

2025 Annual Salinity Summit
Multi-State Salinity Coalition
Tuscany Suites & Casino • February 28-29, March 1, 2025
Poster Presentation

**Technology Assessment of Brine Management for Arizona
with Consideration of Deep Well Injection**

Dr. Peter Fox, Dr. Tiezheng Tong and Bharat Venkatesh
School of Sustainable Engineering and the Built Environment
Arizona State University
Peter.fox@asu.edu 480-965-1734

The challenges Arizona faces regarding the management of brine solutions were highlighted in the Central Arizona Salinity Study which published its Phase I report in 2003. A salt mass balance on the Phoenix Metropolitan Area revealed that one **million** tons of salt accumulate in the region annually. Based on this revelation, the Bureau of Reclamation proposed building a brine pipeline that would deliver 200,000 acre-ft per year of brine to the Gulf of California. The pipeline was rejected by the Arizona Department of Water Resources since Arizona cannot afford to lose 200,000 acre-ft per year of water.

The Central Arizona Salinity Study highlighted the challenges associated with brine disposal in Arizona. Brines have traditionally been viewed as waste streams for disposal, but the brines contain valuable water and some brines contain minerals of value. Without an ocean discharge option, ultimate brine disposal is limited primarily to evaporation ponds. The Arizona Department of Environmental Quality is in the process of assuming primacy over the Underground Injection Control (UIC) portion of the Safe Drinking Water Act. Consequently, deep well injection will become a new and important option for brine disposal in Arizona as the alternatives are either land intensive or energy intensive. Recent innovations and the option to use deep well injection are new developments that can provide brine management strategies capable of recovering valuable resources with economic benefits while reducing costs associated with ultimate disposal. This project is currently assessing the major current and predicted brine streams in Arizona which sources include brackish groundwater desalination, direct potable reuse (which is also now a legal option in Arizona), and semi-conductor generated brines. These brines are being evaluated for treatment with a variety of technologies at different Technology Readiness Levels (TRLs). The characteristics of each brine type will be used to assess technologies that can both increase water recovery and hold potential for recovery of mineral based resources. A dearth of data regarding deep well injection in Arizona exists as deep well injection not been a legal option and Arizona is not a significant producers of fossils fuels. Therefore, a risk based analysis is being developed to evaluate deep well injection as an option for brine disposal and to provide the Arizona Department of Environmental Quality with a preliminary assessment tool.