

Science Camp #170802.8

02-04 August 2016 @ the Condo, the Nelson Cabin, and surrounding area



Advisors

H. Roice Nelson, Jr., Andrea S. Nelson,
Paul F. Nelson, Benjamin B. Nelson



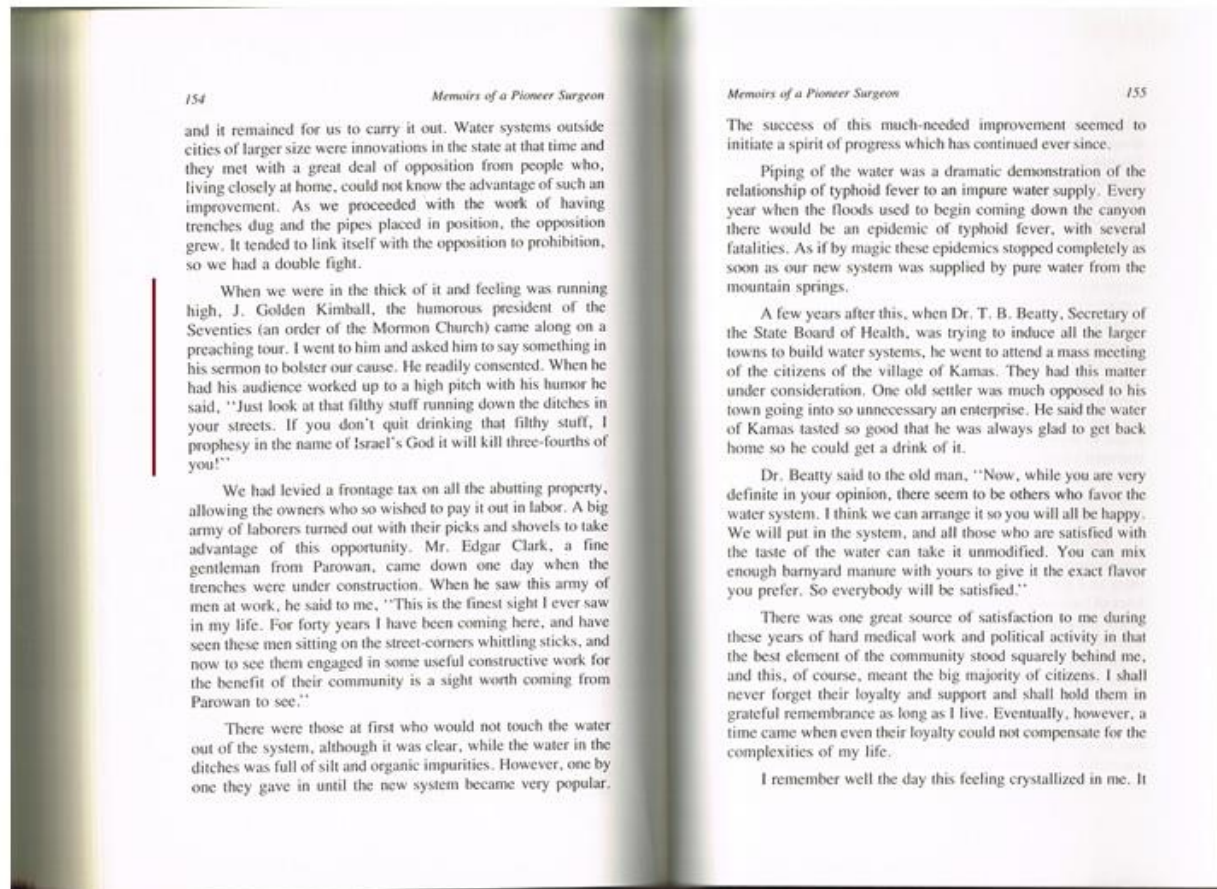
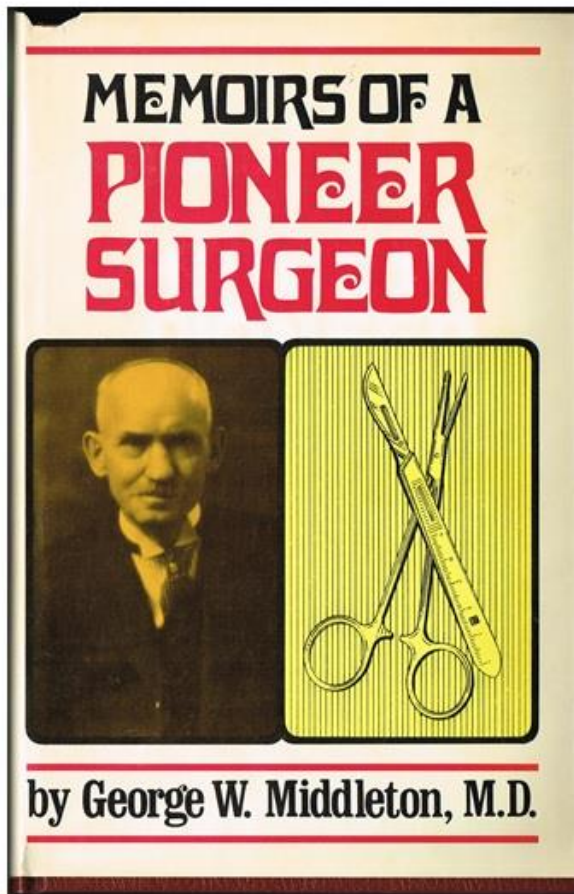
Attendees

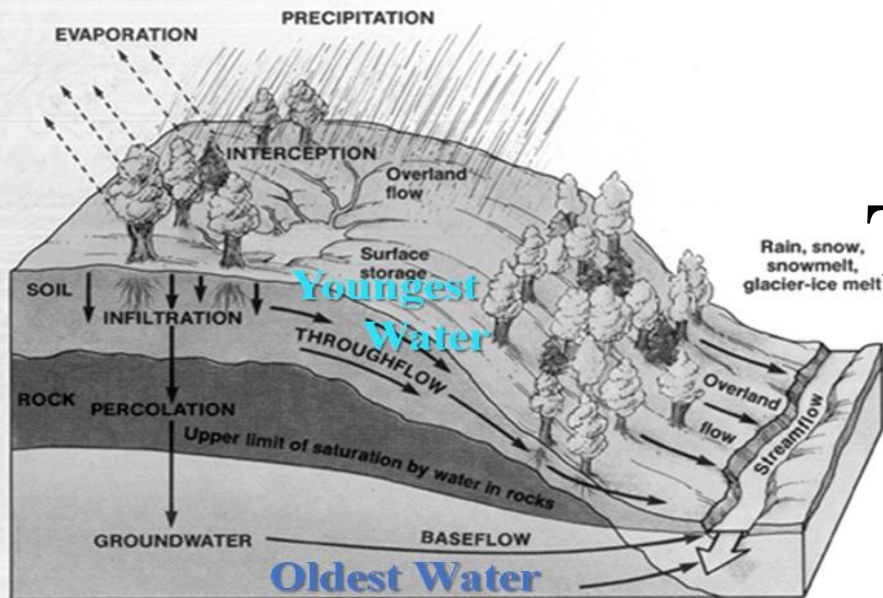
Ethan E. Nelson, Grant M. Nelson, Colby C. Wright,
Taylor R. Wright, Ella D. Nelson, Halle N. Wright,
Bobbie Sophia Waldron, Dallin Spencer Nelson,
Avalyn Joyce Wright, Rachel Lee, & Ian Lee



Water is a Critical Natural Resource

Historical Water Issue in Cedar City

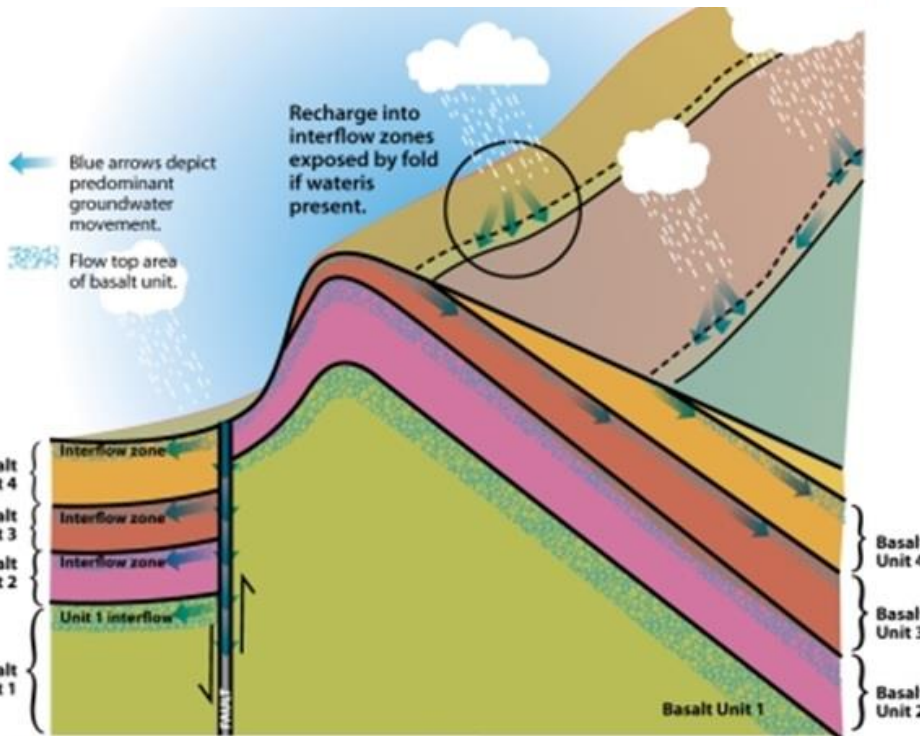




http://snobear.colorado.edu/Markw/geog5321_webpage_04.html

Applying Experience Today to Cedar Valley Water Problems

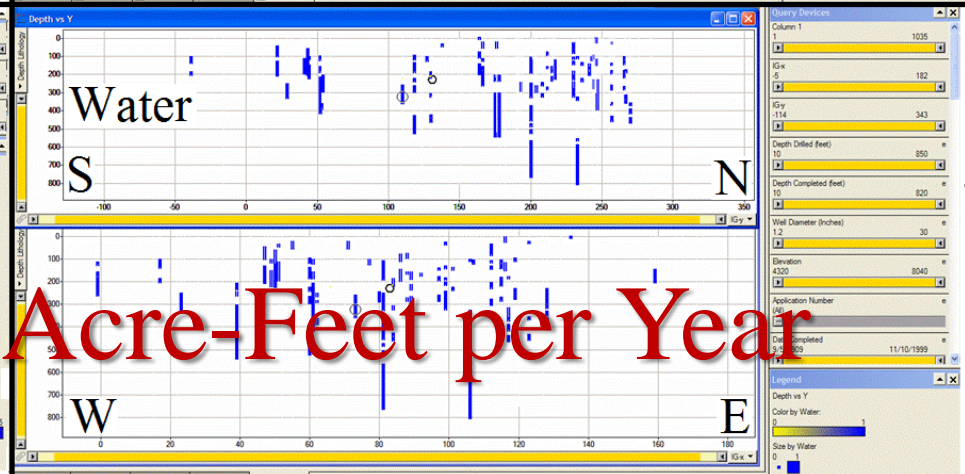
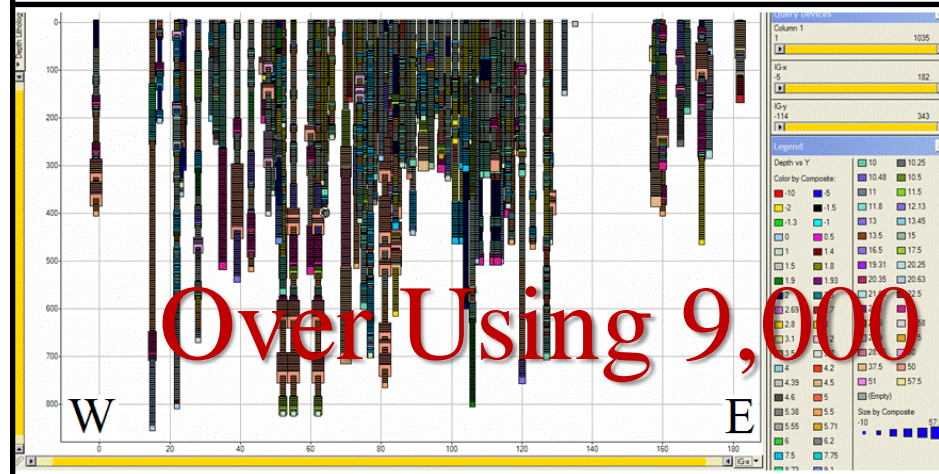
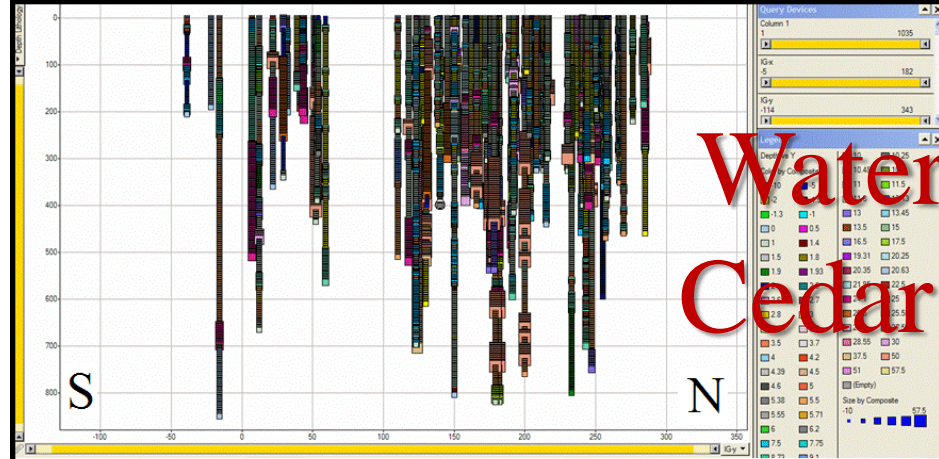
- Bedrock dips to the east;



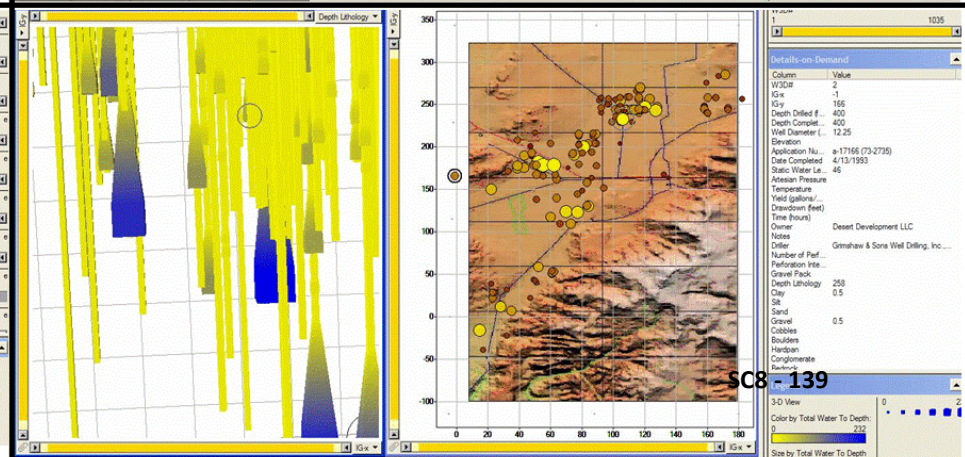
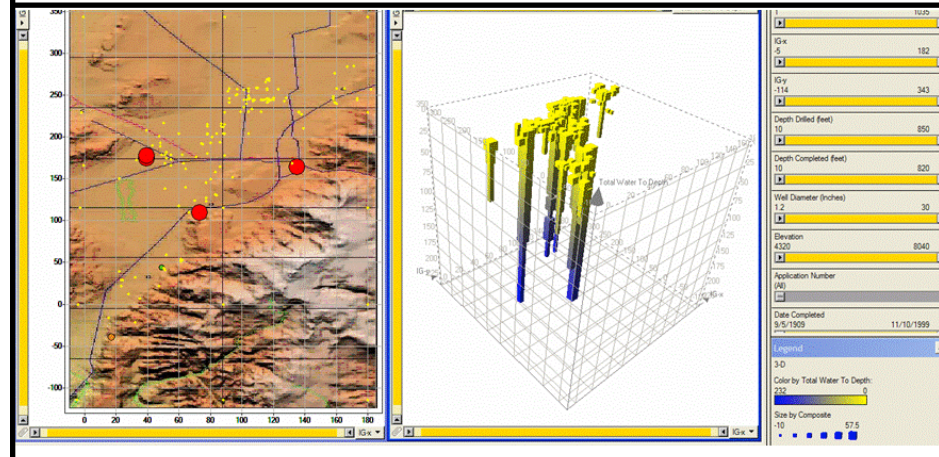
http://cbgwma.org/index.php?option=com_content&task=view&id=60&Itemid=115

- Faults bounding the valley disrupt baseflow, especially into the Cedar Valley basin fill aquifer, which is isolated by clays and is very shallow.

Water Wells Cedar Valley



Over Using 9,000 Acre-Feet per Year



Geology & Geophysics Are Key

Geology of Cedar Valley, Iron County, Utah

7

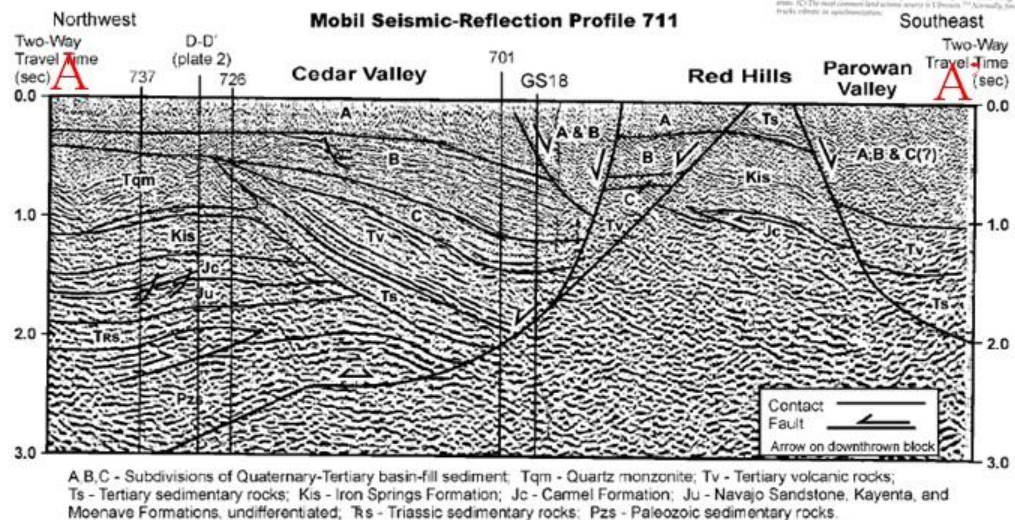
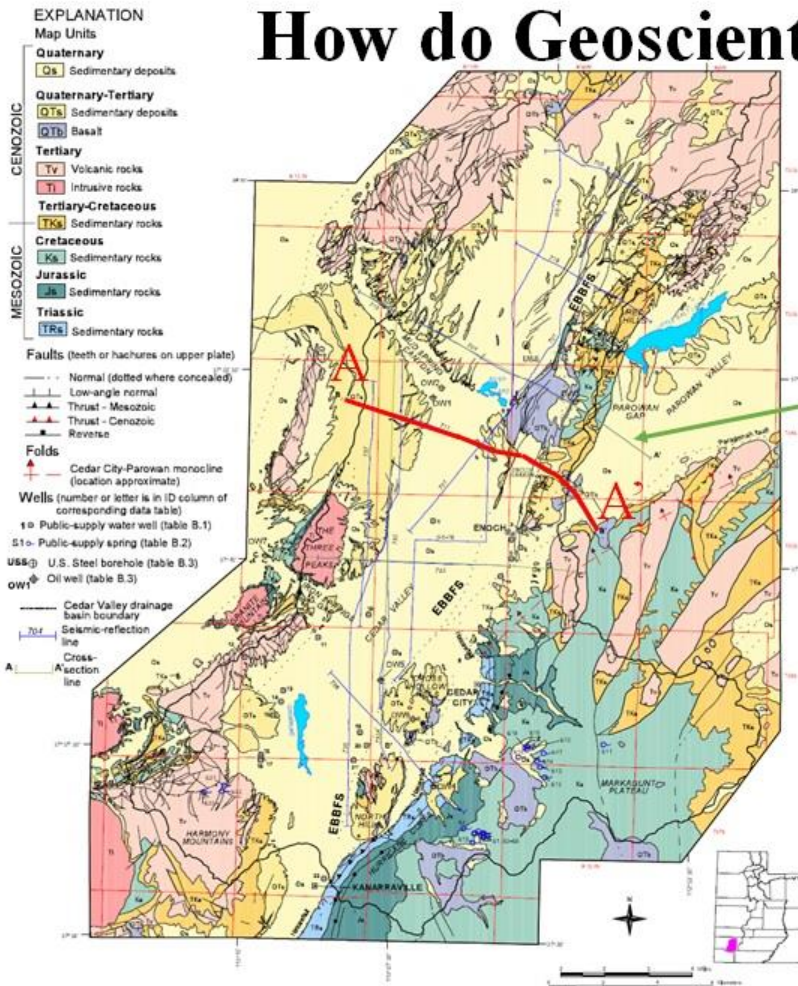
36 New Technologies in Exploration Geophysics

How do Geoscientists see under the ground?

- Line 711 was my first assignment in Mobil Field Operations in February 1978 (it was cold, saw bear tracks).
- When I learned of Bengt Nelson's first winter (1856-1857) at Iron Springs.
- Figures to right from Line 704.



Figure 3-5. Typical land entry operations in southwestern Utah. (A) Surface shooting using the 5000 ft. of explosive over a prime land area. The environmental damage is temporary, but considerable, the equipment, also, more long-term problem. (B) Photo of the shooting of a 500 lb. of dynamite per shot in a better agricultural area. (C) The most common land entry method in Utah. The normally clear of these tracks visible in the photograph.

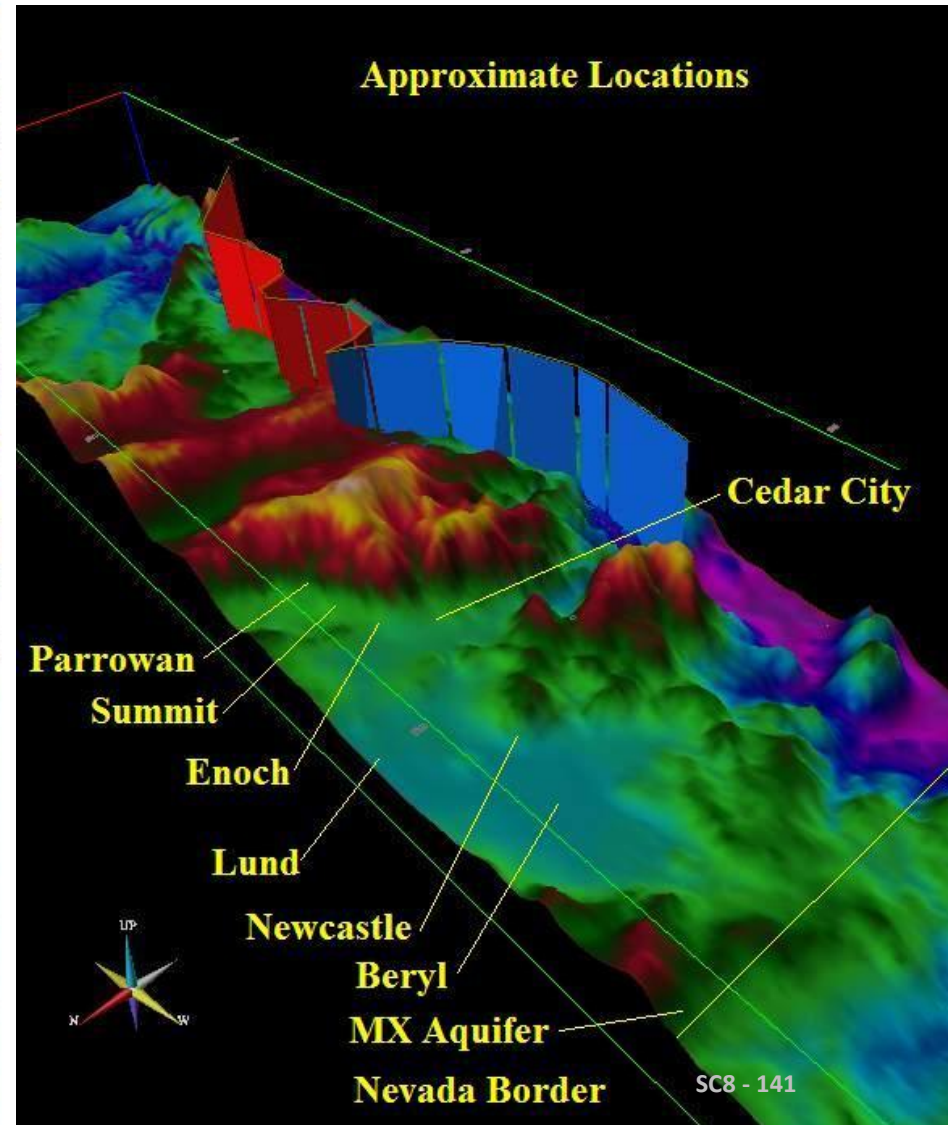
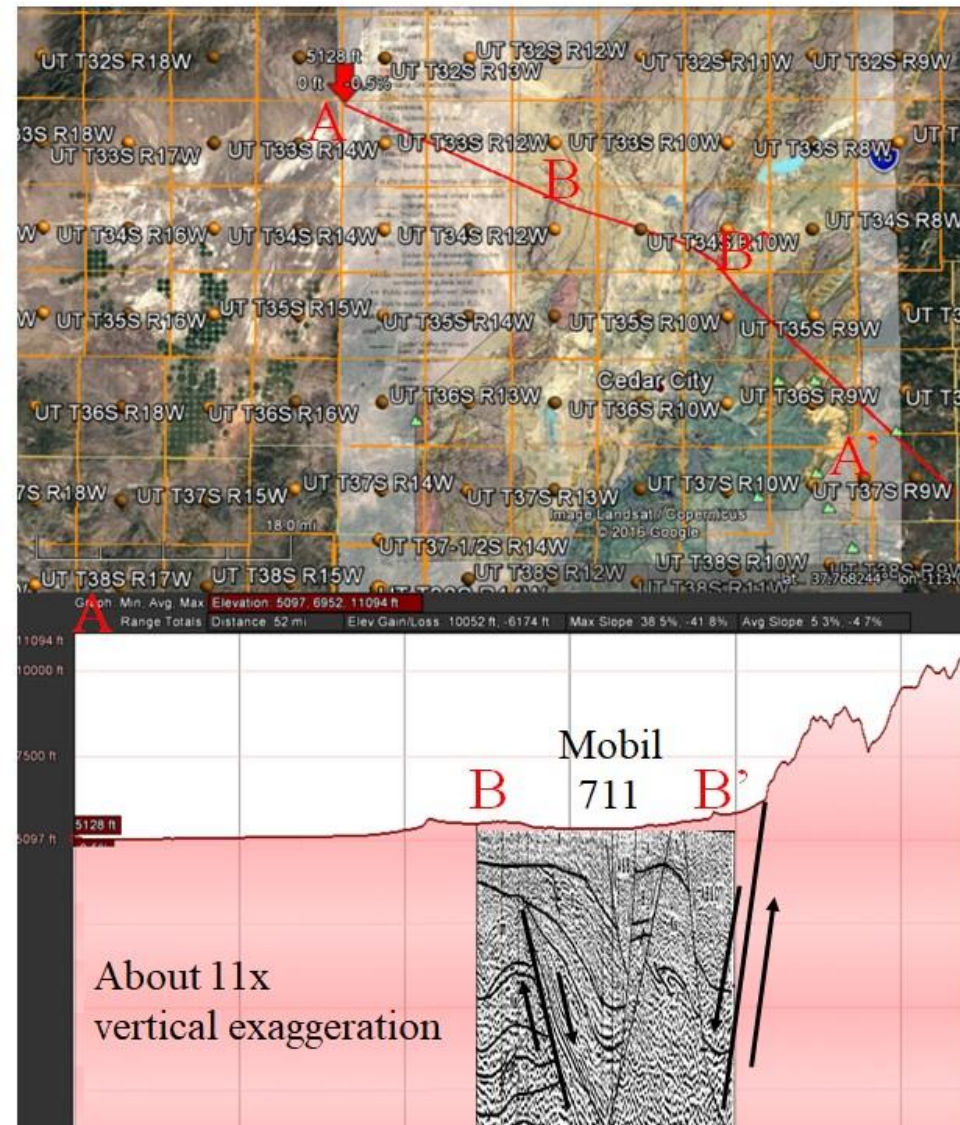


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Figure 6. Simplified geologic map of Cedar Valley drainage basin and adjacent areas. EBBFS is eastern basin-bounding fault system. See figure 5 for stratigraphic column, and appendix A for correlation of map units with those on plates 1 and 2.

Lake Powell Pipeline

Mobil Line 711 cross-section



Water at Iron Springs

Where Bengt & Ellen Nelson Lived



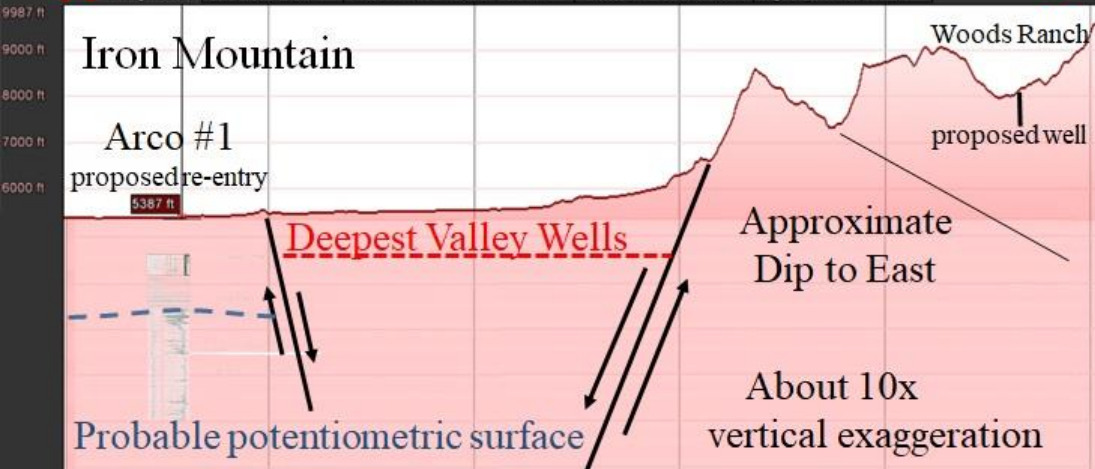
Arco #1 – Woods Ranch cross-section

- An opportunity to test the Fractured Quartz Monzonite Aquifer is to reopen this well.

Top Qm = 2,322'
Fractured: 2,500'-2,615'

Fractured: 2,960'-3,050'

- The proposed test in the Cretaceous rocks is at Woods Ranch or Shepherd's Cabin.



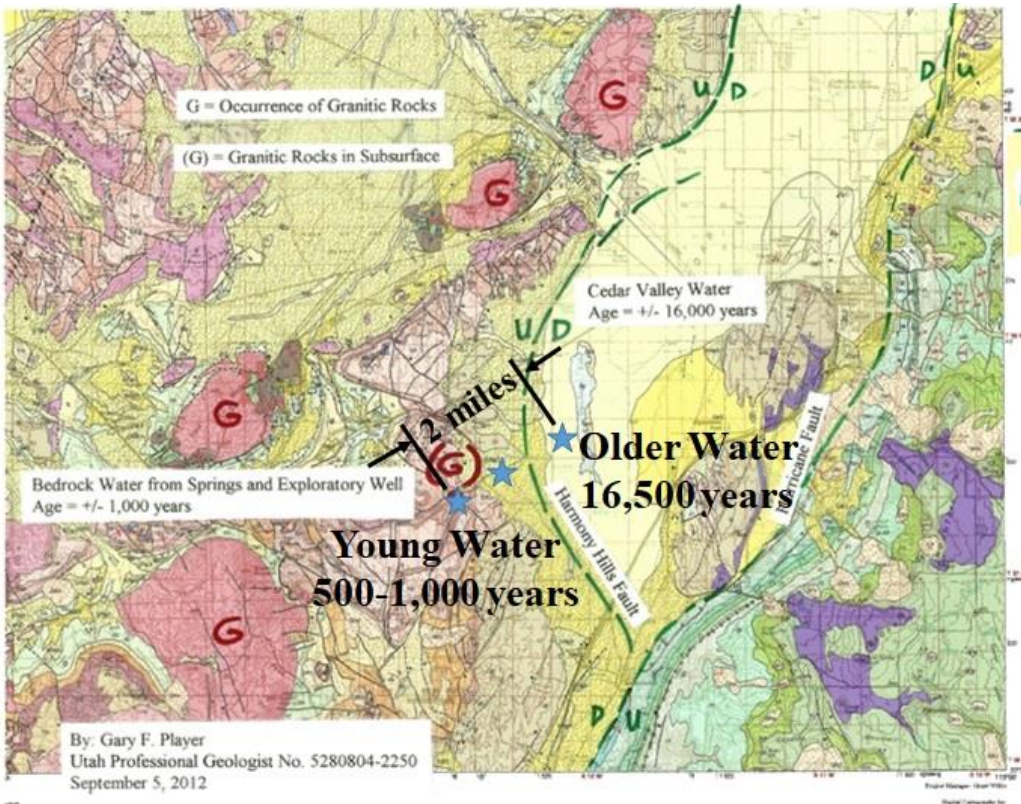
Untapped Fractured Quartz Monzonite Aquifer

Photograph of water in Blowout Pit at Iron Mountain

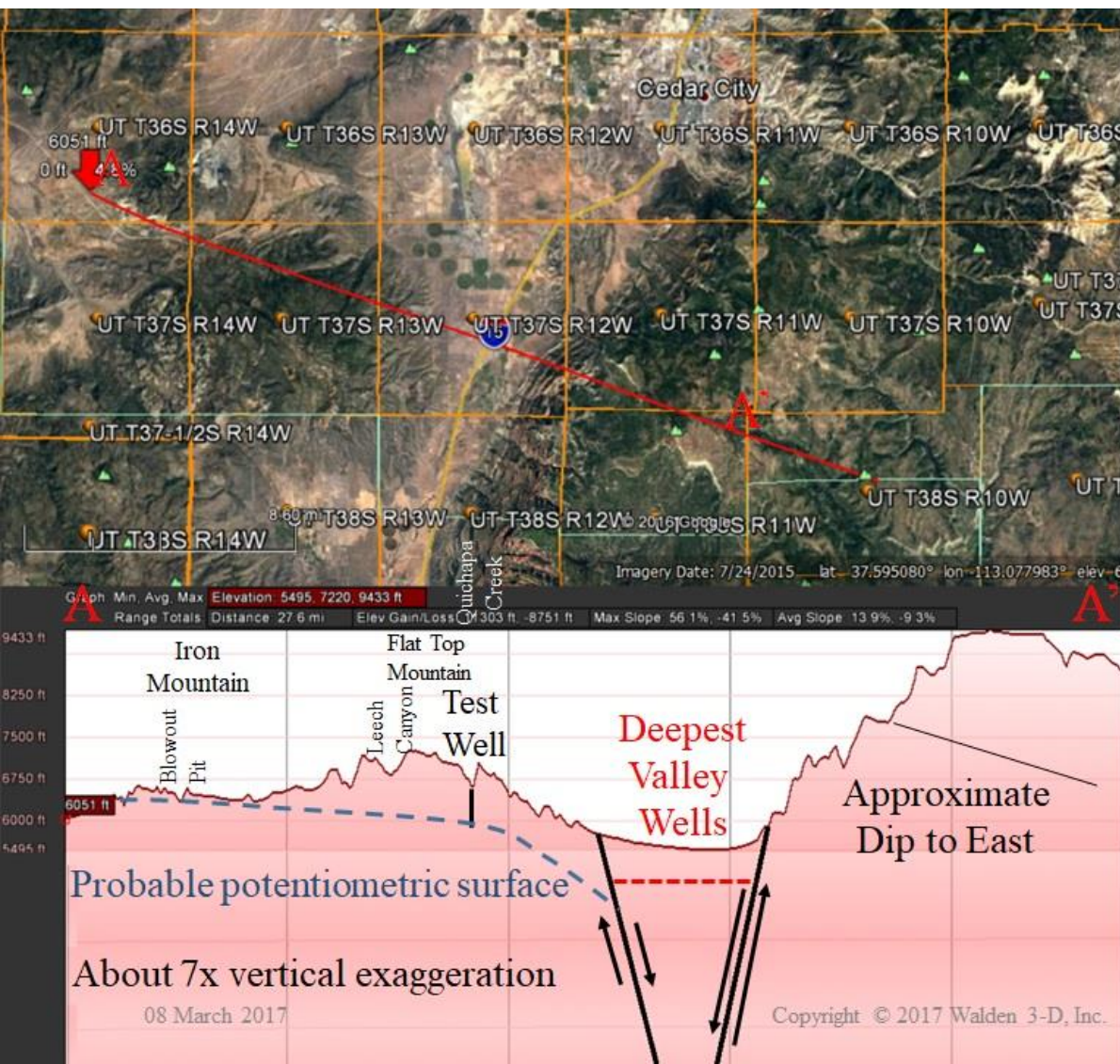


Photograph by Gary Player

Water from
Fractured
Quartz
Monzonite
Fills Blowout
Pit and Other
Iron Mine Pits



Fractured Quartz Monzonite Wells Will Hopefully Be “New Water”

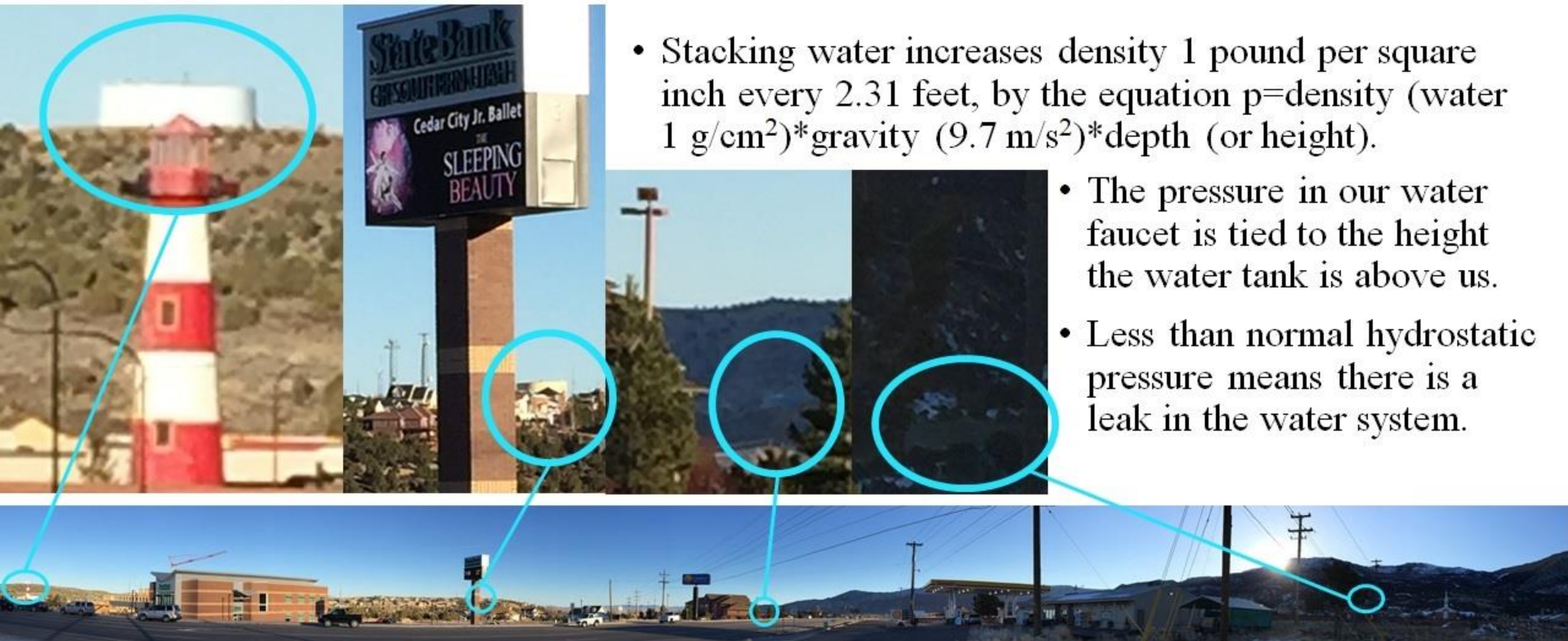


Blowout Pit Cross-Section

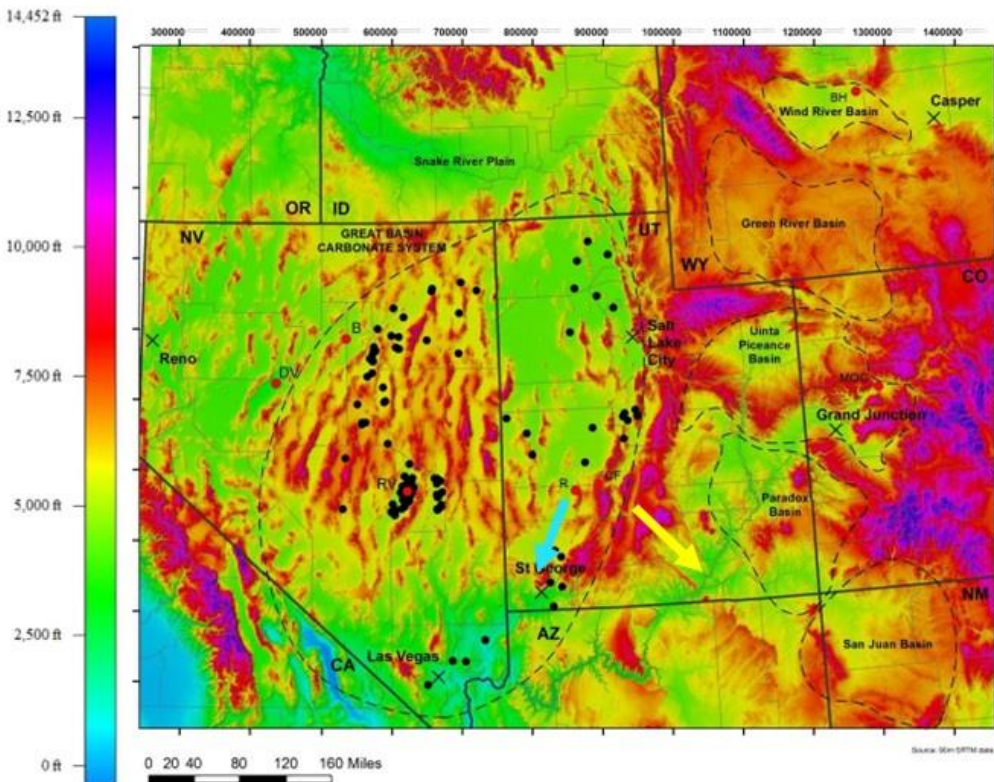
- Dip on bedrock to east drives water falling on Cedar Mountain east.
- Throw of Hurricane Fault allows water to drop down 5,000 feet to the porous Jurassic Sandstone.
- Water filling Blowout Pit tested in Quichapa Creek test well.

Hydrostatic Pressure Is Key

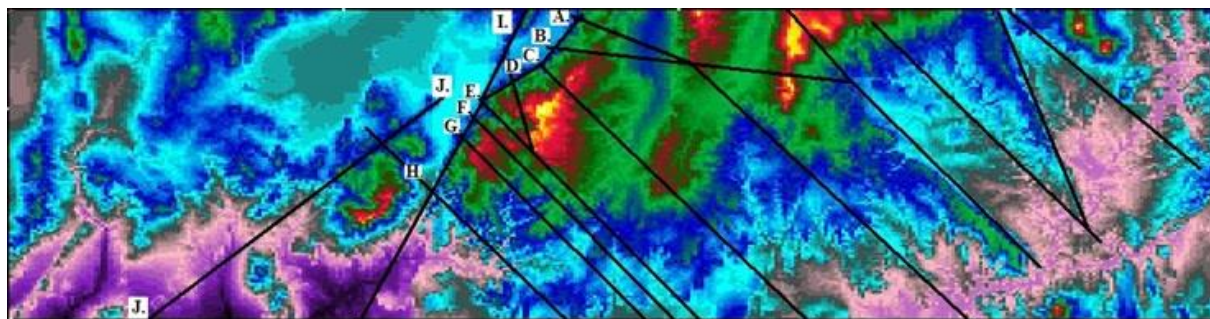
Water Tanks in Cedar City demonstrate hydrostatic pressure



Looking at the Bigger Picture



- There is significant baseflow discharge from The Great Basin (e.g. Cedar City at 5,000 feet) to the south (e.g. St. George at 3,000 feet).
- There is equal or larger baseflow discharge from The Great Basin (e.g. Cedar Valley) to the southeast (e.g. The Grand Canyon).
- This discharge is much deeper than 800 feet, with water running below the isolated Cedar Valley Fill Aquifer.



Possible Fault Geopressure Leak Pathways from Cedar Valley to the Colorado River

Less Than
Normal
Hydrostatic
Pressure

Untapped Cretaceous Aquifer
above the repeated road repairs in Cedar Canyon
(note most significant flow is on east facing outcrops, because beds dip east)



Water
Flowing East
Is Within
Drainage
Basin

What is the cost to repair the road?

Compared to the cost of drilling a deviated hole
and draining the water out of the cliffs to prevent landslides?



Deviated Hole Requires No Pumps and Turbines in the Well Generate Power

Cretaceous Aquifer east of Cedar City

Straight Cliffs Formation over Dakota Formation, north of Highway 14 at Mile 8, east of Cedar City.

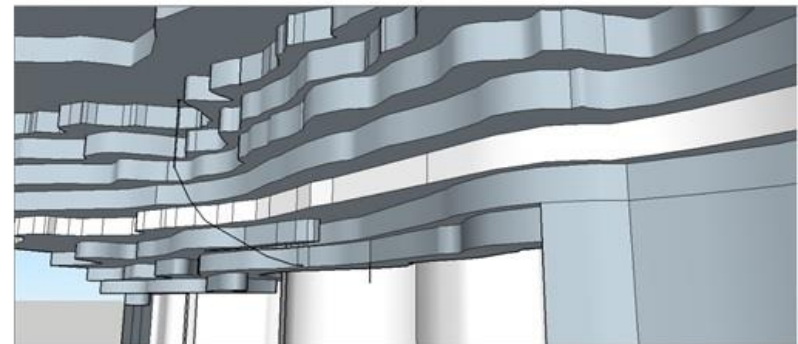
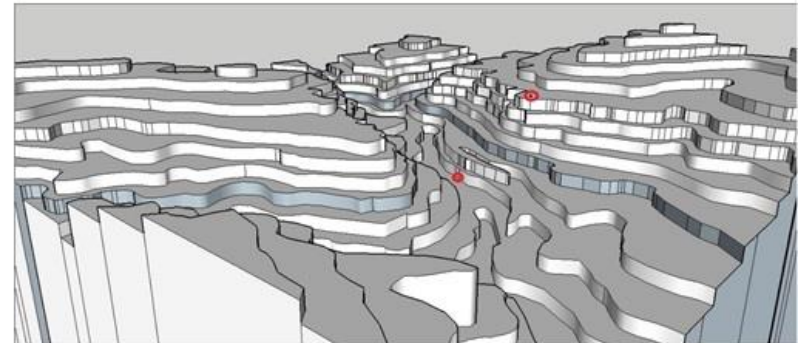
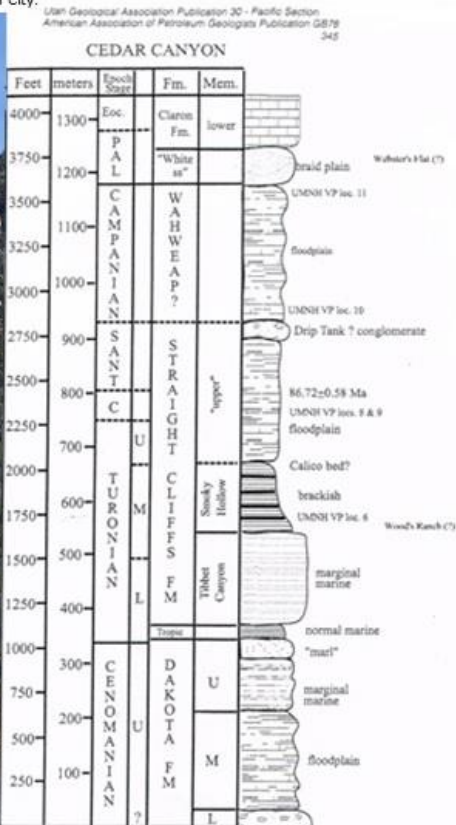


Figure 5. Comparison of Upper Cretaceous and lower Tertiary stratigraphy in Cedar and Parowan Canyons. The Parowan section is hung on the contact between the Claron and Grand Castle Formations.

UGA Pub. 30

Photo by Gary F. Player, Utah Professional Geologist 5280804-2250, March 14, 2015

Notes

2017 Science Camp

- What was best about 2017 Science Camp?

- _____
- _____
- _____

- What would be your ideal 2018 Science Camp Theme?

- _____
- _____
- _____