An Assessment of Geological Carbon Sequestration Options in the Illinois Basin

Saline Reservoirs

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presented by
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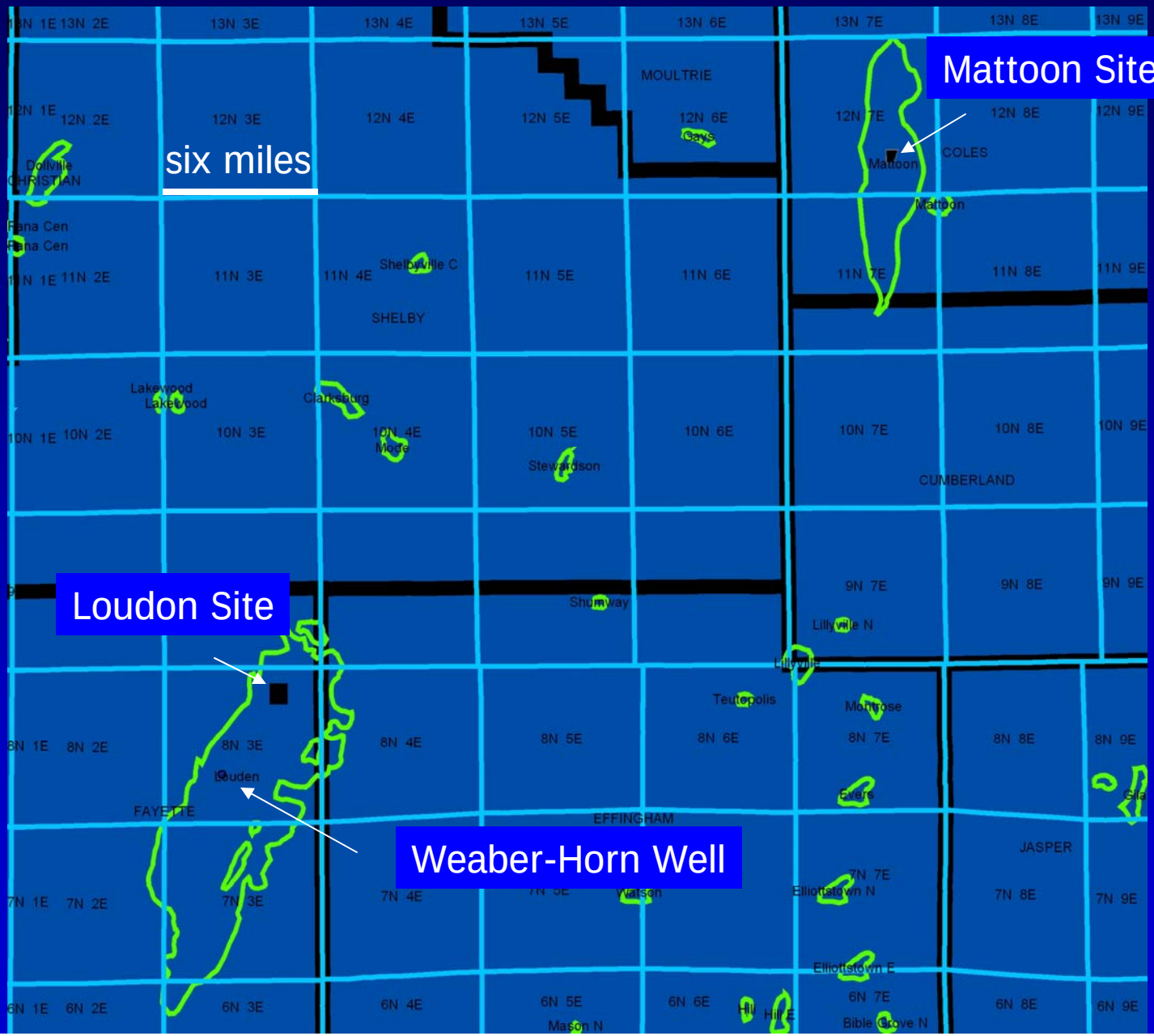
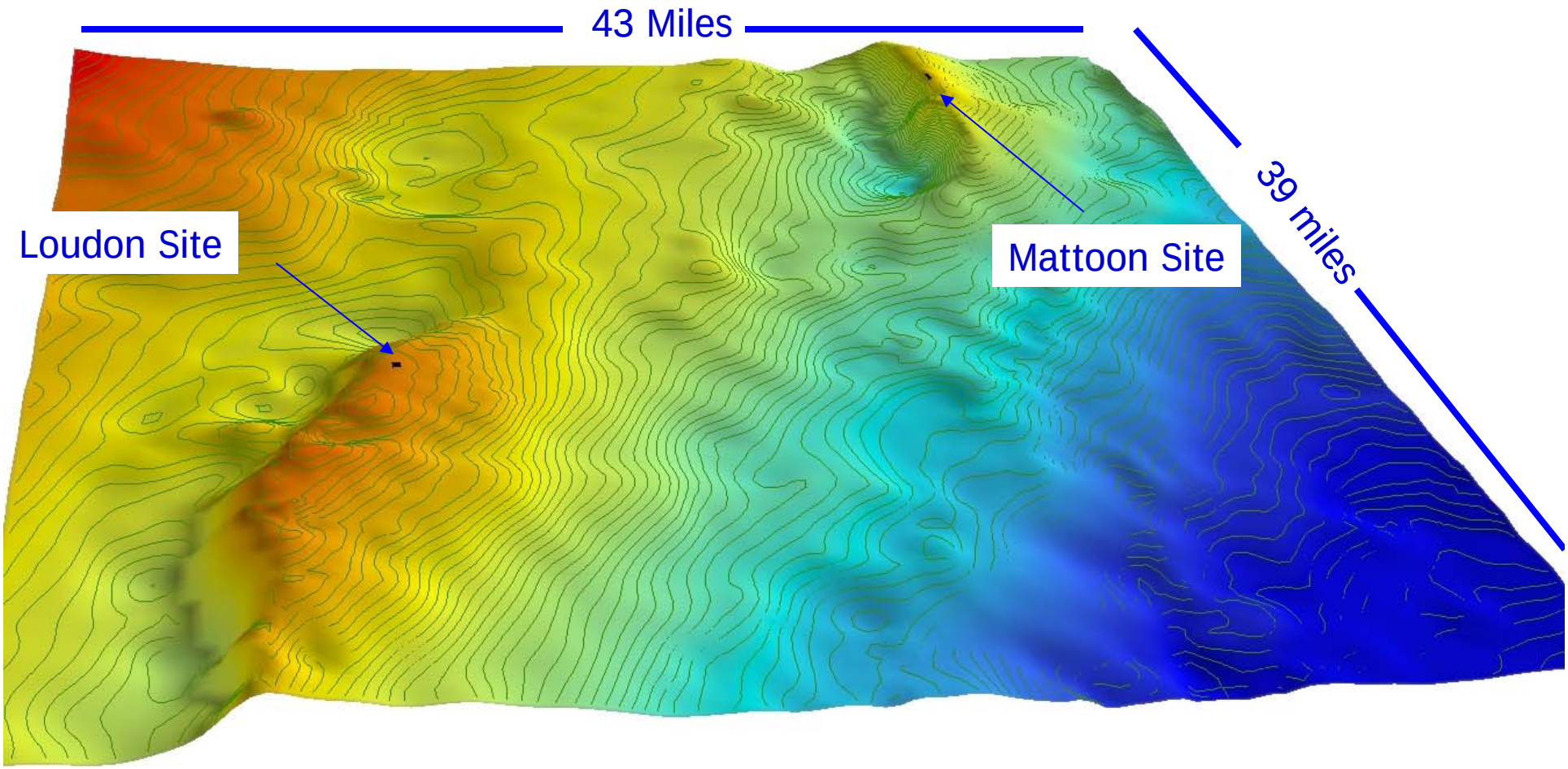
Two Sites

- Two of the six sites (Loudon and Mattoon oil fields) were selected as the best candidates for locating a saline reservoir sequestration well.
- Regional mapping suggests that both the Mattoon and the Loudon sites should be almost identical in geology, including both structure and stratigraphy.

Loudon and Mattoon Area

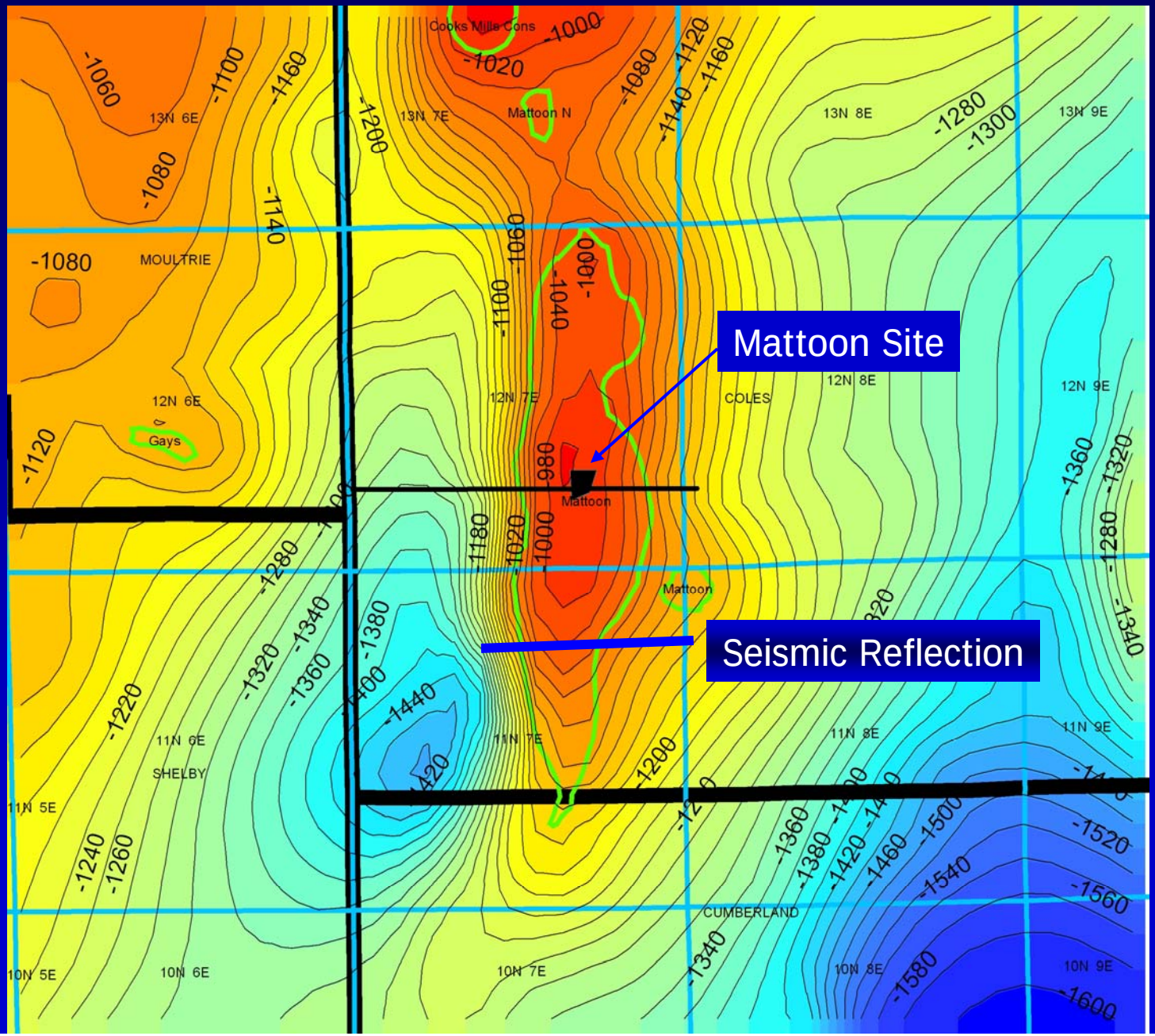


Barlow Subsurface Structure



CI: 20 ft

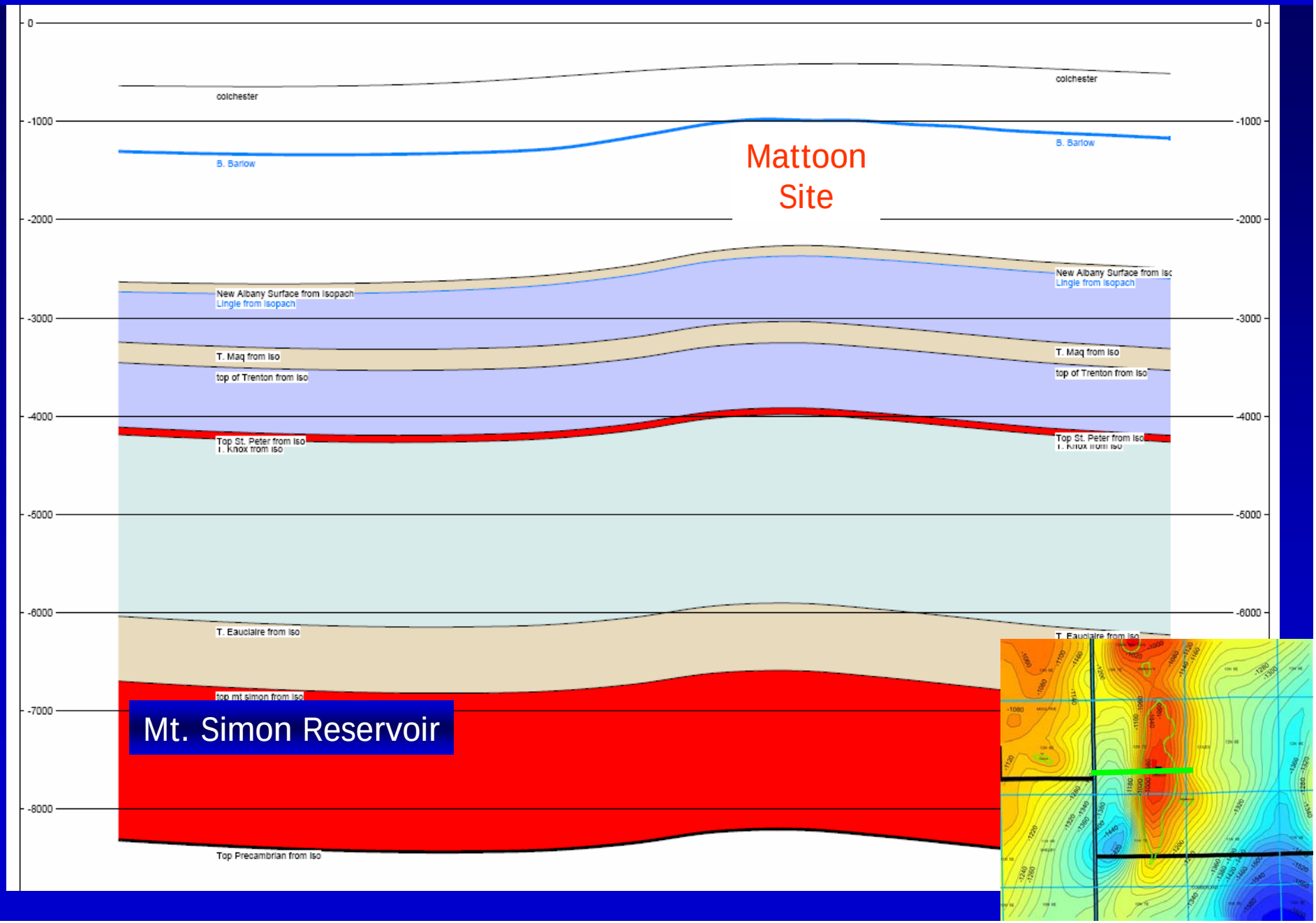
Barlow Structure at Mattoon Site



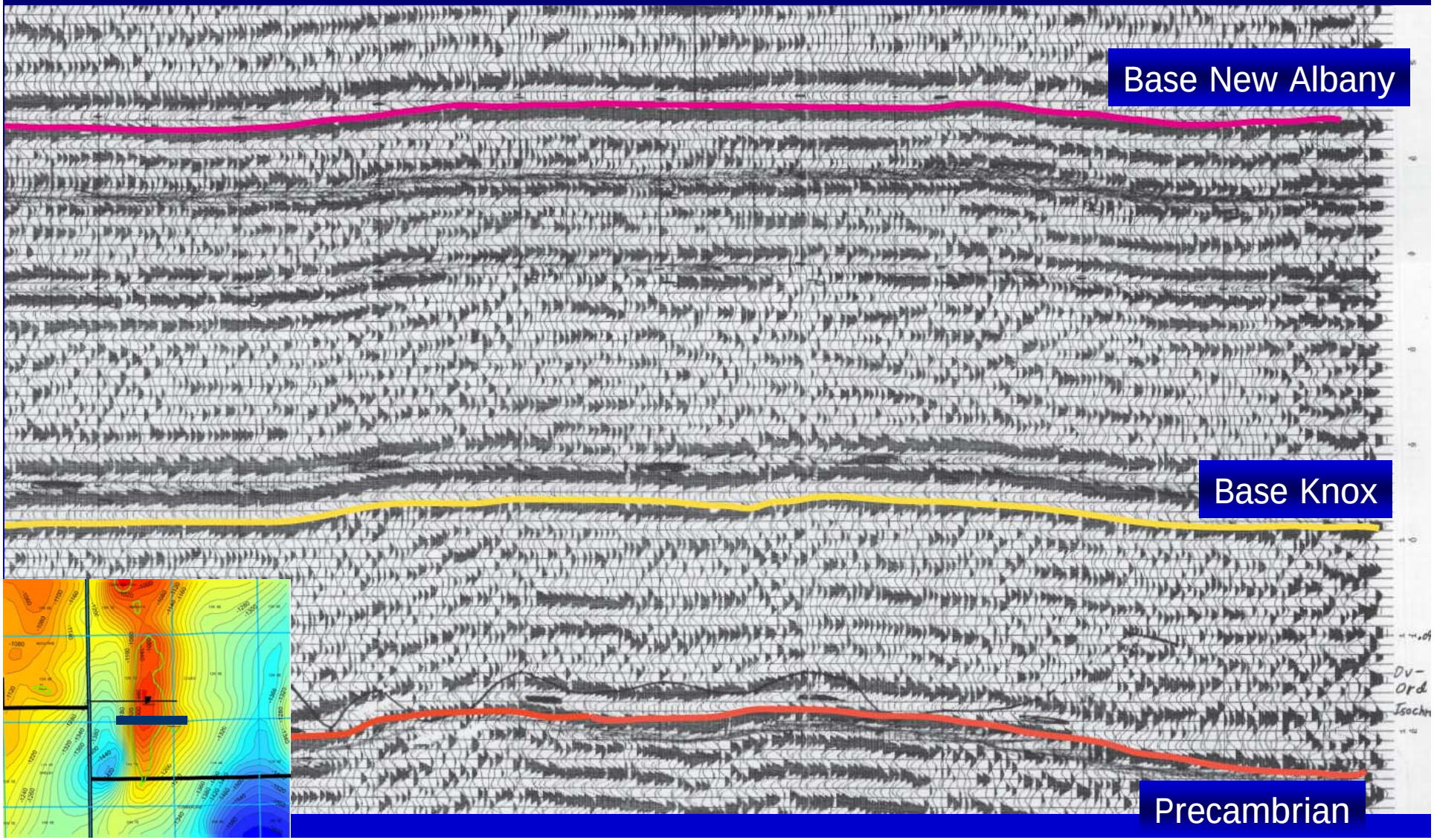
Mattoon Field

West

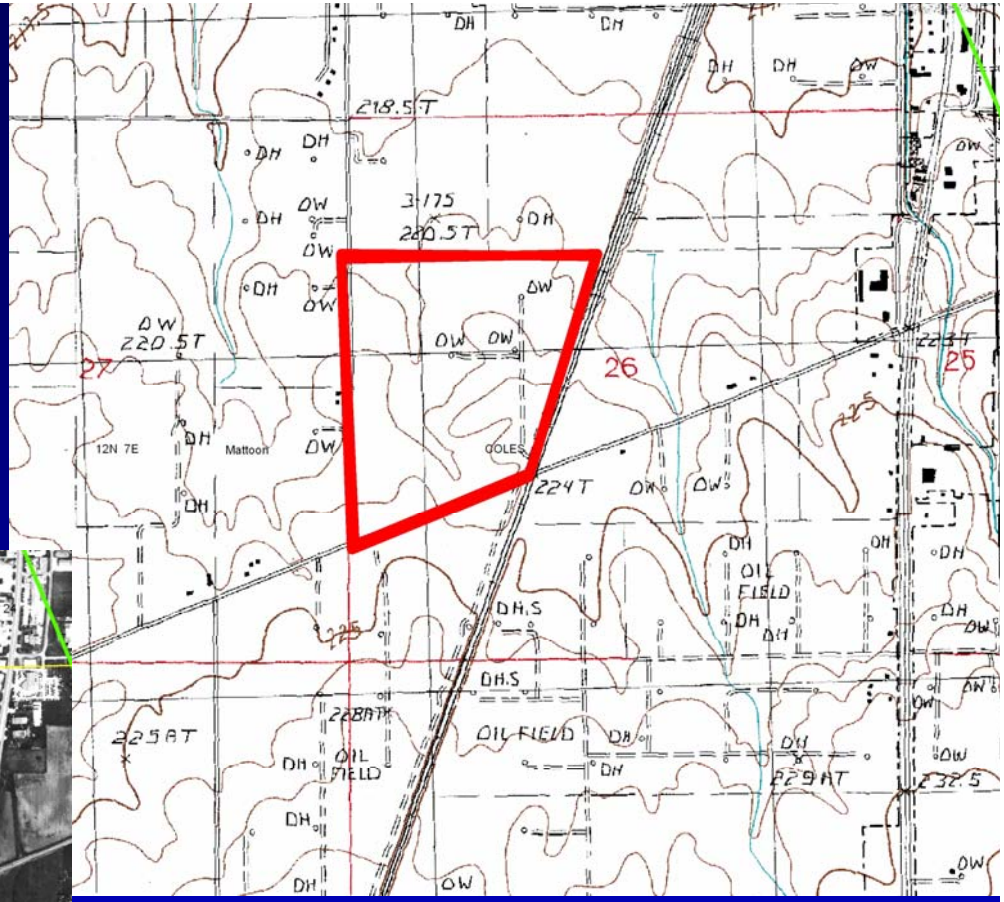
East

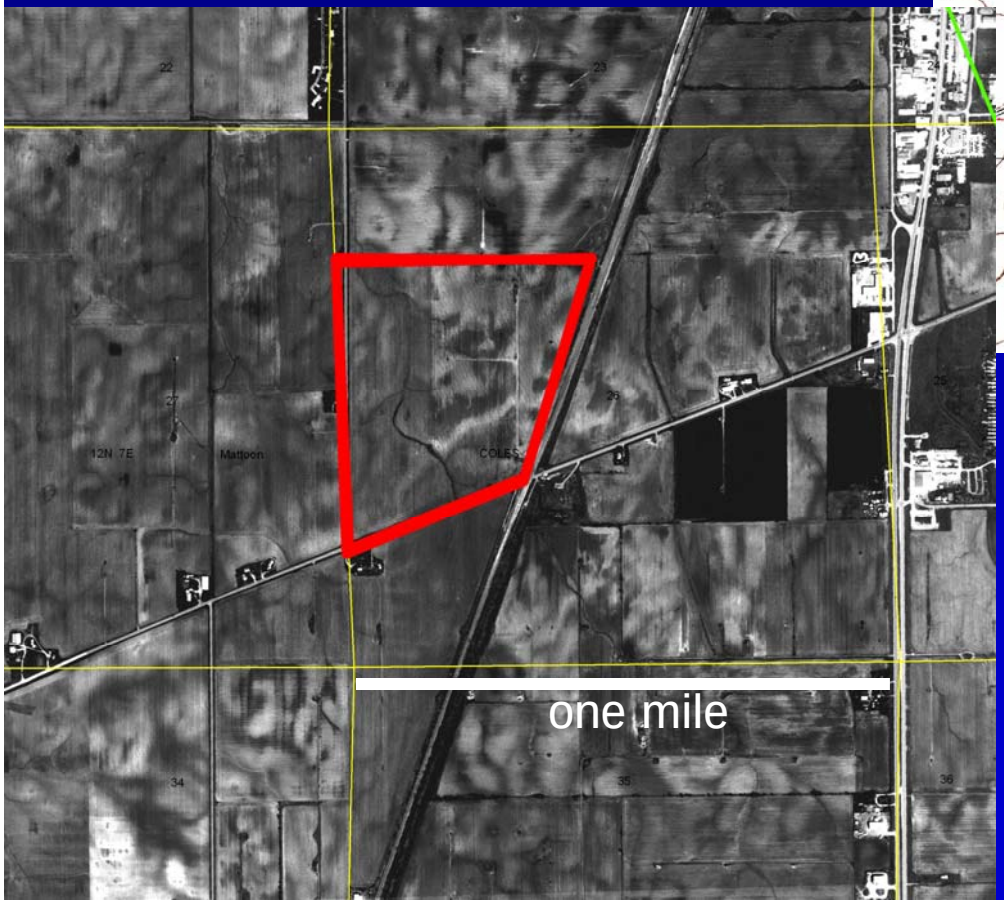


Mattoon Seismic

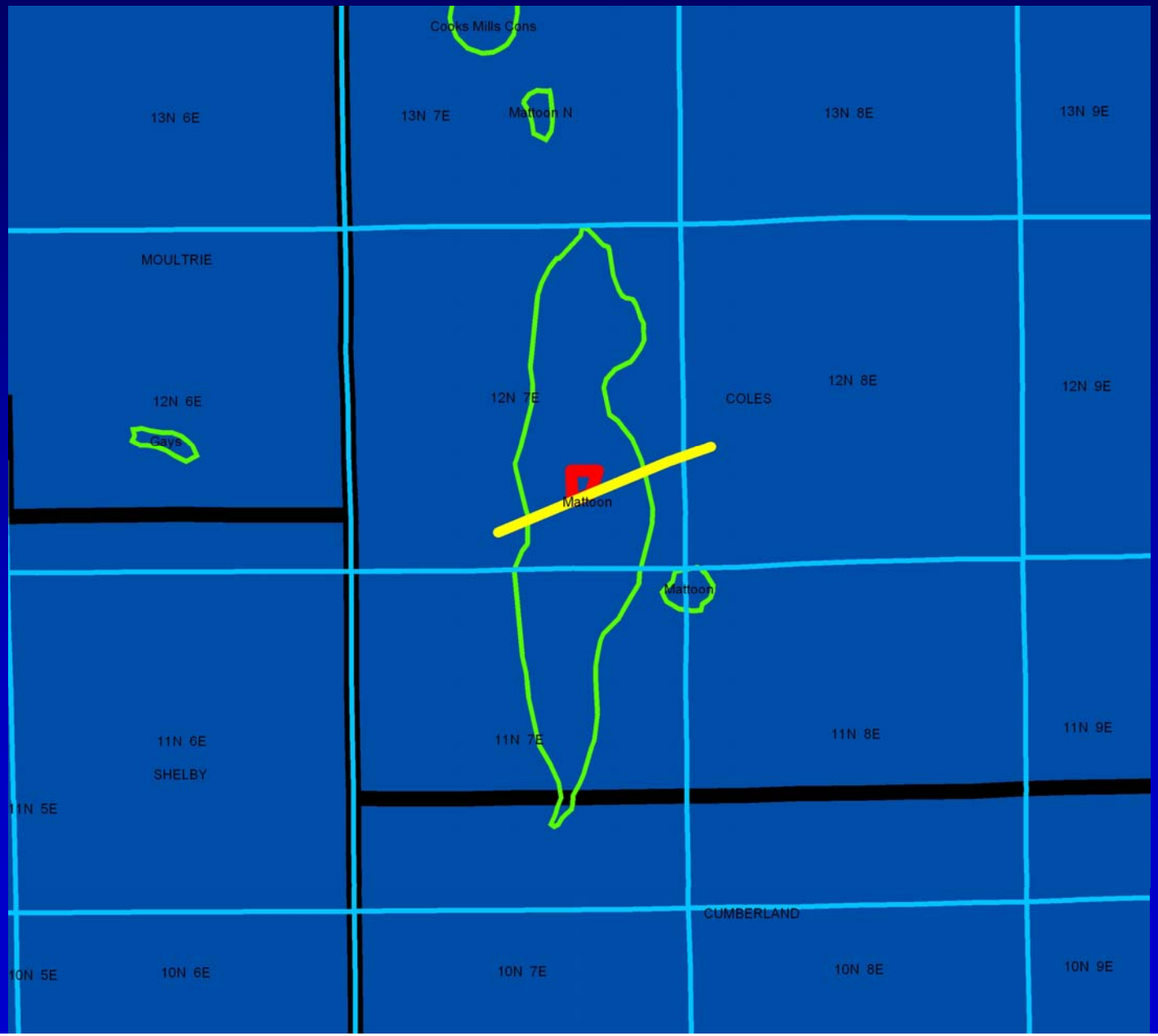


Mattoon Site

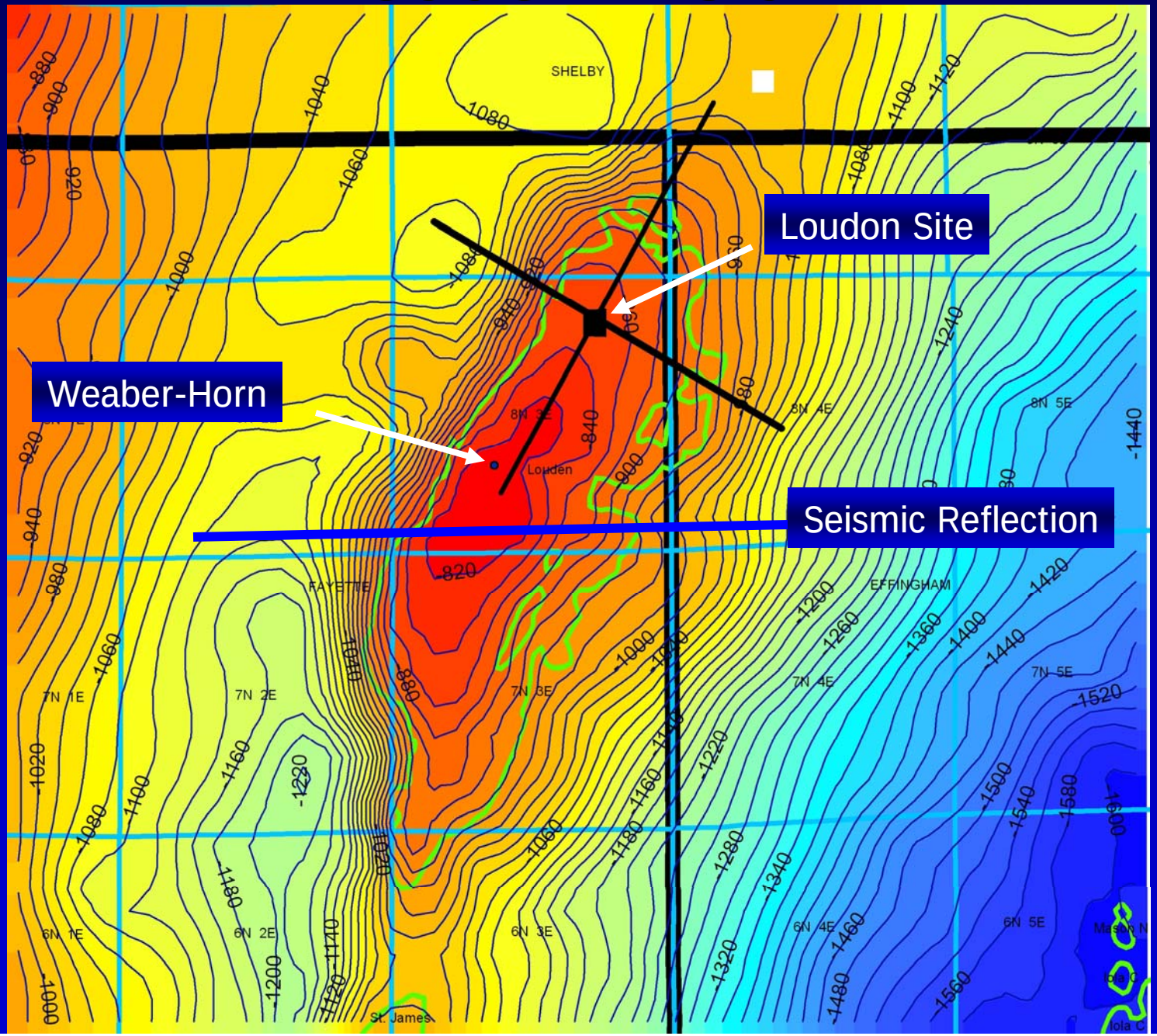




Proposed Mattoon Seismic



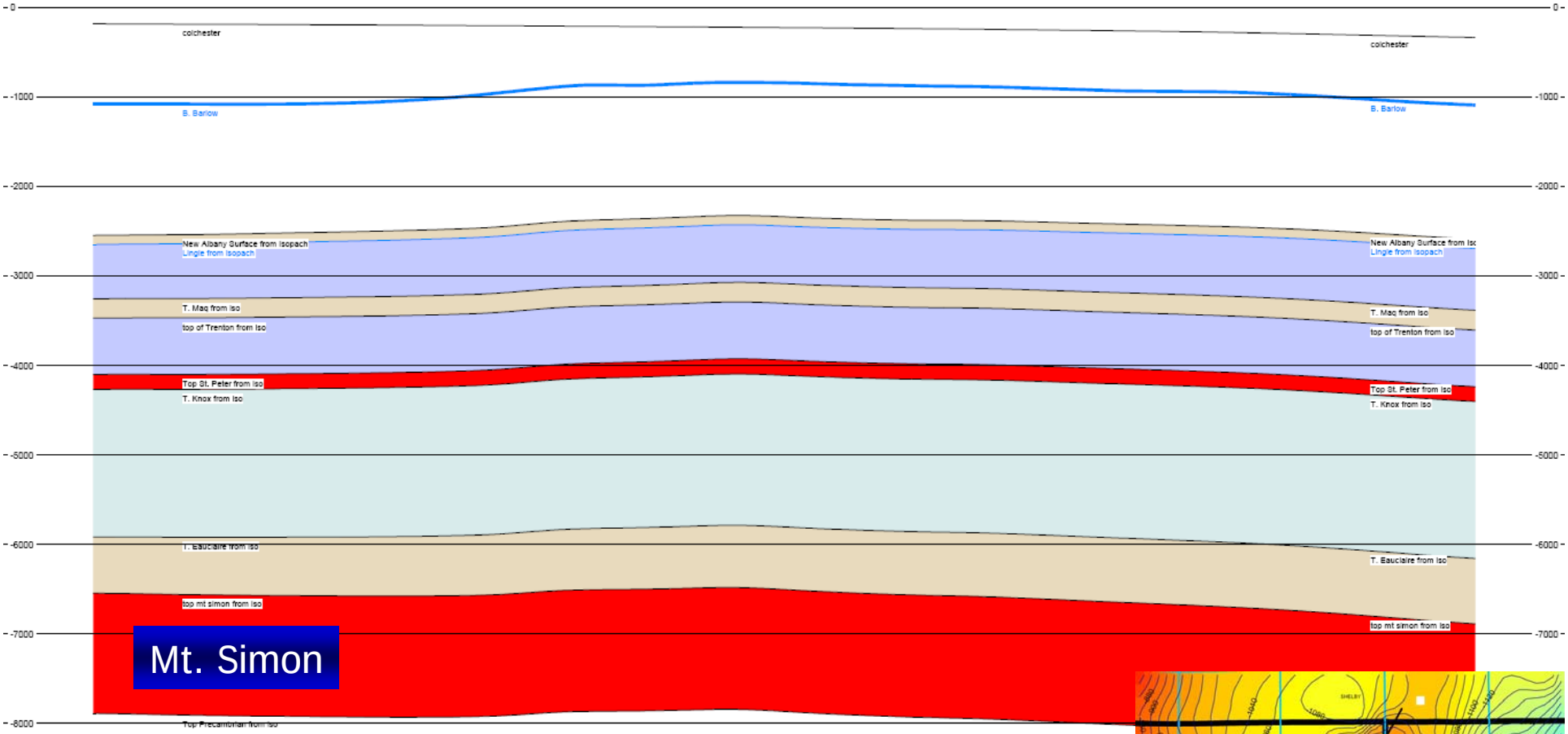
Loudon Field

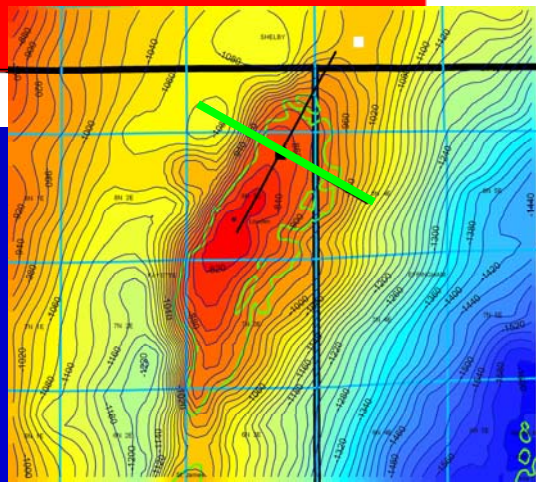


Loudon Field

Northwest

Southwest

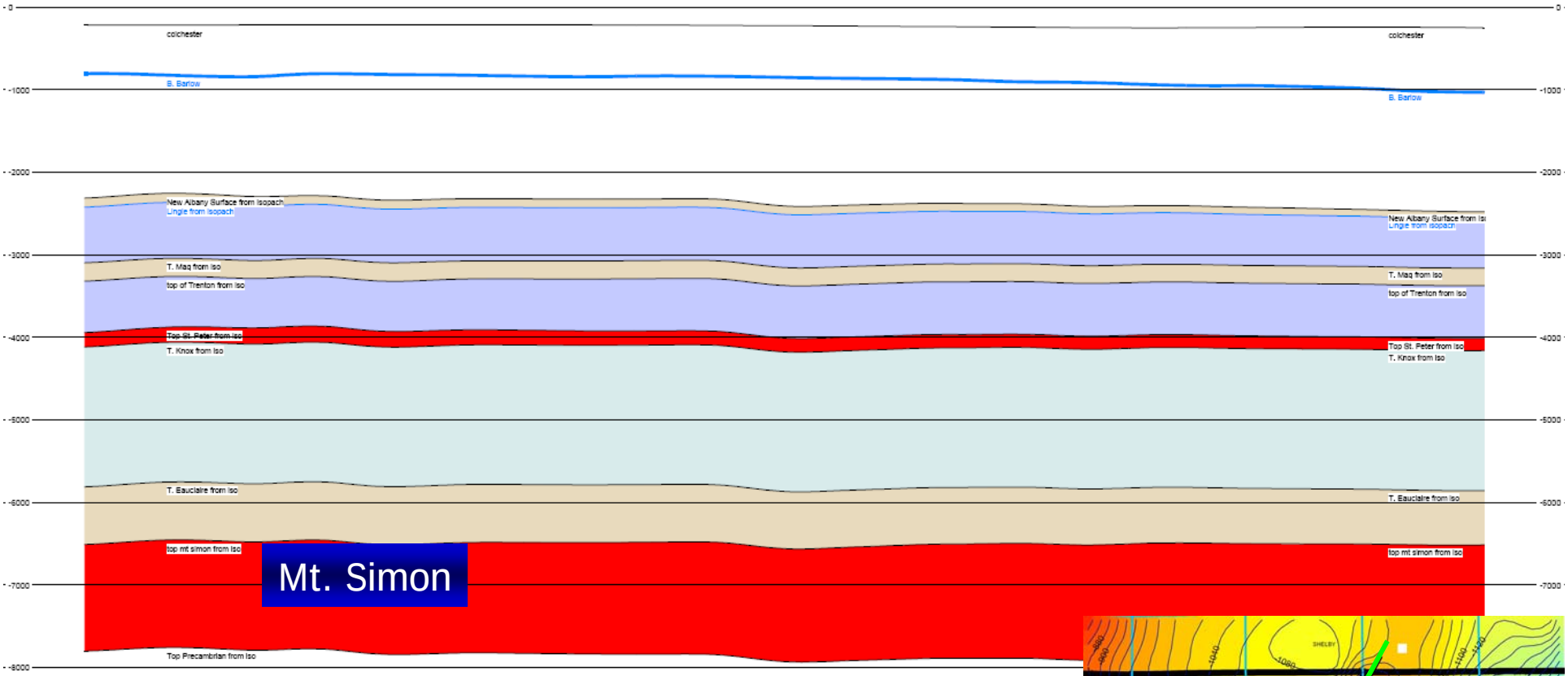


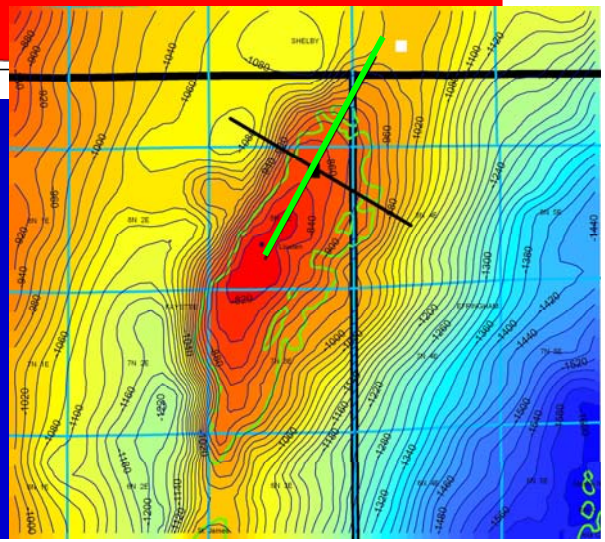


Loudon Field

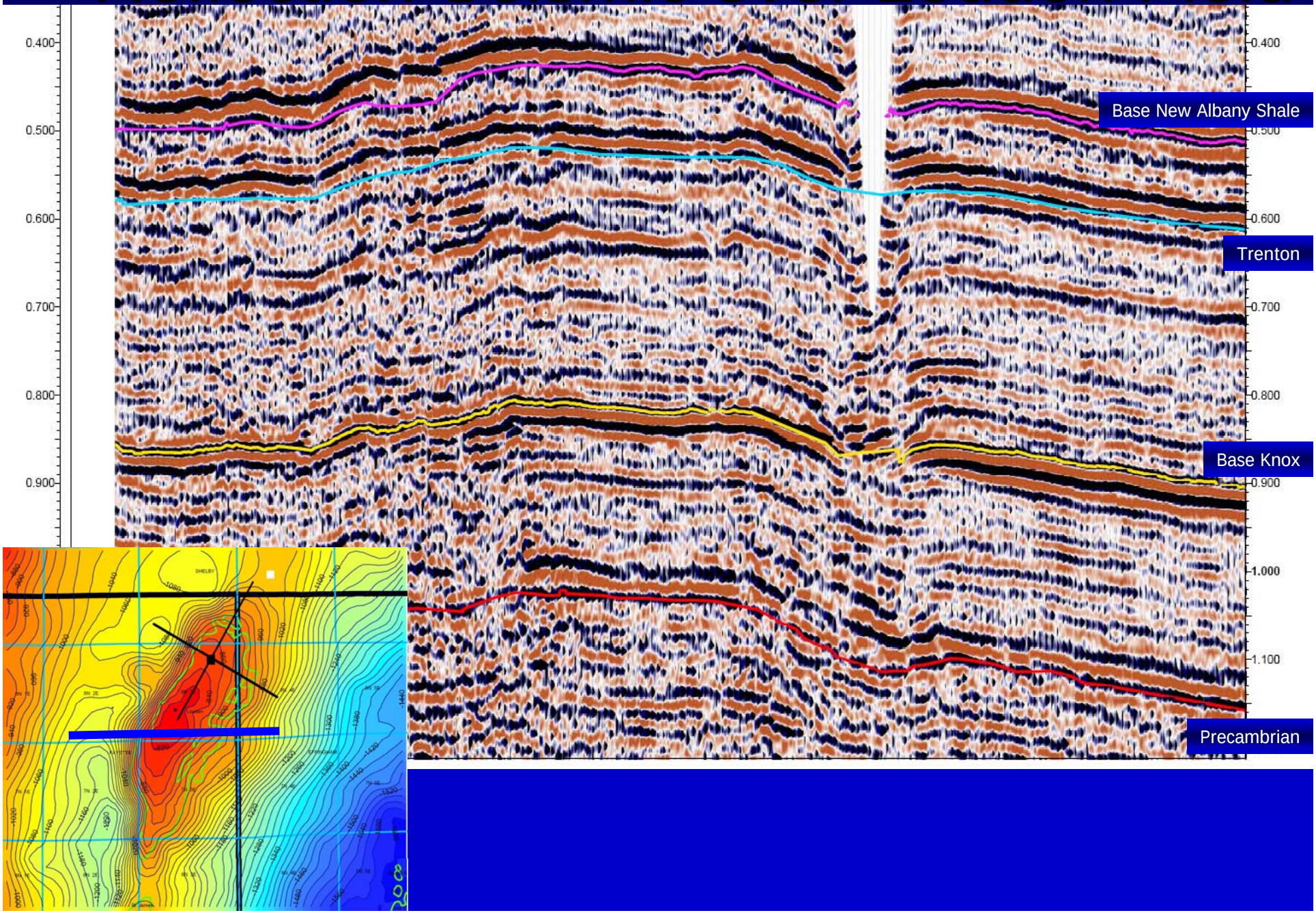
Southwest

Northwest

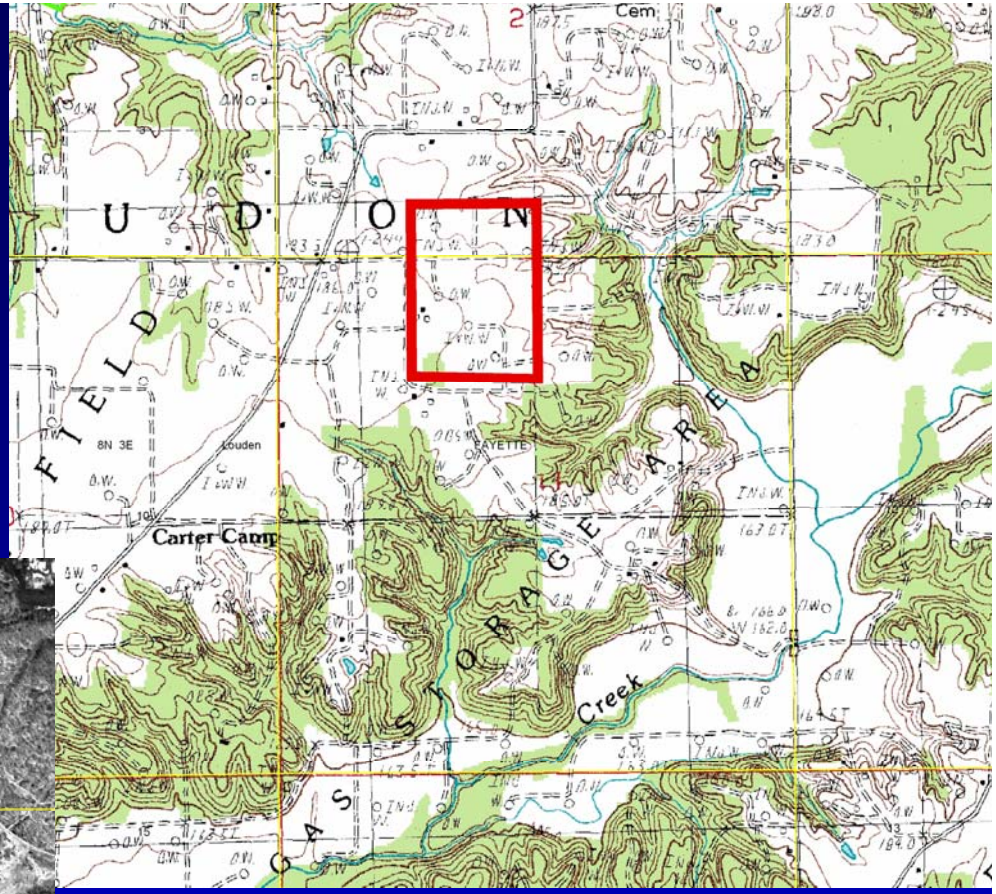


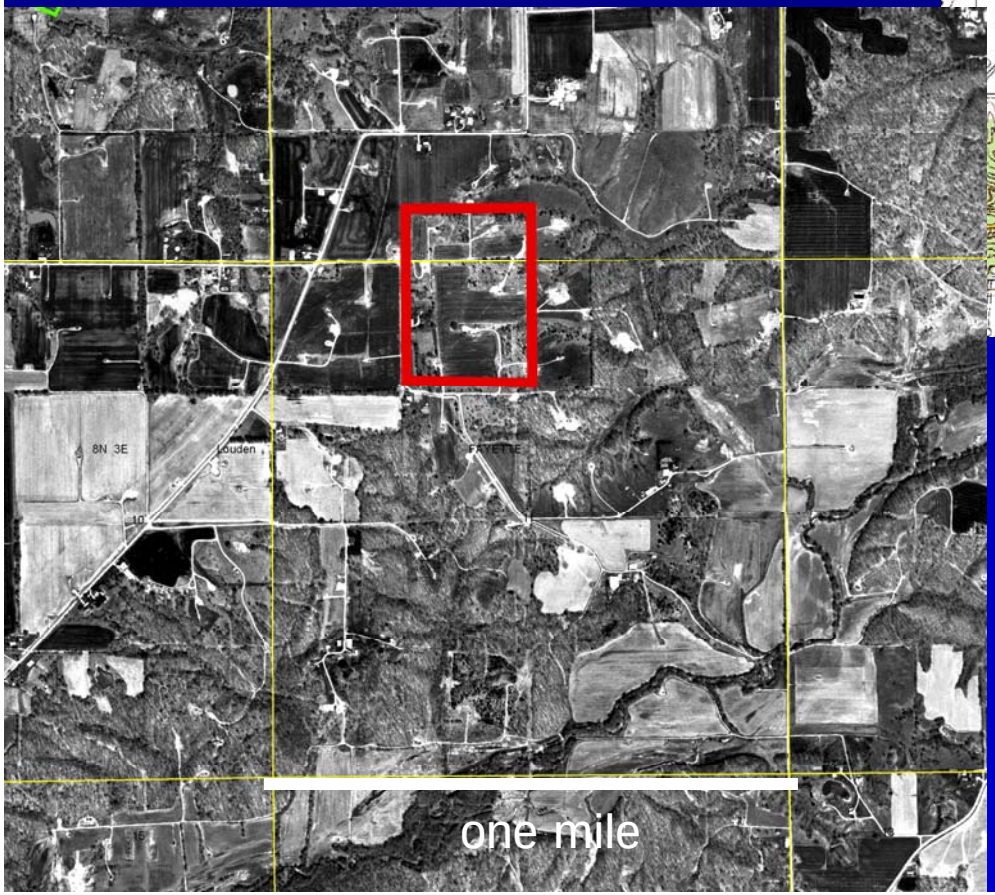


Reflection Seismic over Loudon Field



Loudon Site

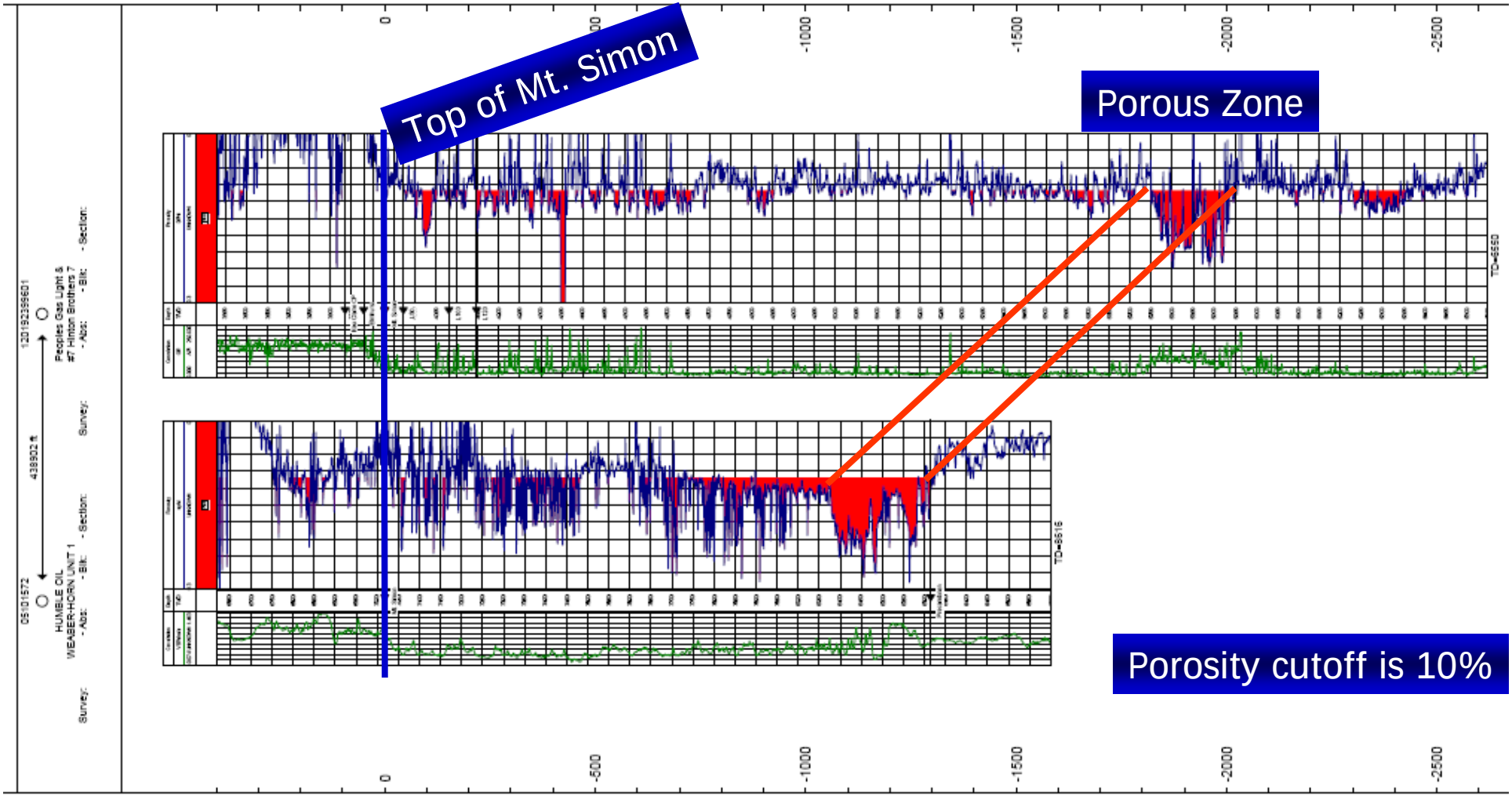

Cem
U D O N
FIELD
GAS STORAGE AREA
8N 3E
Loudon
FAYETTE
Carter Camp
Creek


8N 3E
Loudon
one mile

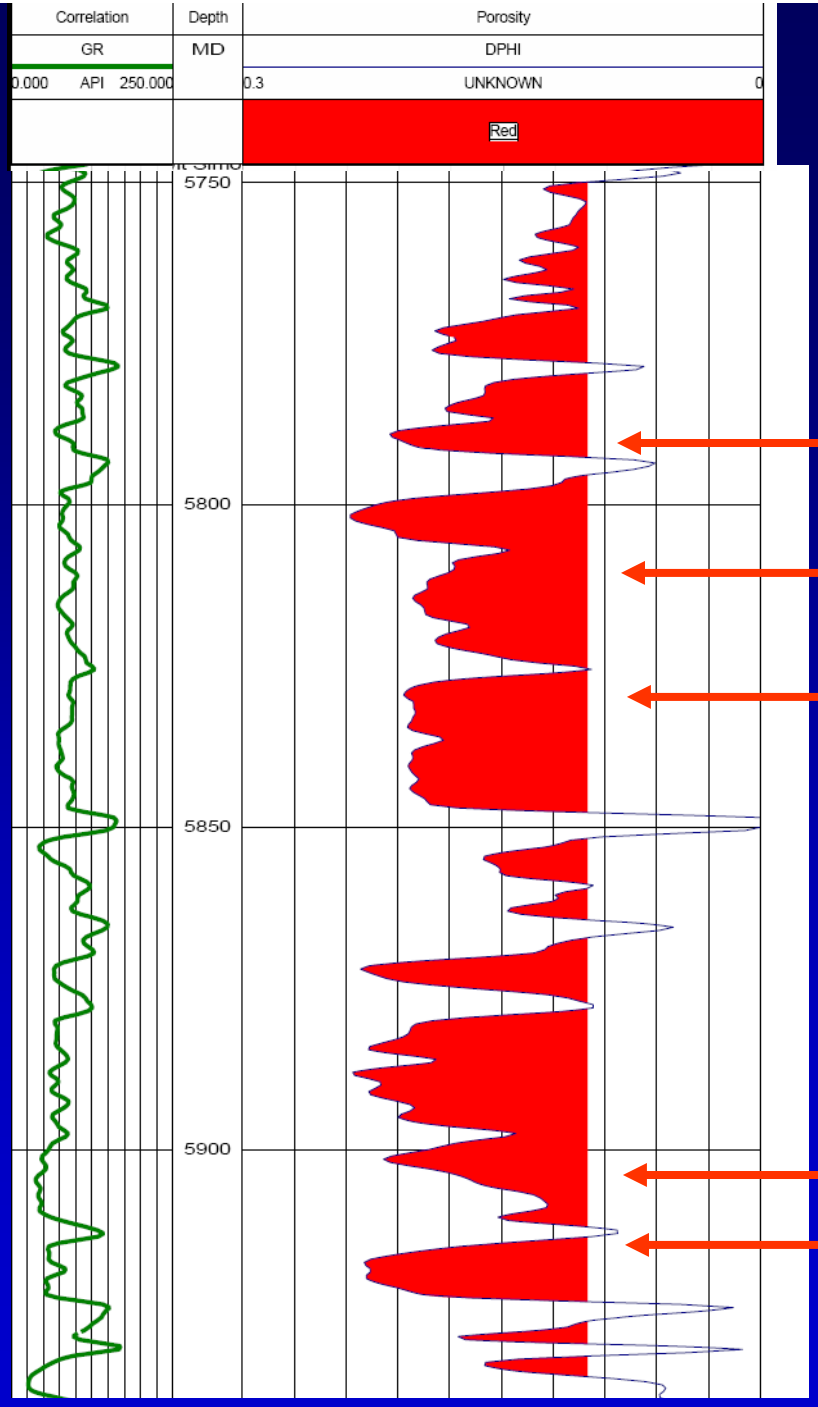
Comparison of Hinton #7 and Weaber-Horn

- Humble Oil Weaber-Horn #1 well is located on the Loudon Field anticline in Fayette County
- Hinton #7 in Champaign County has deep Mt. Simon core analysis

Comparison of Hinton #7 and Weaber-Horn



Core Analysis Hinton #7



5789 ft, 54 mD, 21.1 Ø

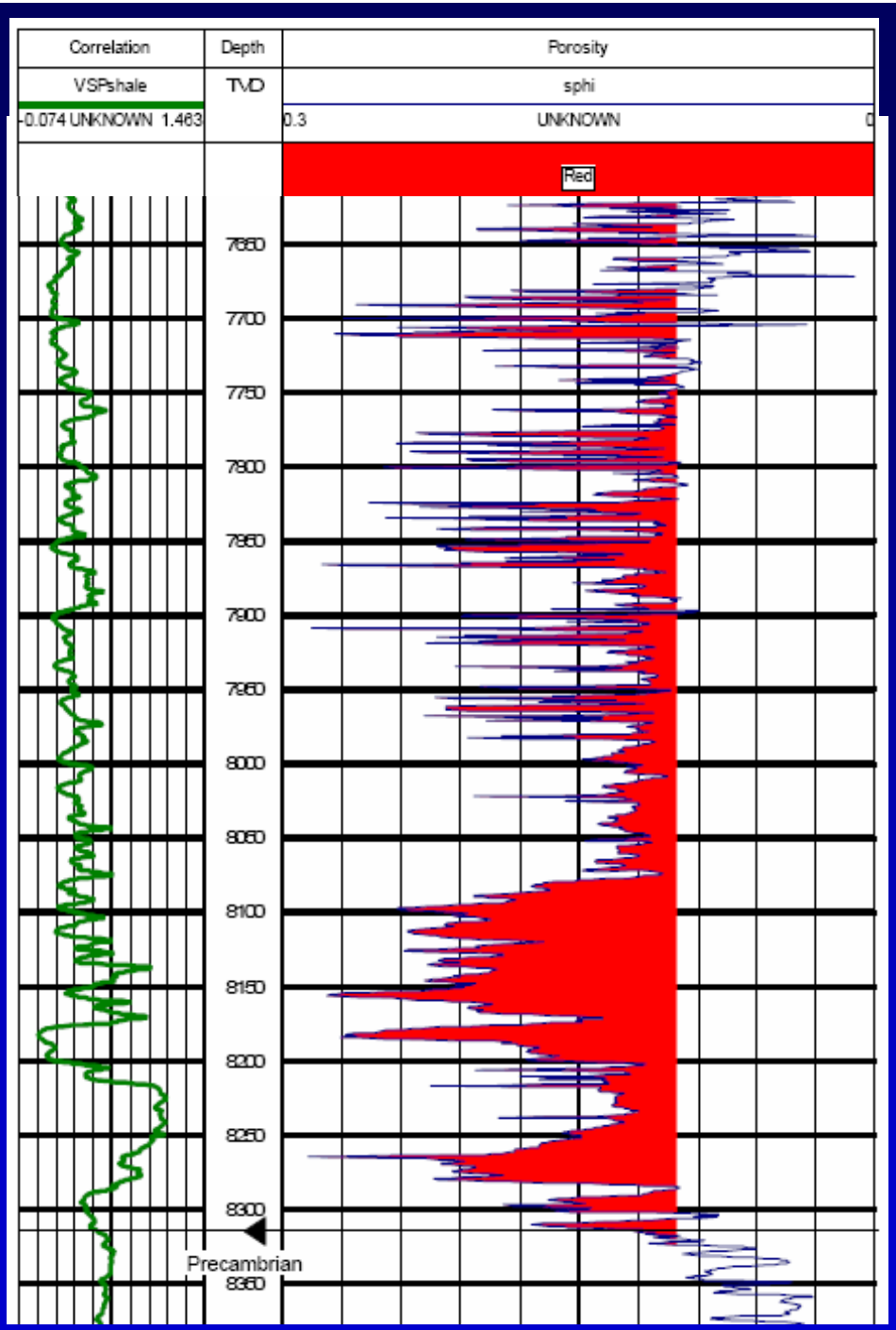
5815 ft, 617 mD, 20.8 Ø

5836 ft, 1300 mD, 23.1 Ø

Rocks can contain up to 20% Potassium Feldspar. Leached grains throughout sample

5904 503 mD, 19.1 Ø

5916 ft, 9.08 mD, 20.3 Ø



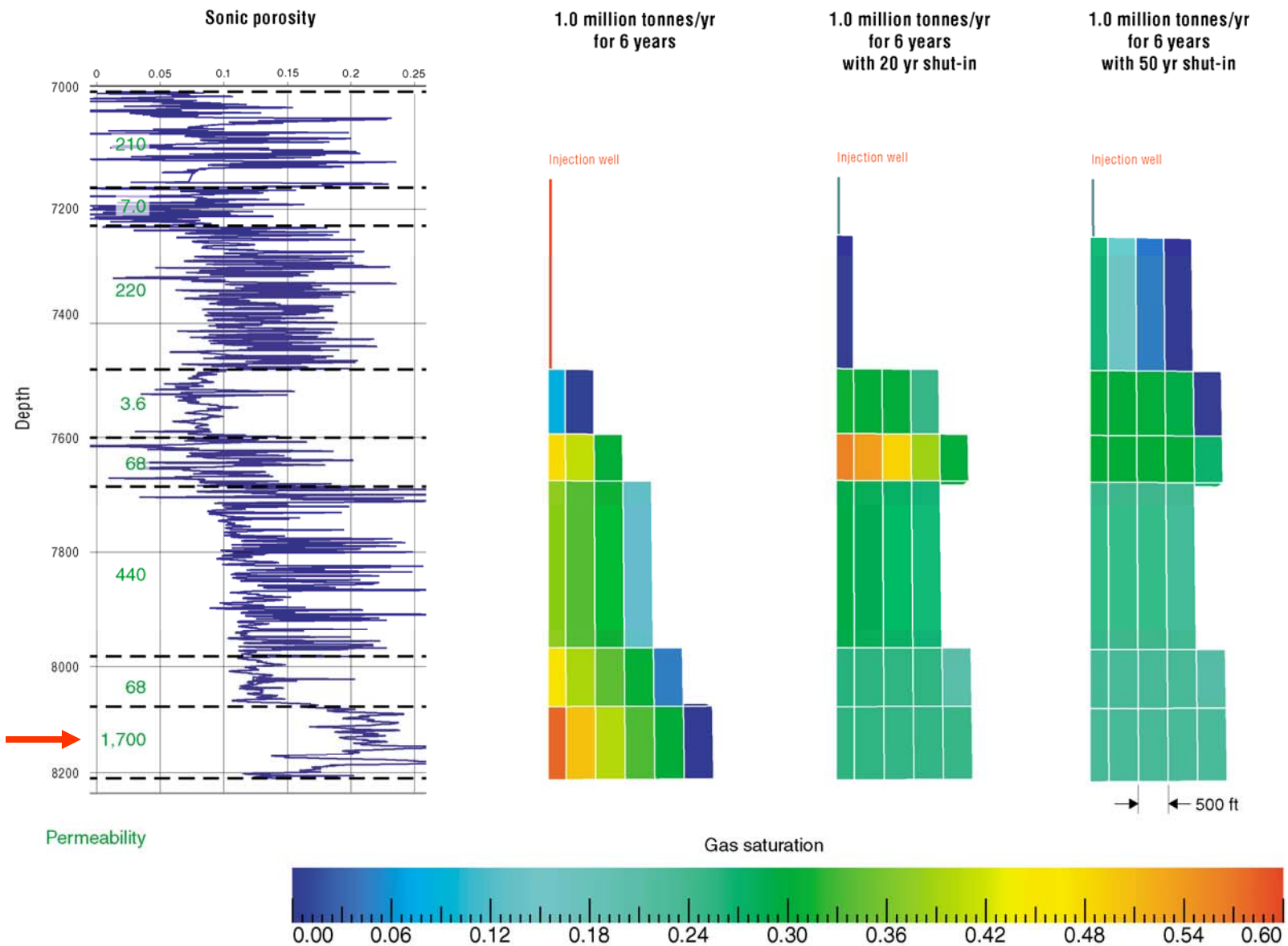
Weaber-Horn Porosity Log Derived from Sonic

Arkosic, poorly sorted, medium to coarse grained, abundant feldspar

Weathered Granite (Saprolite)

Bottom Layer Open for Injection

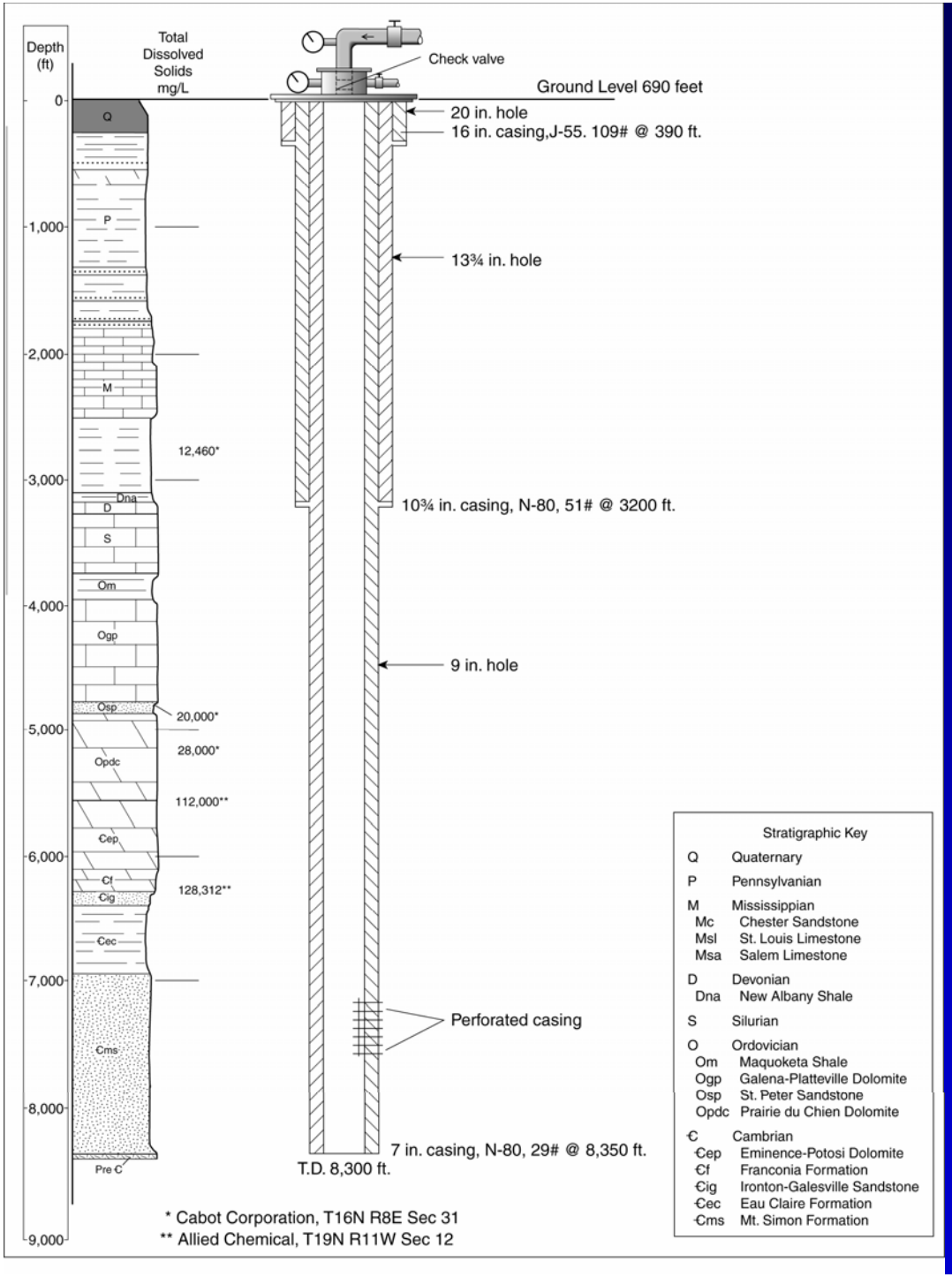
Weaber–Horn (Loudon)



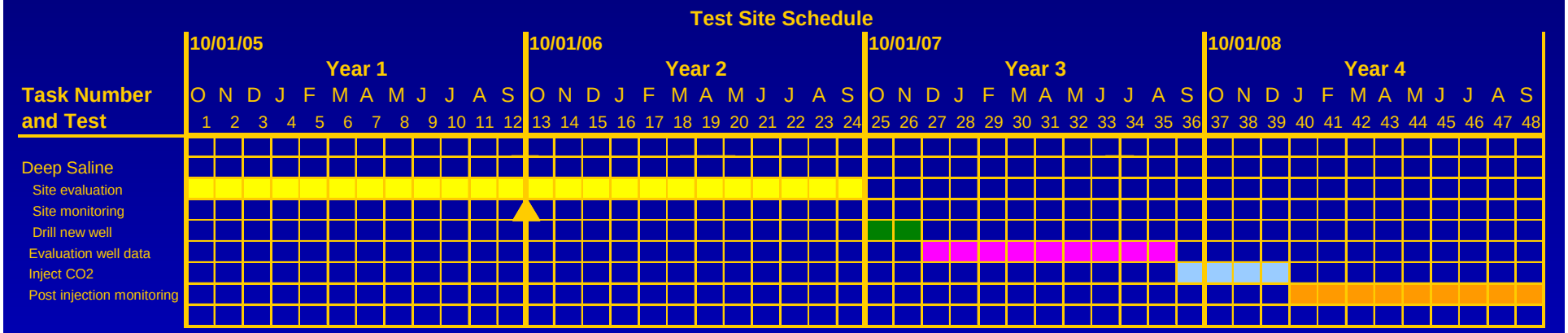
MMV Plan

- ***Ground water monitoring***
  - ***Geochemical methods***
- ***Soil gas sampling***
- ***CO_2 land surface flux monitoring***
- ***Well Logging***
- ***Measuring CO_2 injection rate, volume, and isotopic composition***
- ***Groundwater and Geochemical Modeling***
- Geophysical Methods
  - VSP
  - Electromagnetic Induction (EMI)

Well Design for Mattoon and Loudon Sequestration Test Well



Schedule for Saline Reservoir Test



Accomplishments

- Detailed evaluation of six sites
- Evaluation of extensive seismic reflection data
- Detailed petrophysical analysis
- Regional subsurface mapping
- Acquisition and interpretation of new 2D data
- Currently evaluating Mattoon and Loudon

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