

## How Has the Process of In-Situ Uranium Mining Changed Over Time?

The process of leaching uranium from the ground has changed in two ways. First, acidic leaching solutions originally used in the process were replaced by alkaline leaching solutions. Second, ammonium carbonate in the leaching solutions was replaced by sodium carbonate. Acid leaching solutions used in the late 1960's to the early 1980's, were efficient in leaching uranium, but they also leached other minerals from the uranium mineralized zone. Alkaline leaching solutions preferentially leach uranium from the uranium mineralized zone, resulting in less leaching of other constituents. Currently in the United States all in-situ uranium production is done with alkaline leaching chemistry using carbon dioxide or sodium carbonate and oxygen (US DOE, 1995), which is safer for the environment. The leached uranium from the mineralized zone tends to precipitate out of solution unless it combines with a compound that will keep it in solution. Such compounds are called complexing agents. Originally, ammonium carbonate was used as a complexing agent, but it was problematic because the ammonia was difficult to remove once mining was complete, thus adversely affecting the water quality within the uranium mineralized zone. Sodium carbonate is now used as a complexing agent.

### Resources and Useful Links

- USDOE, 1995, *Decommissioning of US Uranium Production Facilities*, US DOE Energy Information Administration; Office of Coal, Nuclear, Electric and Alternative Fuels, DOE/EIA-0592, 71 pages, <https://www.eia.gov/nuclear/archive/0592.pdf>
- Tweeton, Daryl R. and Peterson, Kent A., 1981, "Selection of Lixiviants for In-Situ Leach Mining," Bureau of Mines Technology Transfer Seminar, William C. Larson, and United States Bureau of Mines. *In Situ mining research: proceedings, Bureau of Mines Technology Transfer Seminar, Denver, Colorado, August 5.* [Washington, D.C.: U.S. Dept. of the Interior, Bureau of Mines, 1981] Pages 17-24, <https://tile.loc.gov/storage-services/public/gdcmassbookdig/insituminingrese00bure/insituminingrese00bure.pdf>

### Other Frequently Asked Questions (FAQs)

To find additional FAQs visit the Texas Groundwater Protection Committee's FAQ webpage at <https://tgpc.texas.gov/frequently-asked-questions-faqs>.