

Bakken Formation Middle Member Lithofacies 4



Julie A. LeFever

LITHOFACIES 4

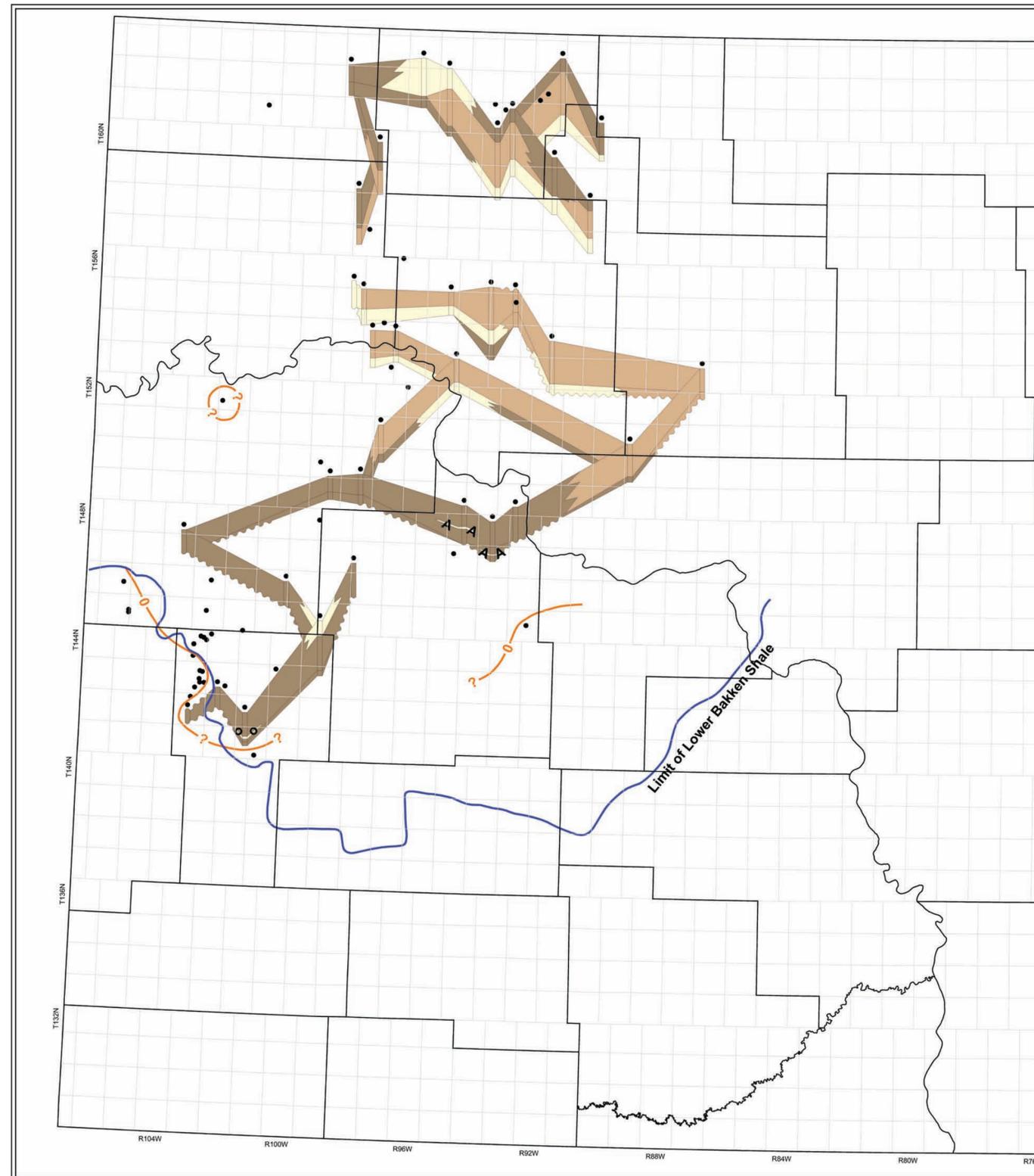
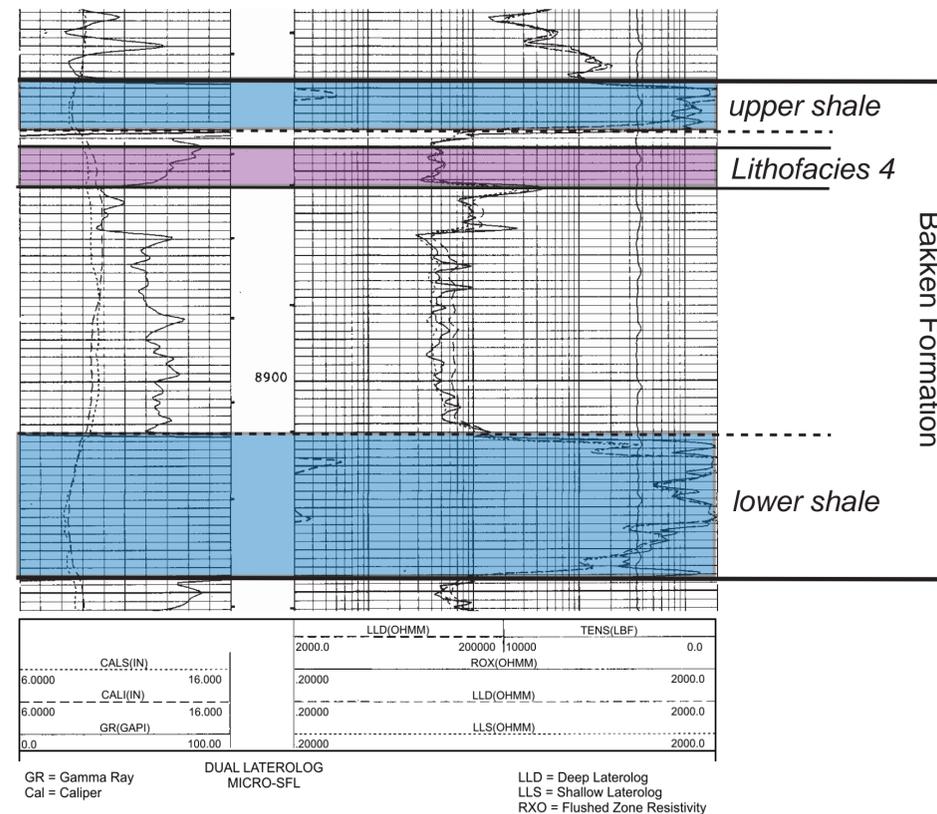
Lithofacies 4 is represented by two distinct parts. The lower portion consists of an alternating sequence of medium grey, argillaceous siltstone to light to medium grey, very fine-grained siltstone with dark grey shale laminae. The upper portion consists of an alternating sequence of medium to light grey siltstones, dark grey claystones to brown-black shales, and tan to light brownish grey, very fine-grained sandstones.

The lower siltstone to sandstone portion of the sequence shows thin parallel or slightly undulatory laminations. Laminations that are thicker are usually coarser grained. Locally, the rock is cemented with dolomite. Soft-sediment deformation is present locally. The basal beds to the upper sequence are thinly laminated, very fine-grained sandstones and siltstones with abundant burrows. Overlying sediments contain interbeds of thinly laminated to cross-bedded siltstones and very fine-grained sandstones. The sandstones occur also as discontinuous beds or lenses due to burrowing. Distribution of the argillaceous content within the interval varies locally, but generally increases towards the western side of the basin. Other features exhibited in core include dewatering structures and thin beds locally rich in organics. Cement, where present, is generally dolomite.

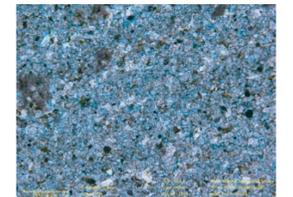
Lithofacies 4 ranges in thickness from 4 to 14 ft. The lower and upper portions of the facies reach a maximum thickness of 4 and 10 ft respectively. Distribution of cores for this facies is limited. The lower contact of the facies is easily recognized on logs since it overlies the prominent clean gamma-ray bench created by lithofacies 3 (see wireline log). Its upper contact with the overlying lithofacies 5 is easier to recognize on newer logs.

The sediments of Lithofacies 4 represent lower through upper shoreface environments. The upper contact is generally gradational with the overlying lithofacies. The lower contact is conformable in the northern portion of the basin and unconformable in the southern portion of the basin. Environments change quickly in response to salt collapse. Sandy beds are still concentrated to the east of the Nesson anticline similar to the underlying lithofacies.

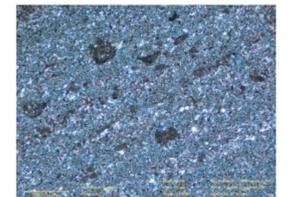
SENW Sec. 11, T.160N., R.95W
 Conoco, Inc.
 #17 Watterud "A"



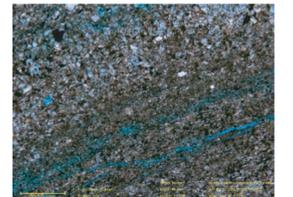
NENW Sec. 19, T.147N., R.96W.
 Maxus Exploration Co.
 #21-19 Carus Fee
 KB = 2547



Dolomite bed with abundant interparticle porosity.



Silty dolomitic limestone with pervasive interparticle porosity.



Calcareous siltstone to very fine-grained sandstone interbedded with thin dolomitic limestone beds. Microfracturing is prominent in siltstone-sandstone layers and with interparticle porosity in the carbonates.

Lithofacies 4

- Unconformity
- Limit of Lithofacies 4
- Limit of Lower Bakken Shale
- Oolite Bed
- Algal Layer
- Upper to Middle Shoreface
- Middle Shoreface
- Lower Shoreface
- Bakken Core Locations