Overview of Bakken Stratigraphy in North Dakota and “Mini” Core Workshop
NENW Sec. 19, T.147N. R.96W.
Maxus Exploration Co.
#21-19 Carus Fee
KB = 2547

Porosity Zone

Upper Bakken Shale
L5 L4 L3 L2 L1

Lower Bakken Shale

09/05 J.A. LeFever
North Dakota Geological Survey
Lower Bakken Shale

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11342.5 ft

Lithofacies 1

Pyrite- and calcite-filled dewatering structure within the shale.

Typical Lower Bakken Shale - Calcite and pyrite grains are common

Microfractures within the shale

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North Dakota Geological Survey
Lithofacies 1

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11341.0 ft

Dolomitization has occurred along the micro-fractures present in the calcareous siltstone. Scattered fossil fragments are also present.

Brachiopod shells and spines within a calcareous siltstone. Locally calcite cement has been replaced with dolomite. Fossil fragments are commonly replaced with pyrite.

Microfractures and interparticle porosity within calcareous siltstone.
Lower Lithofacies 2

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Dolomitization has occurred along small lenses or thin laminae of calcite. Interparticle-intercrystalline and microfracture porosity are prevalent.

Open and pyrite cemented microfractures within clay draped sandstone-siltstone sequence. Some of the calcite cement exhibits dolomitization.

Very fine-grained sandstone-siltstone laminae overlain by clay drapes with pervasive interparticle and microfracture porosity.
Upper Lithofacies 2

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Interparticle and microfracture porosity are prevalent in the very fine-grained sandstone to siltstone interbeds.

Pervasive interparticle porosity within thin dolomitic limestone beds.

Interbedded dolomitic limestone with a very fine-grained sandstone-siltstone. Heavily burrowed with interparticle porosity.
Lithofacies 3

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11314.0 ft

Very fine-grained sandstone to siltstone with well developed interparticle porosity. Microfractures are also present.

Silty limestone with bioclastic material. Porosity is minimal to non-existent.

Calcarenous siltstone to very fine-grained sandstone with abundant interparticle porosity

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Lithofacies 4

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Dolostone 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 5

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Dolostone with abundant interparticle porosity and some moldic and microfracture porosity.

Dolomitic limestone with pervasive interparticle porosity. Pyrite grains and replacement of fossil fragments by pyrite are common.

Silty dolomitic limestone with brachiopods and brachiopod fragments. Pyrite grains are also abundant through this lithofacies. This interval has abundant interparticle porosity and limited microfracture and moldic porosity.
Upper Bakken Shale

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Organic shale.

Shale with thin laminae of calcite and cross-cutting microfracture.

Organic shale with thin calcareous laminae. Pyrite and dolomite grains are also present throughout the shale. Microfracture is present towards the bottom of the photograph.