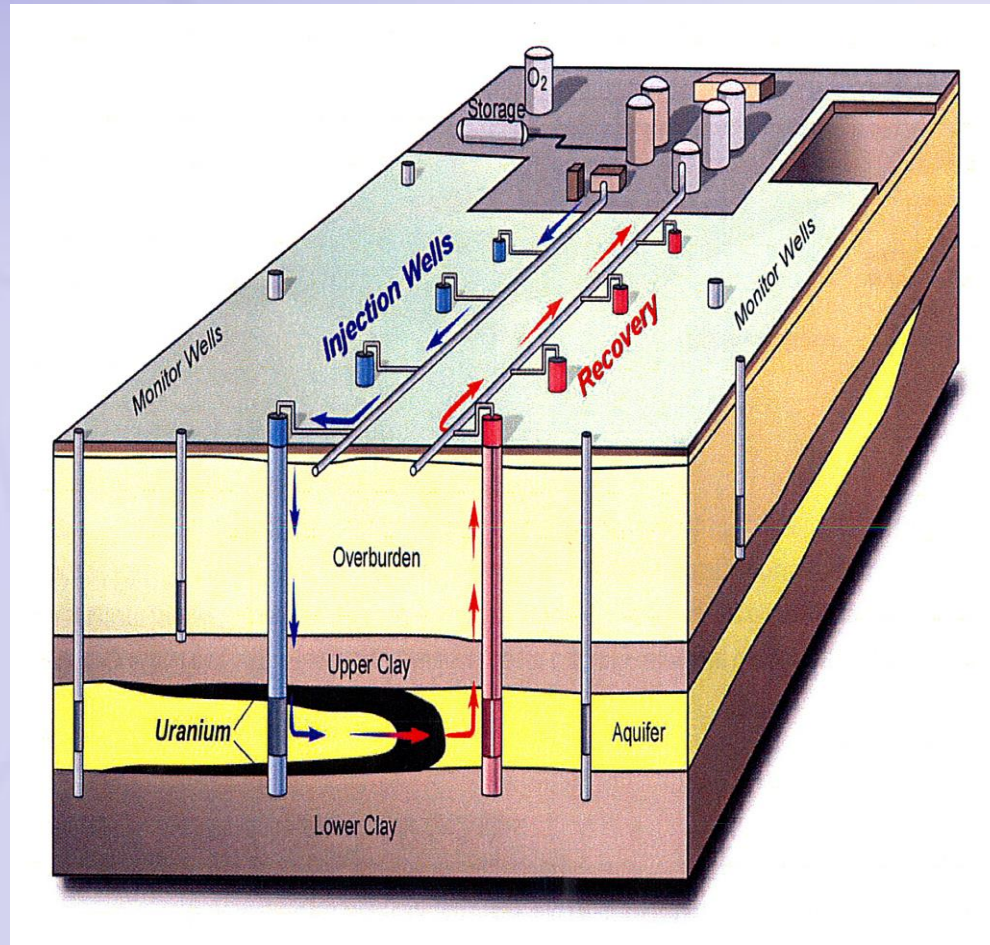
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Basic ISR Mining Method

In-situ recovery or leach (ISR / ISL) is the “In-Place” extraction of a mineral from an ore-body.

Uranium is removed from sandstone deposits by circulating groundwater to reverse the natural geochemical process that deposited it. (reduction / oxidation)

Uranium is recovered without bringing the ore and majority of U series decay products to surface as in conventional open pit or underground methods.



“Typical Footprints” - ISRs in US



Examples of “Improved Sustainability” - Uranium ISRs

- No surface tailings or need for protore / waste rock management or large mill facilities
- Unit costs are reduced allowing lower grade deposits to be mined
- Minimal airborne emissions
- Surface disturbances are small and temporary
- At conclusion of mining, affected ground water is restored to pre-mining conditions
- Use of deep well disposal and/or irrigation systems for liquid waste management at surface

“Improved Sustainability” for an HP - ALARA Improvements

- Tendency toward enclosed, pressurized systems at front end (lixiviant circulation, resin loading and elution) provide less opportunity for radon gas release
- Use of vacuum dryers vs. calciners has reduced effluent releases of yellowcake product
- Much lower operating temperatures of vacuum dryers relative to calciners is producing a more soluble uranium product; less potential pulmonary retention and resultant dose (but chemotoxicity ?).

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