Petroleum Geology of the Parshall Field Area, Mountrail County, North Dakota

**Upper Bakken Shale Isopach Map**

The Upper Bakken Shale is between 15 and 20 ft thick in the Parshall Field area and thins slightly to the north and east.

**Lower Bakken Shale Isopach Map**

The Lower Bakken Shale is up to 50 ft thick west of Parshall Field. It is approximately 30 ft thick at Parshall Field and thins to the east.

**Upper Bakken Shale TOC**

Total organic carbon of the Upper Bakken Shale at Parshall Field is approximately 13 - 15% and increases to the west. TOC data from Webster 1984 and Price 1984.

**Lower Bakken Shale TOC**

Total organic carbon of the Lower Bakken Shale at Parshall Field is approximately 11 - 12% and increases to the west. TOC data from Webster 1984 and Price 1984.

**Upper Bakken Shale PI and Production**

Contour lines show the production index of the Upper Bakken Shale and the red dots indicate wells with any Bakken oil production. Production on the east side of Parshall Field trends along the 0.09 PI contour.

**Lower Bakken Shale PI and Production**

Contour lines show the production index of the Lower Bakken Shale and the red dots indicate wells with any Bakken oil production. Production on the east side of Parshall Field trends along the 0.10 PI contour.

---

**Conclusions**

1. There is a good correlation between the core facies identified and their corresponding log characteristics.

2. Facies E, D, and C are the produced intervals in the middle Bakken member. Within Parshall Field, Facies D is mostly absent and Facies C is pinching out leaving just Facies B for the targeted reservoir moving to the east.

3. There appears to be a thermal maturity barrier to the east side of Parshall Field. Production index values are right at the top of the oil window. The Upper and Lower Bakken Shales are extremely rich source rocks and do not need much to produce oil.

4. Production appears to be solely related to reservoir rocks with a mature source rock present.
   - There is little evidence for lateral migration.
   - With such low porosity and low permeability, fractures play a role in production and can be seen in more detail at Steve Sonnenberg’s poster.

5. Well log analysis suggest that a variable m and n gets a better water saturation model and a variable KPHIEXP gets a better permeability model.

---

**References Cited**

BLAKEY, 2007. (Last accessed on October 1, 2009).


