State of Utah CO_2 Projects | June 2023 Update

Funded:

- Utah SCO2TPro (statewide)
- CarbonSAFE Phase II (Uinta Basin)
- Iron Mountain Focus Project (Iron County, Utah)

Awaiting Decision:

- DE-FOA-0002735: *Red Rocks DAC Hub*
  - A geothermal energy-driven direct air carbon capture and sequestration hub in SW Utah
  - PI: Dr. Jack H. Norbeck, Fervo Energy, Houston, TX
  - UGS Sub-Recipient: Dr. Eugene Szymanski
  - Total Project Cost: $3,585,653 (20% Cost Share)

Awaiting Decision cont'd:

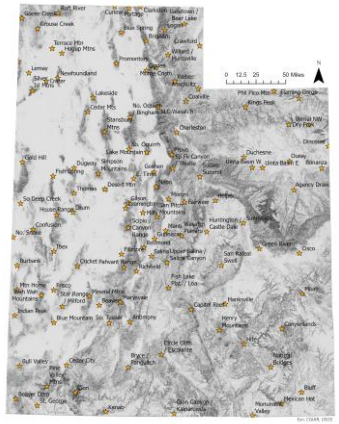
- DE-FOA-0002799: *Utah Statewide Carbon Storage Assessment: Geological Data Gathering, Analysis, Sharing, and Engagement*
  - assess CS resources across Utah, display that assessment and its underlying data in a user-friendly web application, and create a well-organized foundation for CS data management moving forward
  - PI: Eugene Szymanski, Ph.D., UGS
  - Contributors: Univ. Utah EGI; Univ. Utah Dept. of Geology & Geophysics, Dept. of Anthropology, & Dept. of Sociology
  - Total Project Cost: $1,131,388 (20% Cost Share)

Utah SCO2TPro: Data Input

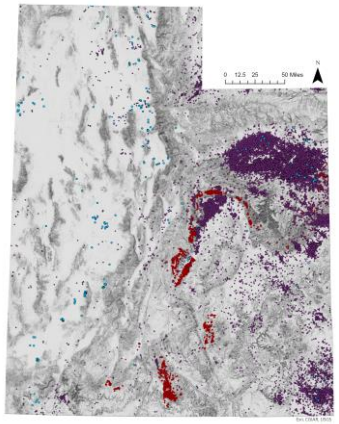
- 50x50 km grid has 89 cells in Utah – the UGS has gathered data for about **60%** of the state so far
- Product will have most value if all data types are considered and stored such that inputs may be regenerated for future work, allowing more data to be included with time

CUSP grid population for Utah is a complex data management challenge

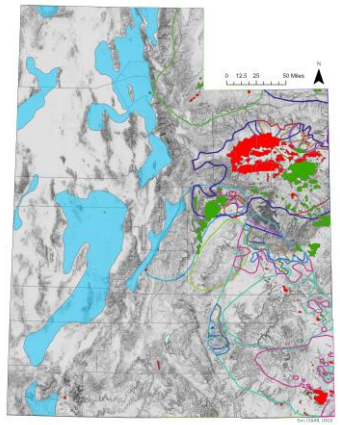
Strat Columns



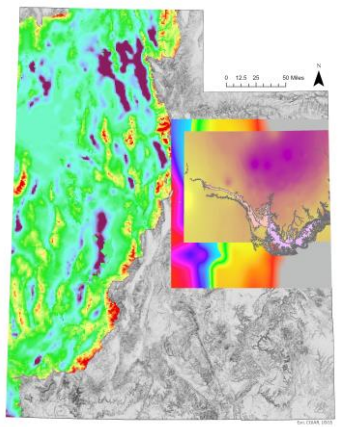
Wells

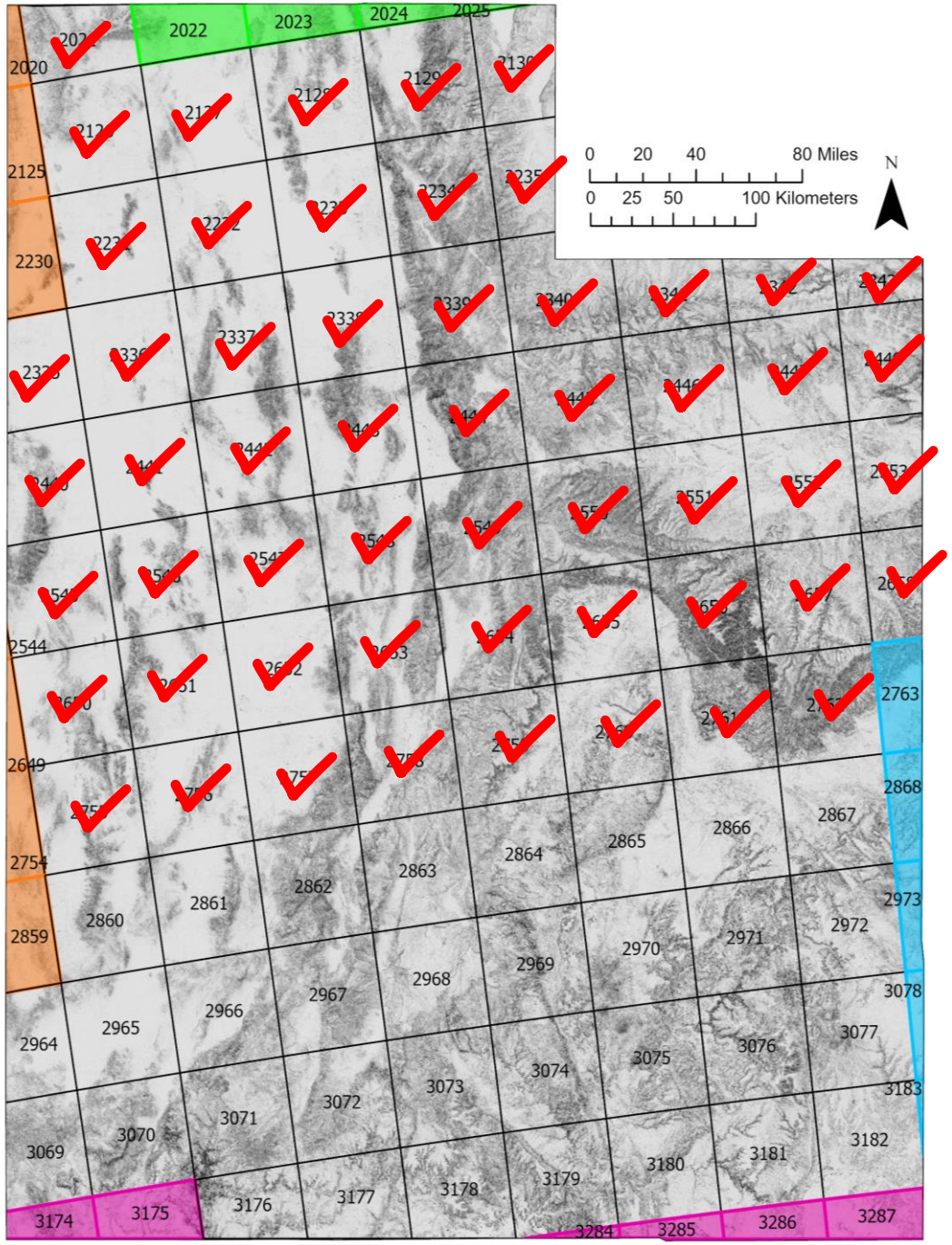


2D Surfaces



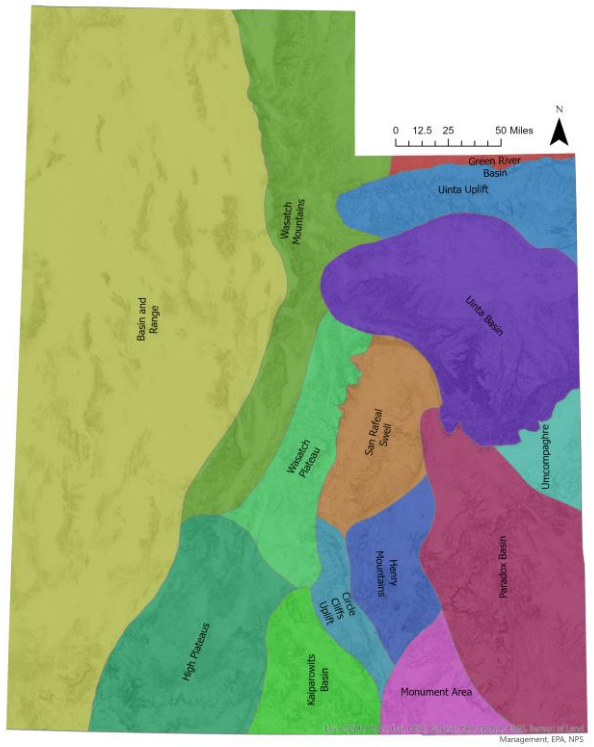
3D Surfaces

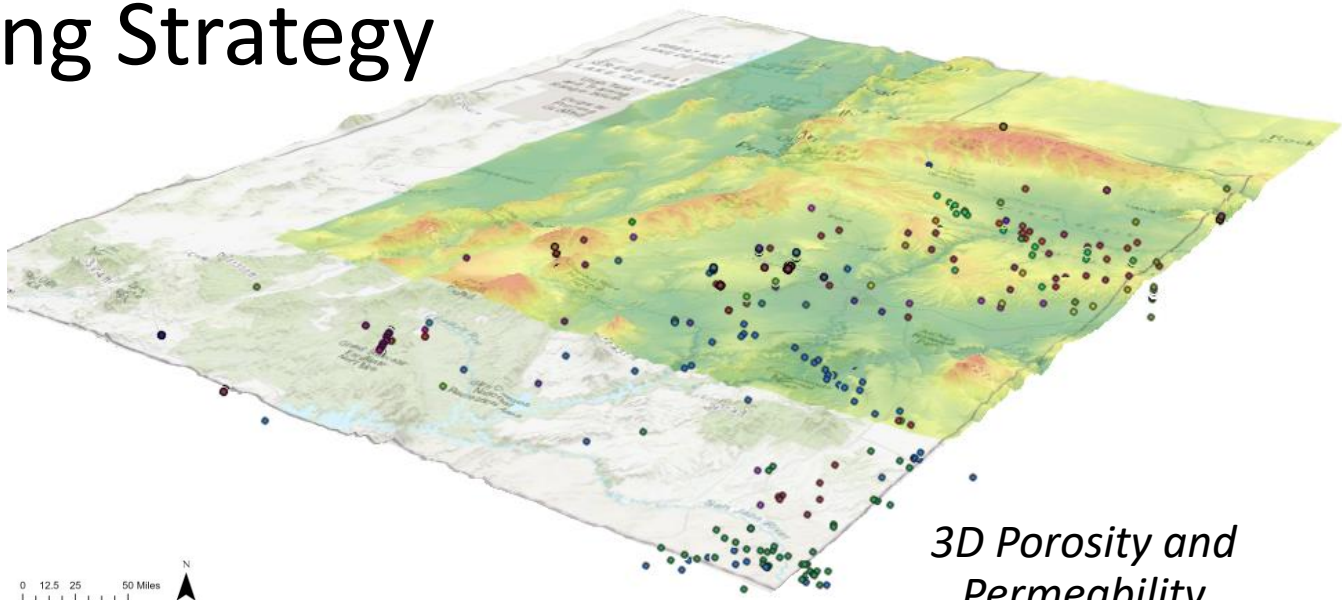




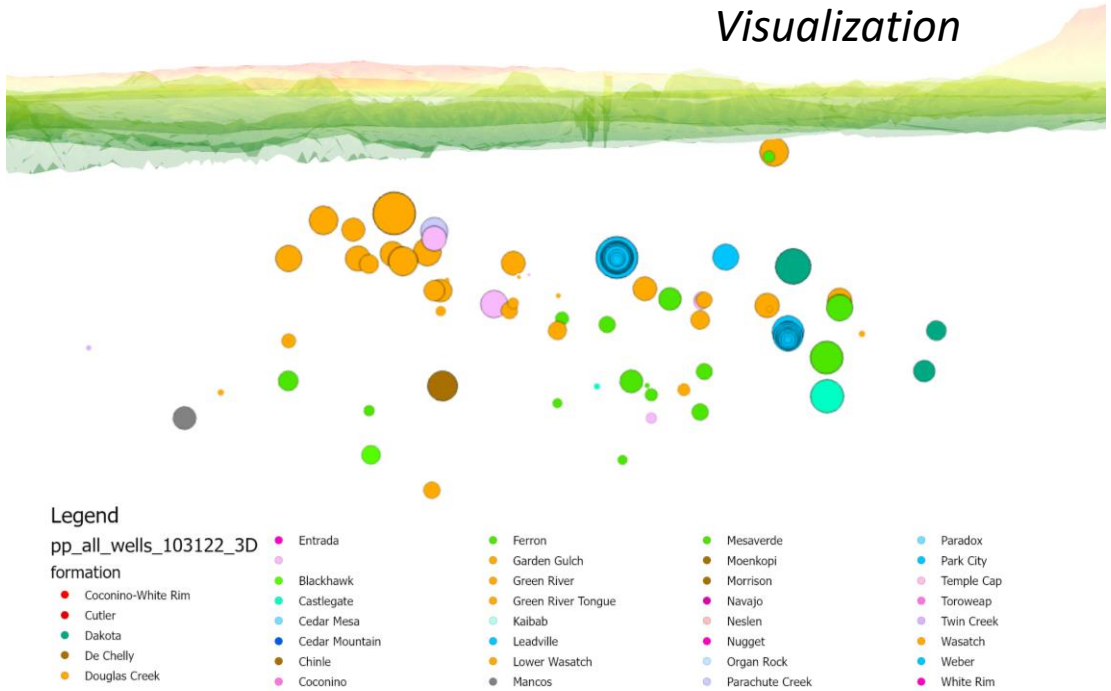
Utah SCO2TPro: Data Gathering Strategy

- divide Utah into regions / basins
- remove overlap for simplification
- define key reservoir and seal layers for each basin / region
- assess spatial extent of each layer – extracting outcrop limit from existing mapping
- gather well tops, depth, thickness, and rock properties for each layer
- store data in statewide database schema but use basins to focus work





3D Porosity and Permeability Visualization



Uinta Basin CarbonSAFE Phase II

Project scheduled to begin Summer 2023

DOE Funding: $8,007,459
Non-DOE Funding: $2,001,865
Total Value: $10,009,324

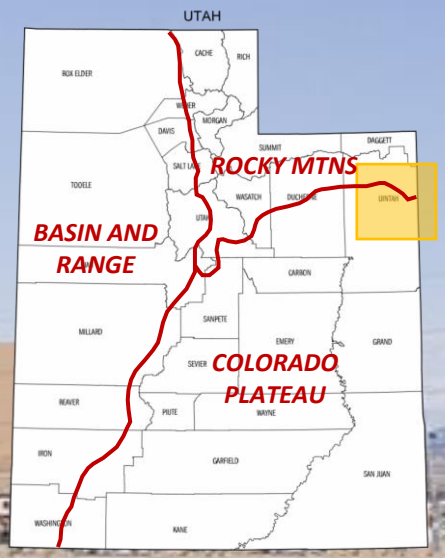
Principal Investigator: Dr. Ting Xiao (UU EGI)
- Brian McPherson (UU EGI), Co-PI
- Michael Vanden Berg (UGS), Co-PI
- Richard Middleton (Carbon Solutions LLC), Co-PI
- Maohong Fan (University of Wyoming), Co-PI

Bonanza Coal-Fired Power Plant

Contributors:

Energy & Geoscience Institute – *Project Lead*
Utah Geological Survey – *Geology Team Lead*
Hohn Engineering and KGH Operating – *Industry partners*

Univ. Utah Dept. of Geology and Geophysics *(Prof. L. Birgenheier)*
Carbon Solutions
Los Alamos National Lab
New Mexico Tech
University Of Wyoming
University of Oklahoma
Utah School and Institutional Trust Lands Administration (SITLA)

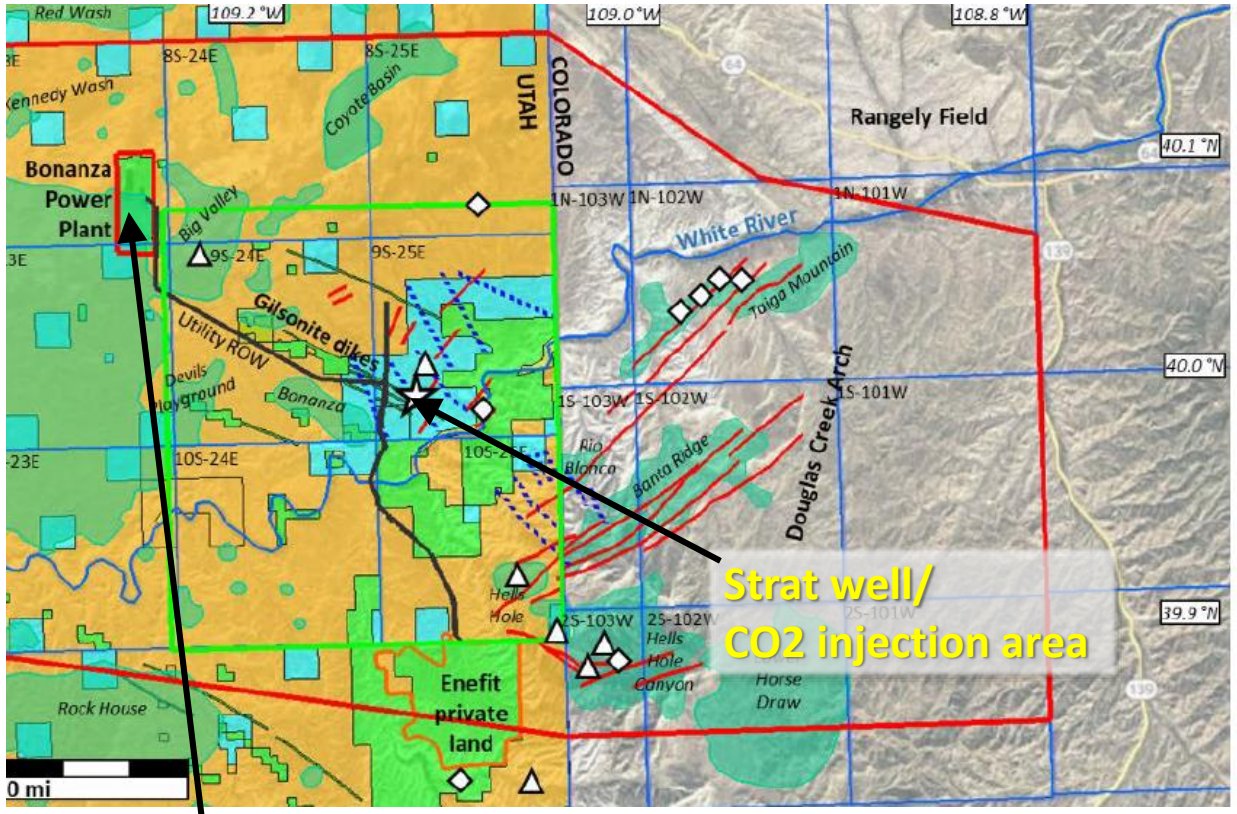


Uinta Basin CarbonSAFE Phase II

Period	Formation / Member		Thickness (feet)	Depth (feet)*	Lith.
EOCENE	Green River Formation		1490	0	
	Wasatch Formation		1025	1490	
CRETACEOUS	Mesaverde Group	Price River Ss	1475	2515	
		Sego Sandstone	435	3990	
	Mancos	Mancos Shale	4155	4425	
		Frontier	45	8580	
		Frontier-Lower	60	8625	
		Tununk	85	8640	
	Dakota-Upper		110	8710	
	Dakota-Lower		55	8750	
	Cedar Mountain Fm		85	8805	
	Buckhorn Conglomerate		75	8890	
JURASSIC	Morrison Formation		605	8965	
	Curtis Formation		85	9495	
	Entrada Formation		175	9580	
	Carmel Formation		60	9750	
	Chinle Formation		590	9810	
	Moenkopi Formation		810	10405	
	Weber Sandstone		800	11215	

Injection Target
Seal

- General stratigraphy from Hintze (1992)
- Approximate Depths of individual formations and gamma log from well API # 43-047-10916



LEGEND

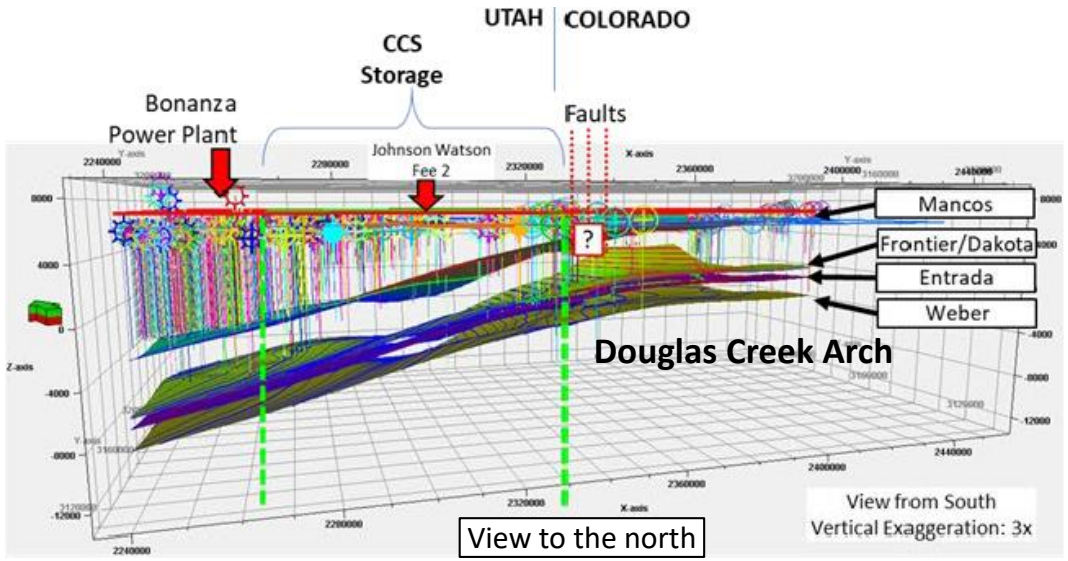
CarbonSAFE PHASE II Study
- Area of Study
- Proposed Injection Site
- CCS Storage Area

Geological Features and Data
- Wells with Cores from seal/reservoir
- Wells with Cuttings
- Potential faults
- Recently acquired 2D Seismic Lines

Oil and Gas Operations
- Oil and Gas Field
- Enefit Private Land
- Enefit Permitted Utility Right-Of-Way

Utah Land Ownership
- Tribal
- Private
- State (SITLA)
- Federal

The Bonanza Coal-Fired Power Plant emits ***~3.0 million tons CO_2 per year***

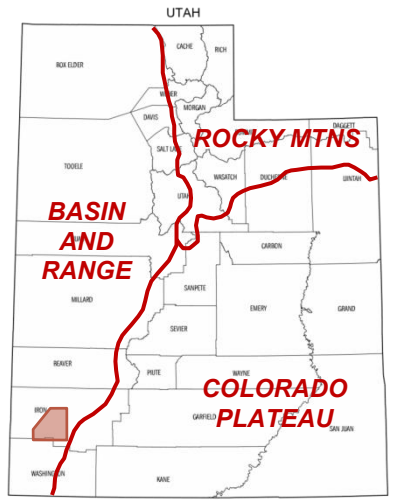


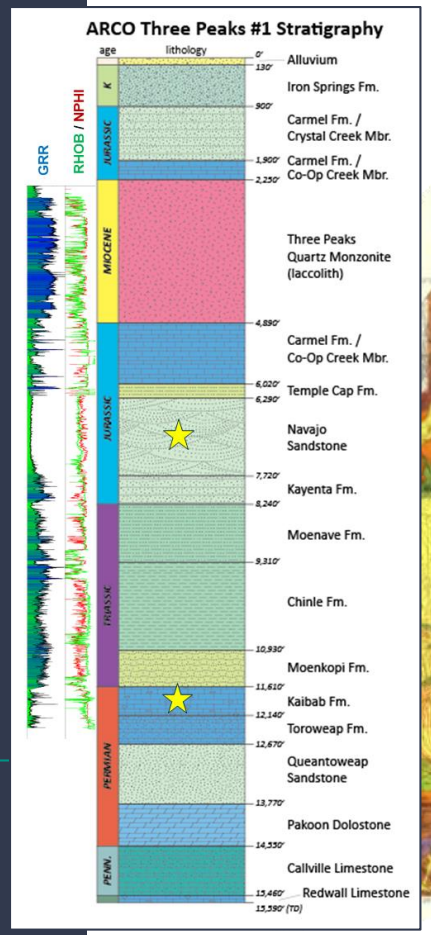
View to the north

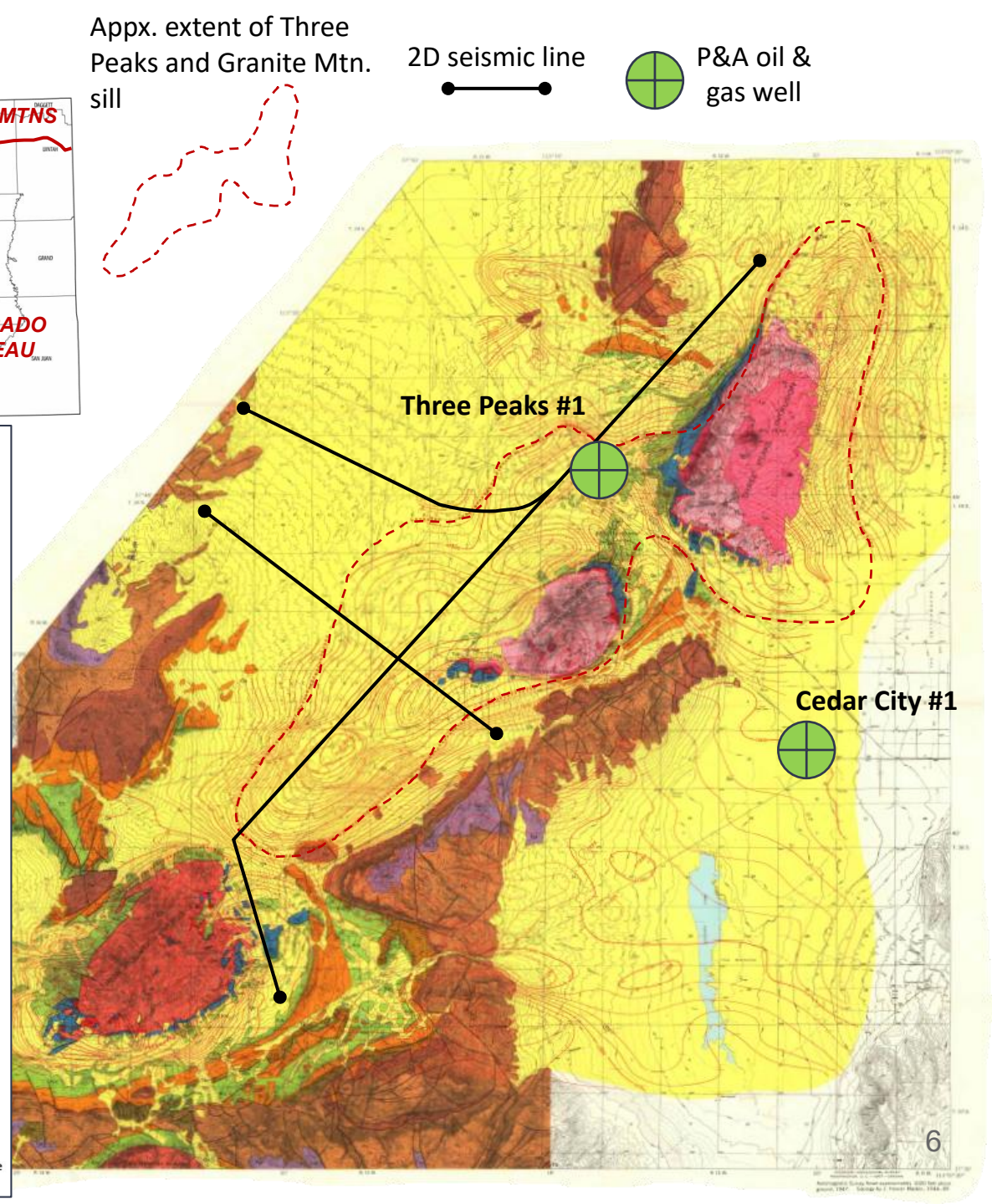
CUSP Iron Mountain Focus Project, Iron Springs District

Subsurface Characterization Plan:

- ***Groundwater / Aquifer Characterization***
- ***Stratigraphy / Chronostratigraphy***
- ***Subsurface Isopach Mapping***
- Structural & Tectonic History Analysis
- ***Petrophysics and Reservoir Quality Characterization (core / cuttings / outcrop)***
- ***2D Seismic Interpretation***
- Outcrop Study of Navajo Fm. and other strata
- Gravity Survey and Mapping
- Historical and Modern Seismicity







Figures: Generalized geologic maps of the greater Iron Springs District, Utah showing the location of wells and schematic outline of volcanic intrusions (modified from Blank and Mackin, 1967).