Chapter 2

GEOLOGY
Geologists

Wellside

Sedimentologist
Chapter 2

Where were the hydrocarbons?

- Cherokee Beach Sands
- Shoestring Sands
- Previous Geologic Models
Chapter 2

Where are the hydrocarbons?

What is the current geologic model?
Chapter 2

Where and in what direction should I plan my well path?
Chapter 2

Is there a preferential direction to permeability?
Is directional permeability a result of depositional systems or fractures or both?
Where are the Hydrocarbons?

Vertical wells require:

- Pre-drill estimate of oil in place

- Log evaluations

- Post-drill estimate of oil in place to select the perforating interval and turn the well over to production.
Where are the Hydrocarbons?

Horizontal well placement requires:

- Input as to where the hydrocarbons are in the reservoir aerially as well as vertically.

What are the best criteria to determine the optimum direction and true vertical depth of the well path?
Geology

The following issues dramatically impact horizontal well orientation and completion design:

- Depositional environment
- Natural fractures
- Wellbore stability
Geology

An accurate description of YOUR field is critical to the success of the horizontal project.

This workshop will concentrate on Pennsylvanian Sandstone Reservoirs.
Fluvial-Dominated Deltaic (FDD)
Oil Reservoirs in Oklahoma:
The Bartlesville Play
Fluvial-Dominated Deltaic (FDD) Oil Reservoirs in Oklahoma: The Bartlesville Play

Where is your field in this system?
Where would you put the horizontal well?
How do you decide well direction?
Fluvial-Dominated Deltaic (FDD) Oil Reservoirs in Oklahoma: The Bartlesville Play

Should you drill parallel or transverse?
Regional Stratigraphy and Oil and Gas Potential of the McLouth Formation in the Southern Forest City Basin of Northeast Kansas
Thesis by Carl F. Dietz  1995
Regional Stratigraphy and Oil and Gas Potential of the McLouth Formation in the Southern Forest City Basin of Northeast Kansas
Thesis by Carl F. Dietz 1995
A NEW METHODOLOGY FOR OIL AND GAS EXPLORATION USING REMOTE SENSING DATA AND SURFACE FRACTURE ANALYSIS

Topical Report
August 1995

By
Genliang Guo
Herbert B. Carroll

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Bartlesville, Oklahoma
Geologic Interpretations

Rock Mechanics

“Estimating Compressive Strength from Travel Time from Sonic Logs”

by Ken Mason
The answer to the wellbore stability question will determine completion technique:
- Open-hole completion
- Slotted liner
- Cemented liner/casing
Geology

- Formation dip and strike
- Faults - 3D display
- Reservoir continuity
The Bartlesville “Zones”
1. DGI - A
2. DGI - B
3. DGI - C
4. DGI - D
5. DGI - E
6. DGI - F

Legend:
- Black: flood-plain mudstone
- Grey: meandering channel fill
- Dark grey: splay
- Light grey: braided channel fill

sp: splay
res: residual
What does the Bartlesville look like on an induction log?
Perf here?

Here?

and/or here?
What does a horizontal well in the Bartlesville look like on an induction log?
Compartmentalization
AAPG Methods in Exploration Series No. 14

HORIZONTAL WELLS

FOCUS ON THE RESERVOIR

Edited by
Timothy R. Carr
Erik P. Mason
Charles T. Feazel
Effect on monthly field production

Location of infill horizontal well and its effect on monthly field production
Geology Conclusion

- Determine target direction and true vertical depth.
- Determine target window based on target thickness, strike and dip.
- Consider lease lines and required legal spacing.
- Consider rock mechanics in the completion design.