Are In-Situ Uranium Mine Operators Required to Clean Up Affected Groundwater?

Yes. Before starting in-situ mining, also known as in-situ leaching (ISL), an operator is required to determine the quality of the groundwater within and away from the uranium-mineralized zone (baseline quality). After mining is complete, the mine operator must restore the groundwater within the uranium-mineralized zone to its pre-mining quality (based on 26 separate constituents). This is accomplished by pumping groundwater from the mined zone to the surface and treating it using reverse osmosis. The treated water is then re-injected into the mined zone and the process is repeated. Additionally, mining is only permitted in a zone that has been approved for an aquifer exemption by Texas Commission on Environmental Quality (TCEQ) and U.S. Environmental Protection Agency (EPA).

If a mine operator is unable to restore groundwater quality in the mined zone to its pre-mining level for all 26 constituents, the operator may request to leave this groundwater at the final quality level that they have achieved. Before TCEQ approves such an action, the agency considers factors such as:

- Suitable uses of the groundwater at its present quality.
- Suitable uses of the groundwater prior to mining.
- Possible future uses of the groundwater.
- The extent of the groundwater restoration efforts.
- The ability of existing technology to restore groundwater to baseline quality.
- The harmful effects of the groundwater at its present quality level.
- The amount of energy, water, or other natural resources that would be needed to completely restore the groundwater to pre-mining baseline quality.

Any such approval by TCEQ is subject to public participation, including public notice, public comment, and in some cases, a contested case hearing. Constituents for which approved groundwater concentrations not reduced to pre-mining levels varied from site to site and included ammonia, arsenic, calcium, magnesium, manganese, molybdenum, selenium, radium-226, uranium, sulfate, and alkalinity. In each case, operators of these sites were allowed to leave the groundwater at the elevated levels after attempting to restore groundwater to pre-mining conditions and after the TCEQ determined that the groundwater was suitable for its pre-mining purposes.

Resources and Useful Links

- TCEQ Source Material Recovery and By-Product Material Disposal, https://www.tceq.texas.gov/permitting/radmat/uranium/uranium.html

- TCEQ In Situ Leach and Conventional Uranium-Recovery Methods, https://www.tceq.texas.gov/permitting/radmat/uranium/process.html

- TCEQ Regulations for Class III Wells, https://www.tceq.texas.gov/permitting/radmat/uic_permits/UIC_Guidance_Class_3.html

- U.S. Environmental Protection Agency Class III Injection Wells for Solution Mining, https://www.epa.gov/uic/class-iii-injection-wells-solution-mining

- U.S. Nuclear Regulatory Commission (NRC) *NUREG 1569: Standard Review Plan for In Situ Leach Uranium Extraction License Applications*, http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1569/sr1569.pdf

- U.S. NRC *NUREG 6870: Consideration of Geochemical Issues in Groundwater Restoration at Uranium In-Situ Leach Mining Facilities*, https://www.nrc.gov/reading-rm/doc-collections/nuregs/contract/cr6870/index.html

- Texas A&M AgriLife Extension Service (TAES) *Drinking Water Problems: Radionuclides (B-6192)*, https://twon.tamu.edu/wp-content/uploads/sites/3/2021/06/drinking-water-problems-radionuclides.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.