

## How Much Groundwater Is Required for an *In Situ* Uranium Mining Operation ?

Groundwater is removed from the aquifer in two ways during *in situ* mining, and the amount depends on the size of the operation. First, during *in situ* mining, more groundwater (about 1% more, usually referred to as “bleed water”) is pumped from the aquifer than is injected. This is done to ensure that all of the injected fluids are recovered from the zone that is being mined. Second, after active mining and during aquifer restoration, reverse osmosis treatment of the groundwater results in about 75% recovery of the total volume of groundwater treated. The remaining 25% is a reverse osmosis brine. Both the bleed water and the brine are disposed of in a Class III injection well. The amount of groundwater removed from the aquifer and disposed of through injection depends on the size and duration of the *in situ* mining operation and can add up to several hundred acre-feet of water per year (note: 1 acre-foot = 325,851 gallons).

### References:

- Texas Commission on Environmental Quality (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, [http://texreg.sos.state.tx.us/public/readtac\\$ext.ViewTAC?tac\\_view=5&ti=30&pt=1&ch=331&sch=E&rl=Y](http://texreg.sos.state.tx.us/public/readtac$ext.ViewTAC?tac_view=5&ti=30&pt=1&ch=331&sch=E&rl=Y)
- TCEQ Regulations for Class III Well Production Area Development, [http://texreg.sos.state.tx.us/public/readtac\\$ext.ViewTAC?tac\\_view=5&ti=30&pt=1&ch=331&sch=F&rl=Y](http://texreg.sos.state.tx.us/public/readtac$ext.ViewTAC?tac_view=5&ti=30&pt=1&ch=331&sch=F&rl=Y)
- 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, <http://www.nrc.gov/reading-rm/doc-collections/nuregs/contract/cr6870/cr6870.pdf>
- Texas A&M AgriLife Extension Service (TAES) *Drinking Water Problems: Radionuclides* (B-6192), <http://www.agrilifebookstore.org/default.asp>

For additional Frequently Asked Questions (FAQs) related to groundwater quantity, groundwater quality, septic systems, water wells, administrative entities, and publications, visit the Texas Groundwater Protection Committee’s FAQ webpage at <http://tgpc.state.tx.us/frequently-asked-questions-faqs/>.