DOE Focused Project: Characterization of CO₂ storage potential in Harquahala basin, western central Arizona



by Arizona Geological Survey University of Arizona

as part of



CUSP Annual Meeting

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AZGS Basin Analysis Group



Brian F. Gootee (Lead) Research Geologist Tribal Liaison bgootee@arizona.edu



Lisa A. Thompson Research Geologist lathompson@arizona.edu



Tawnya Wilson Research Geologist tawnyawilson@arizona.edu

Project Summary

Pre-feasibility evaluation for underground storage potential of CO₂

Project Objectives

- Collect data, process seismic, create crosssections and construct initial 3D model
- Cultivate partnerships with energy companies
- Working group participation and outreach
- Identify data needs and recommendations for Phase 2
- Update CUSP databases
- Publish Open-File Report
- Develop a Phase 2 project

AZ Basins with CO₂ Storage Potential



Harquahala Basin Location Map





4. Next Steps

Geologic Setting and Available Data

Geologic Setting

- Extensional basin formed during mid-Cenozoic extension between 25 and 10 Ma
- Modified half graben
- High angle normal fault to the SW
- Axial alluvial plain centered on SW margin
- Basin fill likely occurred in two stages
- Thermal springs present most 87-97° F
- Historic water extraction has caused local subsidence and shallow earth fissures

Conceptual Depositional Model



Harquahala Geology and Available Data Map



Available Data

- 204 wells with lithology logs
- 143 wells with borehole temperatures
- 19 wells with aq. chemistry data
- 5 vintage 2D seismic lines
- Gravity and aero-magnetics surveys
- Surficial mapped geology
- InSAR 20-year range

Data Limitations

- No petrophysical logs
- No core salt and basalt untested

Well Depths Summary Chart





Characterization Update





LOGICAL SURVEY

Summary and Next Steps

Key Takeaways:

- Basin analysis for pre-feasibility study
- Deep basin with probable bedded salt
- Salt, basalt, and fine-grained sediments all provide sealing potential
- Hydrogen storage component
- Close to existing infrastructure and large energy producers
- Ideal location between southern CA and south-central Arizona
- Multiple stakeholders including an industry partner
- Geothermal potential
- Characterization well needed

OGICAL SURVEY



Next Steps

- Modify DTB contours based on an additional gravity survey
- Complete time depth conversion of PW24
- Basin fill interpretation based on seismic data and proprietary gravity profiles
- Continue seismic reprocessing for other lines
- Modify DTB contours based on seismic interpretation
- Continued collaboration with our industry partners

•		FY 2022			FY 2023		
Task	Q2	Q3	Q4	Q1	Q2	Q3	
Data collection and analysis							
Workshop development							
Model update and phase II development							
Reporting and outreach							
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