Field Examples of Osagean/Meramecian Reservoir Systems

by Kurt Rottmann

Goals

- Highlight the characteristics of the major reservoir systems
- Suggest how the Mississippian horizontal play can be expanded

TYPES OF OSAGEAN/MERAMECIAN RESERVOIR SYSTEMS

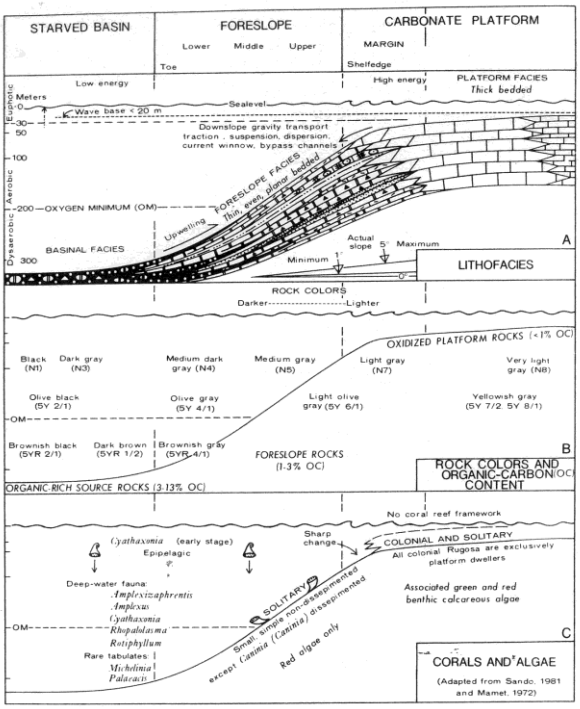
1.) **Talus deposits**

2.) **Secondary dolomites**

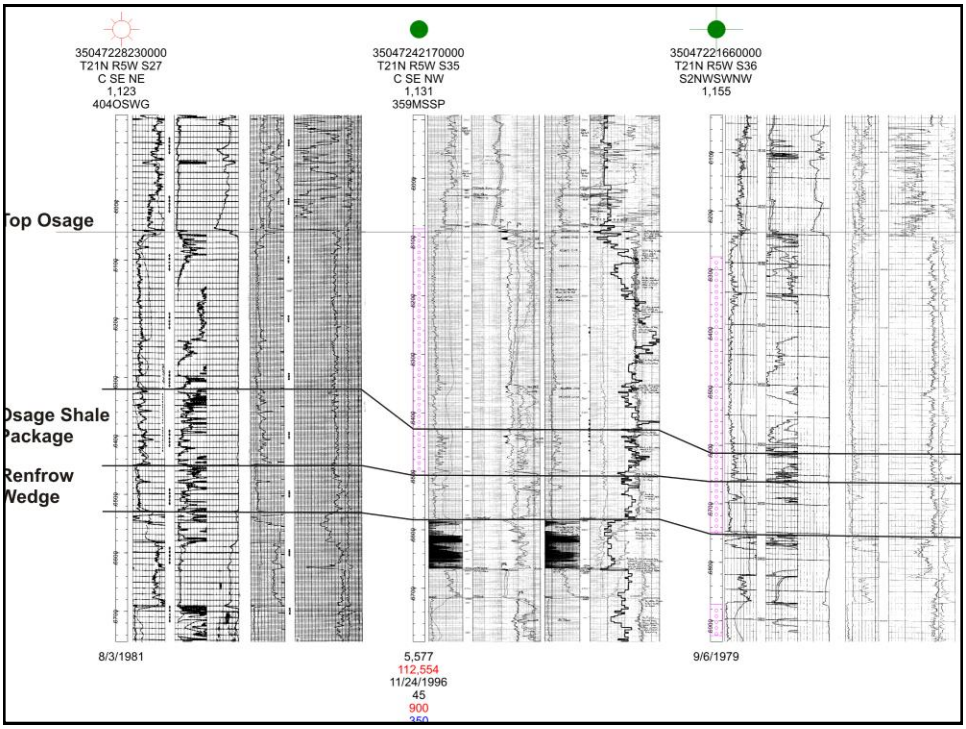
3.) **Spiculites**

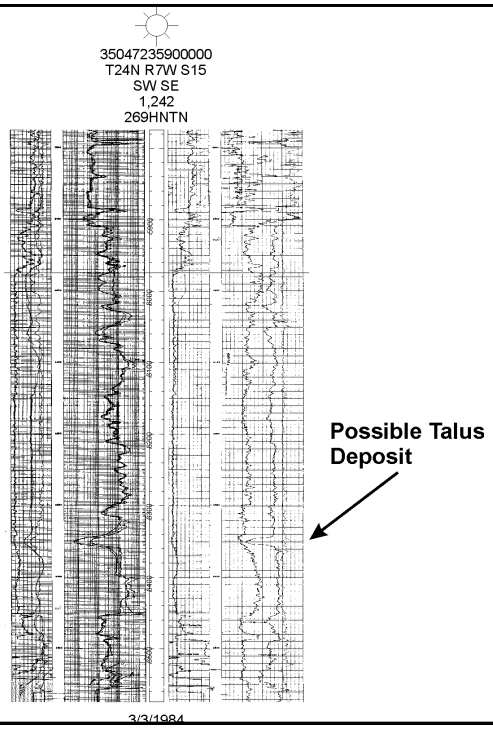
4.) **Tripolitic cherts**

5.) **Fractured cherts**



Gutschick and Sandberg, 1983, fig 7, Reprinted by Permission of Society of Economic Paleontologists and Mineralogists





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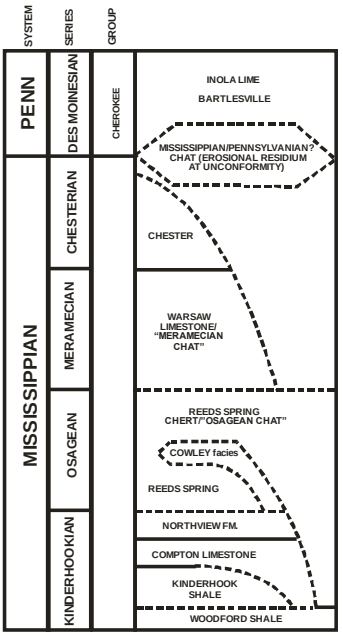
Stratigraphic Column for North-Central Oklahoma
(west of the Nemaha uplift)



Modified from Mazzullo, Wilhite, and Woolsey, 2009, Fig 2, Reprinted by Permission of American Association of Petroleum Geologists

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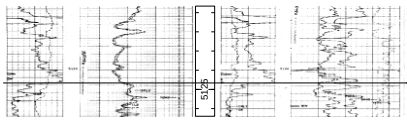
1-27
T29N R16W S27
C NW
JACK EXPL INC



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SW NE SW
NOBLE ENERGY INCORPORATED
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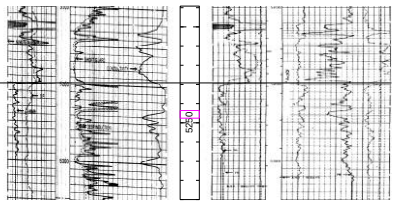

782
330,502
5/14/1991
5,350
1
602
1

TYPES OF OSAGEAN/MERAMECIAN RESERVOIR SYSTEMS

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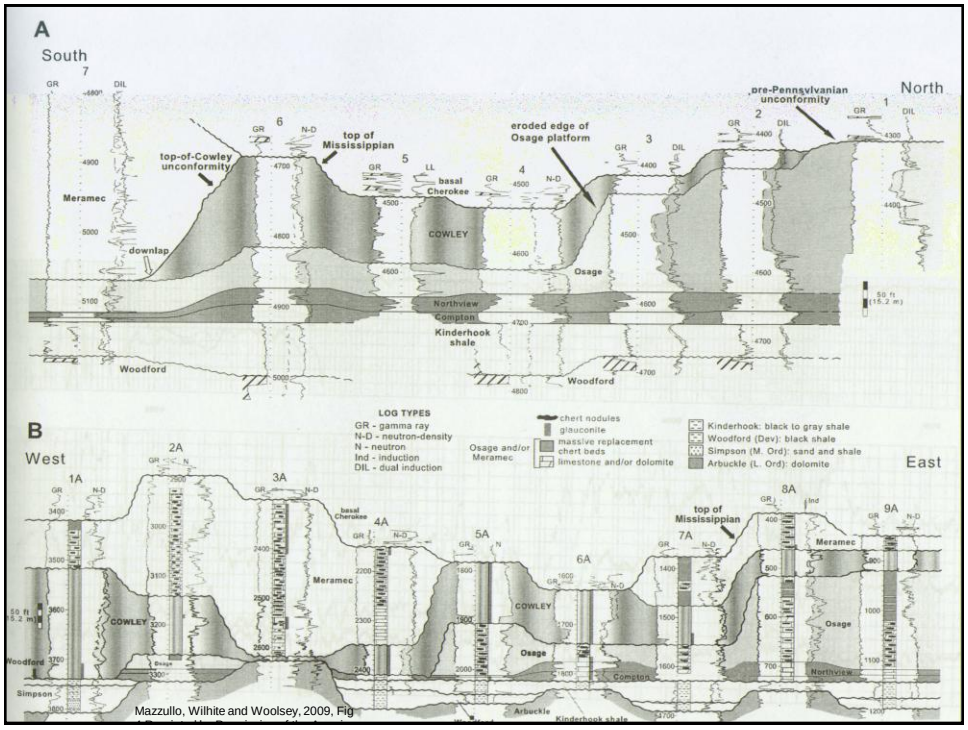
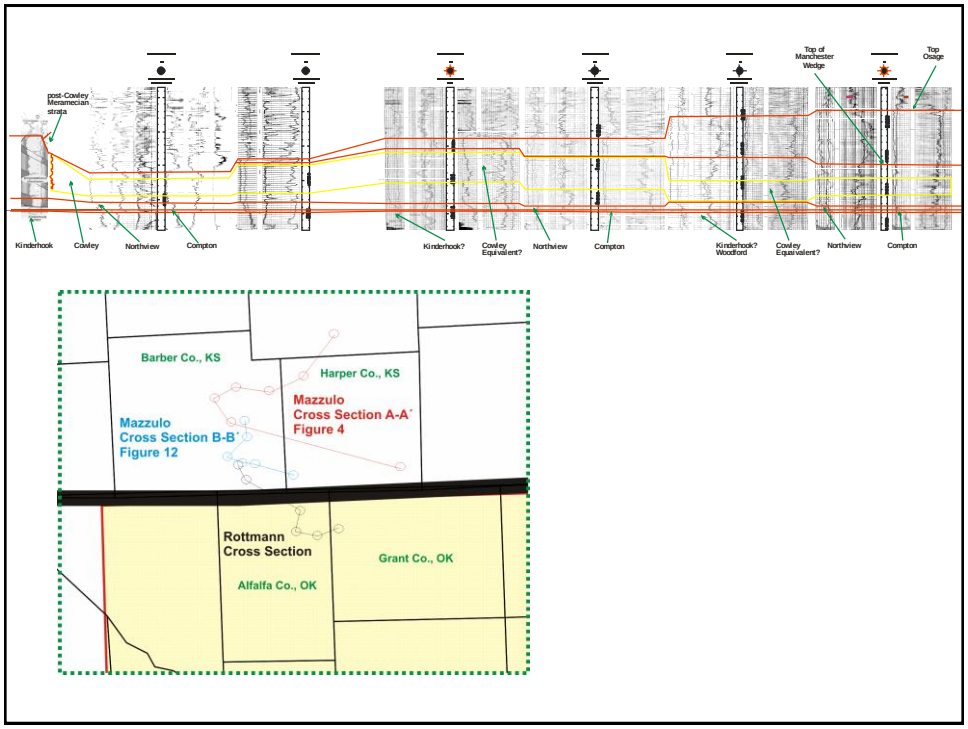
Definition of spiculite

- A sediment or rock composed principally of the siliceous spicules of invertebrates; esp. a *spongolite* composed principally of sponge spicules

Glossary of Geology, Second Edition, 1980



Mazzullo, Wilhite and Woolsey, 2009, Fig



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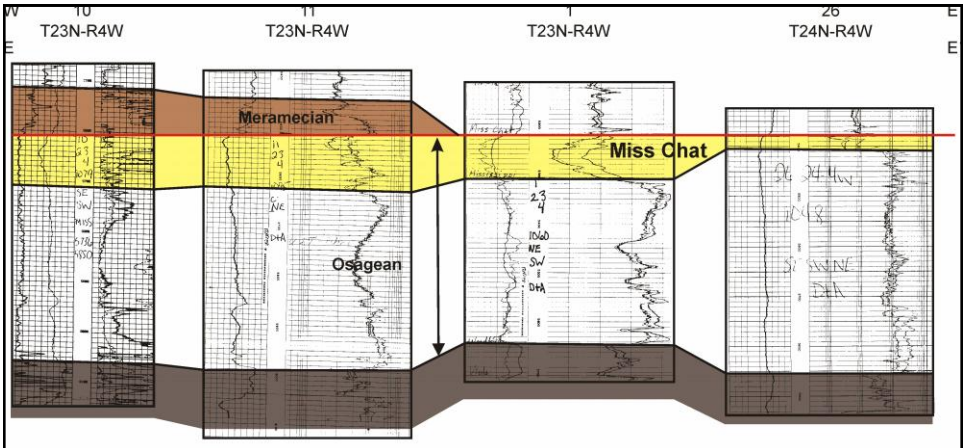
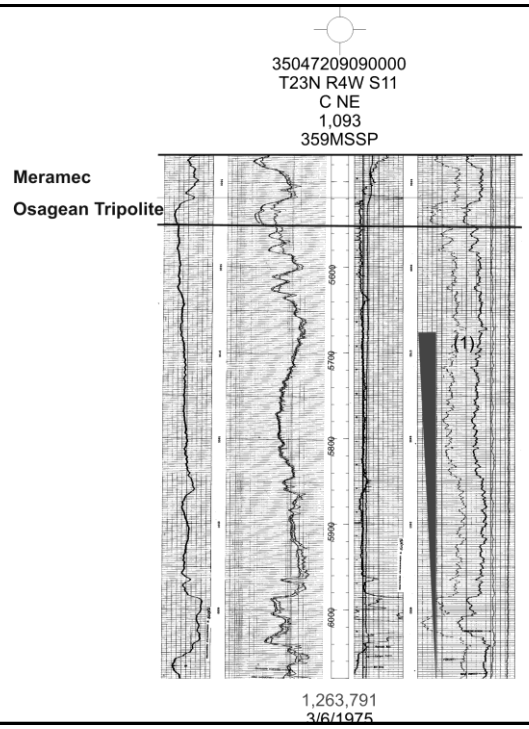
Definition of tripolite

- (a) a light-colored porous friable siliceous (largely chalcedonic) sedimentary rock, which occurs in powdery or earthy masses that result from the weathering of chert or siliceous limestone (Tarr, 1938, P. 27). It has a harsh rough feel and is used for the polishing of metals and stones.

Glossary of Geology, Second Edition, 1980



Possible Chat/Meramecian Relationship



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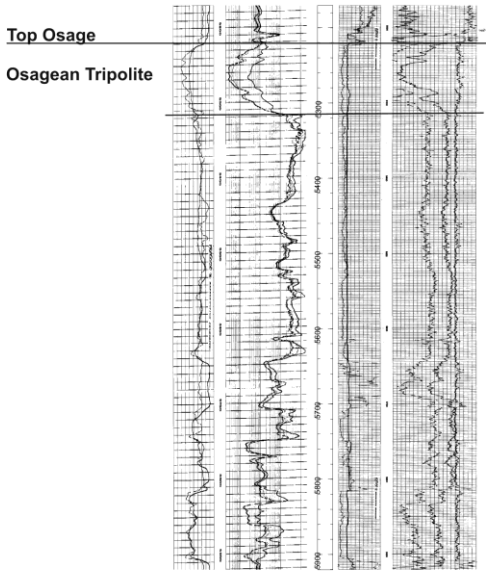
C NE SW
1,060



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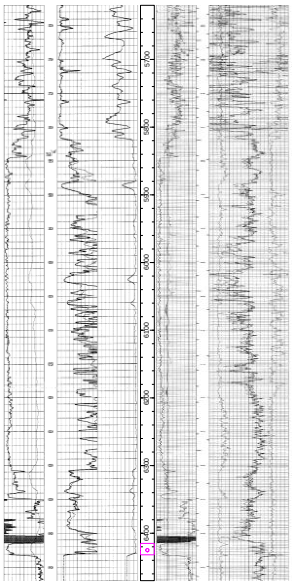
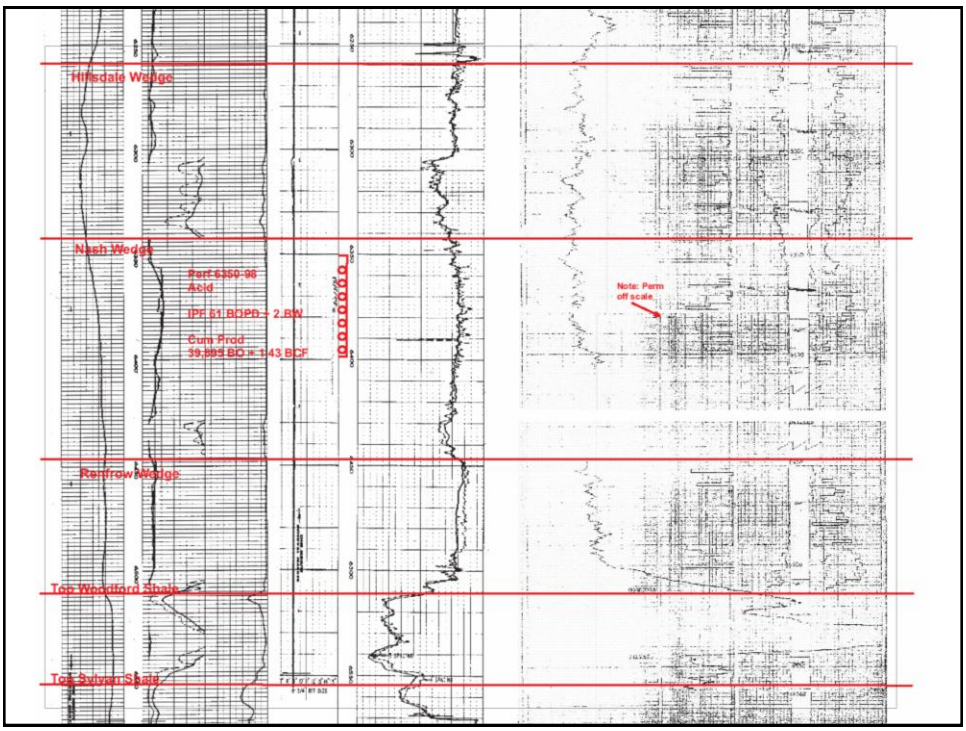
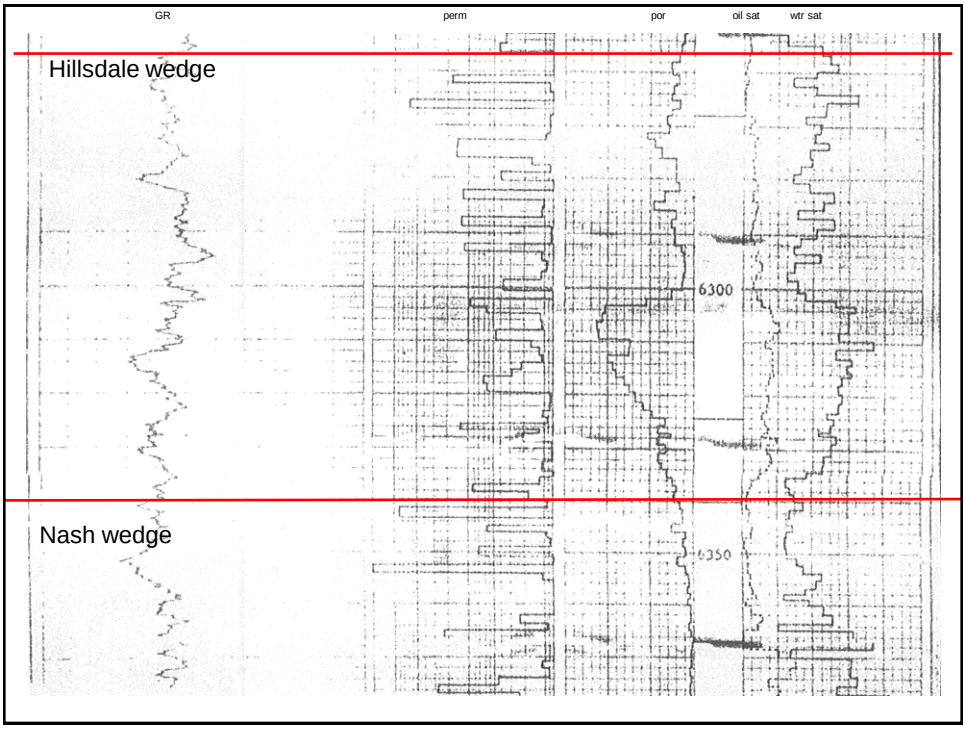


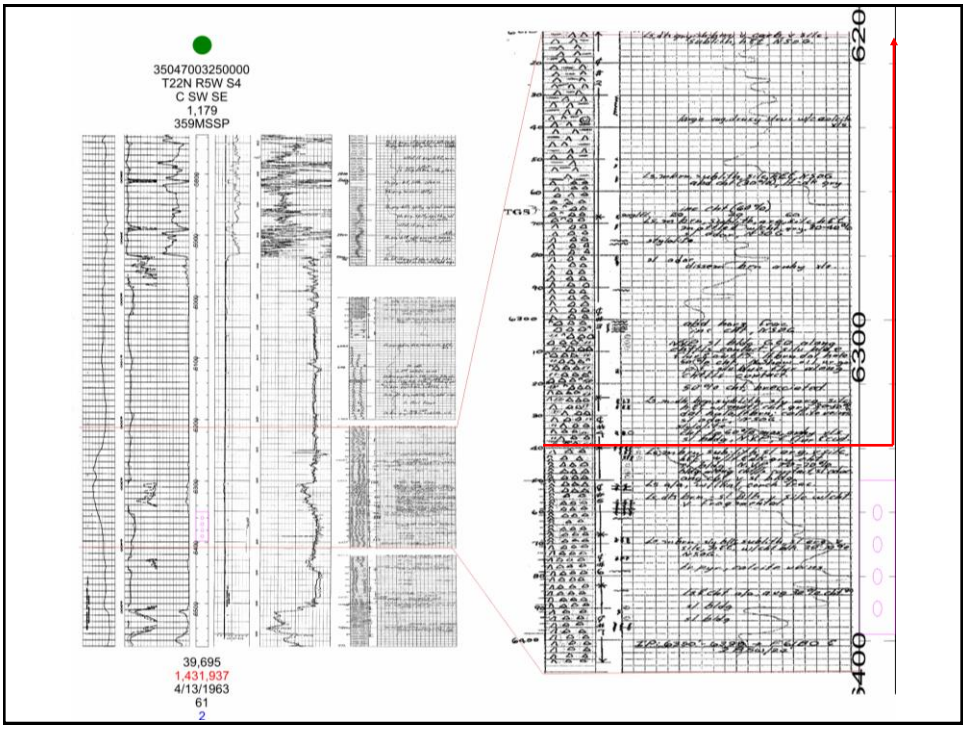
9/3/2007

Characteristics of tripolitic chert "chat" production

- High water saturation
- Hard to calculate water saturation
- Water drive / high water cuts
- Strange producing characteristics for chat production




GR
perm
por
oil sat
wtr sat
Hillsdale wedge
Nash wedge
6300
6350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T22N R5W S4
C SW SE
1,179
359MSSP
39,695
1,431,937
4/13/1963
61
2
6200
6300
6400

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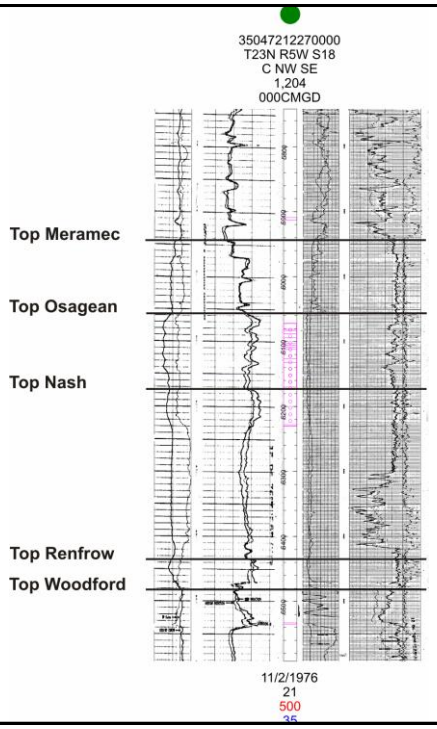
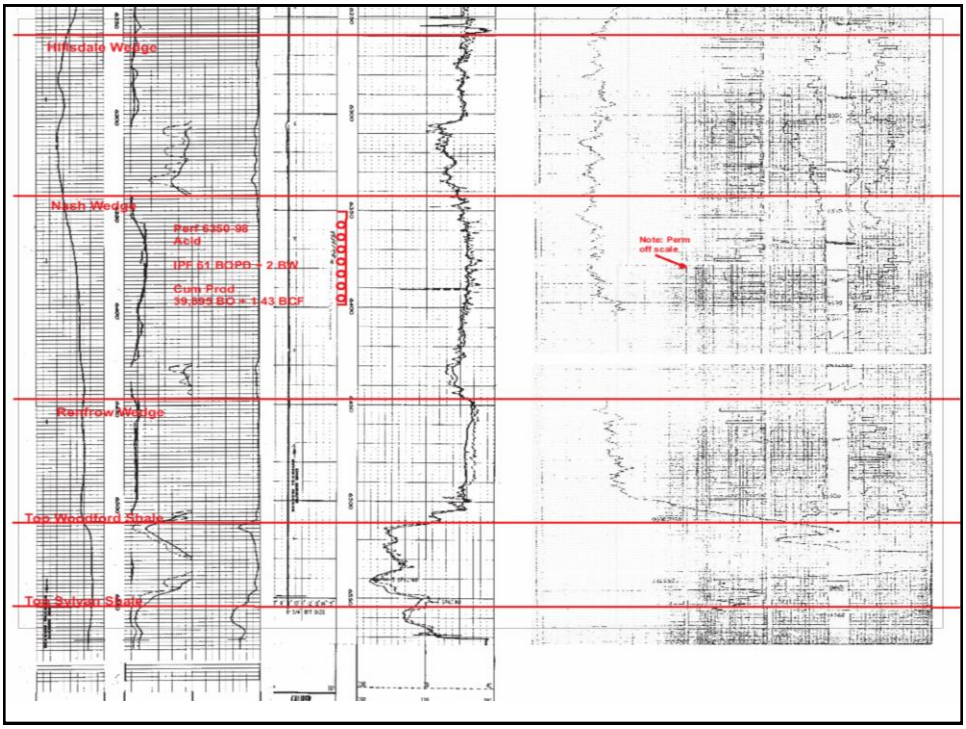
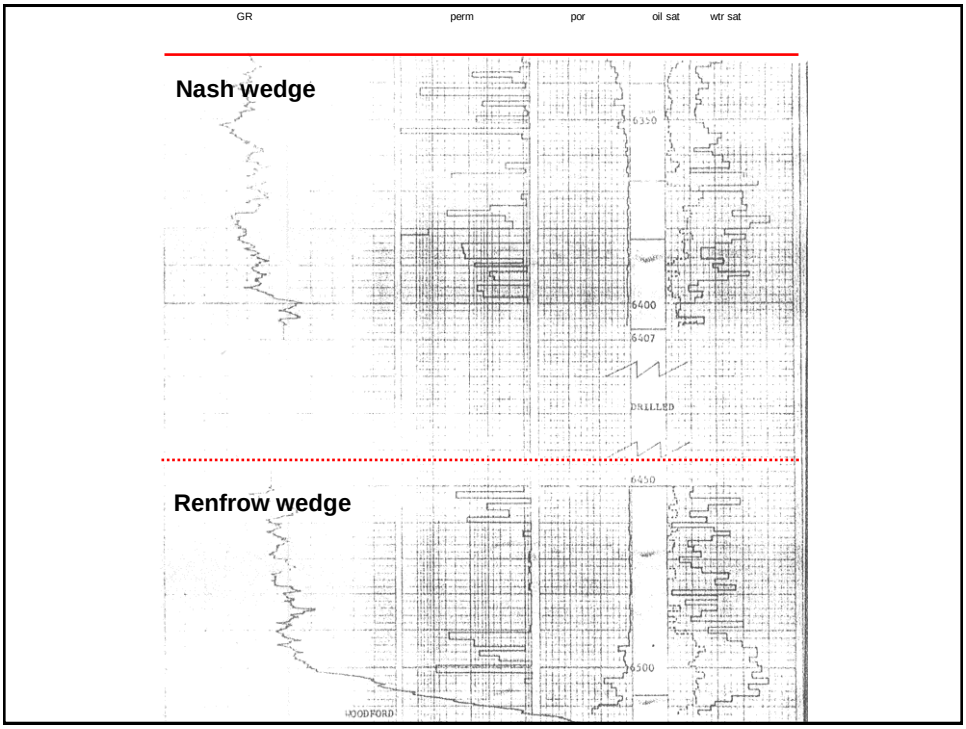
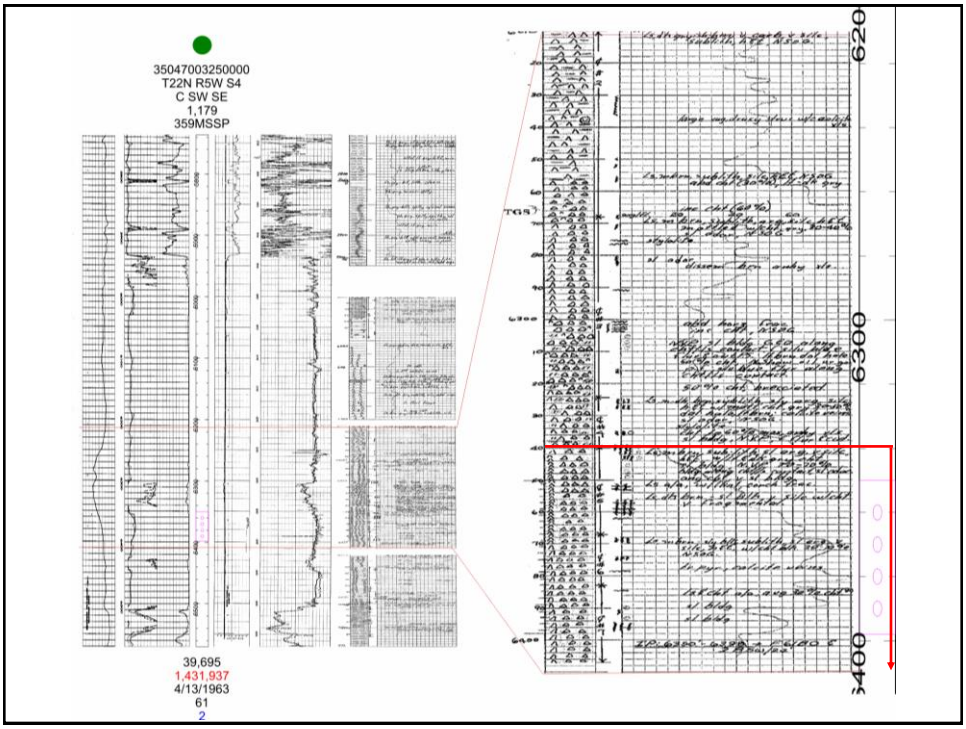



Hitsdale Wedge
Nash Wedge
Perf 6350-98
Acid
IPF 61 BOPD – 2 BW
Cum Prod
39,895 BO + 143 BCF
Note: Perm off scale
Renfrow Wedge
Top Woodford Shale
Top Sylvan Shale


GR
perm
por
oil sat
wtr sat
Nash wedge
6350
6400
6407
DRILLED
Renfrow wedge
6450
6500
WOODFORD



Characteristics of fractured production

- Low water saturation
- Calculations of water saturations are pretty straight forward
- Solution drive or gas expansion with gravity drainage in the fractures
- Producing characteristics somewhat better understood but still strange

CONCLUSIONS

- Multiple types of reservoirs are present within the Osagean/Meramecian Series with the Cowley facies, the tripolitic cherts (both high and low porosity), fractured cherts and limestones being the primary type reservoirs
- Identifying the depositional geometries of Osagean “wedge” deposits are critical when pursuing Mississippian reservoirs within this interval
- The Mississippian horizontal play will not be confined to the high porosity, high water production tripolitic and dolomitic deposits that occupy the top of the Osagean or occur in the Meramecian intervals. A major component of the Mississippian horizontal play will be the low porosity, fractured intervals of specific wedges of the Reeds Spring Formation in north-central Oklahoma

References

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- Gutschick, R.C.; and C.A. Sandberg, 1983, Mississippian continental margins of the coterminous United States, in D. J. Stanley and G. T. Moore, eds., The Shelfbreak: Critical Interface on Continental Margins: SEPM Special Publication 33, p. 79-96
- Mazzullo, S.J.; Wilhite, Brian W.; and Woolsey, I. Wayne, 2009, Petroleum reservoirs within a spiculite-dominated depositional sequence: Cowley Formation (Mississippian: Lower Carboniferous), South-central Kansas; AAPG Bulletin, v. 93, no.12 (December 2009), p.1649-1689
- Wilson, J.L., 1978, Continuing Education, Course Notes, Stratigraphic relations of carbonate reservoirs: Department of Geology Rice University, Oklahoma City Geological Society, p. 25