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Bakken Sandstone
Assessment Unit 52440301

Bakken Sandstone Assessment Unit 52440301
Williston Basin, Canada Geologic Province 5244

Geologic Summary

Detailed map of this assessment unit

Exploration/Discovery-History Data
- Plots of Known Field Sizes
- Tables

Assessment Input Data

Assessment Results
- Assessment Unit Summary
- Detailed Assessment Results
- Undiscovered Field-Size Distributions

USGS PROVINCES: Williston Basin (5244) **GEOLOGIST:** M.E. Henry

TOTAL PETROLEUM SYSTEM: Bakken (524403)

ASSESSMENT UNIT: Bakken Sandstone (52440301)

DESCRIPTION: This assessment unit covers a relatively small area in the south-central part of the Williston Basin province. It includes the southeastern part of Saskatchewan, and a small southwestern corner of Manitoba. The eastern, northern and western boundaries were drawn to include an area around the thermally mature source rock, which is as far from the mature rock as the most distant production from Bakken reservoirs, assigned to this reservoir, in the Williston Basin. The southern boundary is the Canadian-United States International Boundary.

SOURCE ROCKS: The main source rock for this system is the Upper Devonian to Lower Mississippian Bakken Formation.

MATURATION: Source rocks are mature for liquid hydrocarbon generation only in the central part of the unit and possibly two smaller areas to the north of the main area. There is, however, a much larger area of thermally mature Bakken, which continues southward across the International Border into the United States.

MIGRATION: The relationship between the distribution of pools assigned to this unit and the extent of thermal maturity indicates lateral migration distances of about 100 km.

RESERVOIR ROCKS: Reservoir rocks are generally developed in sandstone, in the middle member of the Bakken.

TRAPS AND SEALS: All pools assigned to this assessment unit are reported to occur in combination traps. Seals probably are formed by the upper Bakken member.

REFERENCES:

Creaney, S., Allen, J., Cole, K.S., Fowler, M.G., Brooks, P.W., Osadetz, K.G., Macqueen, R.W., Snowden, L.R., and Riediger, C.L., 1994, Petroleum generation and migration in the Western Canada sedimentary basin, *in* Mossop, G.D. and Shetsen, I., comps., Geological atlas of the Western Canada sedimentary basin: Calgary, Canadian Society of Petroleum Geologists and Alberta Research Council, p. 455-468.

NRG Associates, Inc., 1994, The significant oil and gas pools of Canada: Colorado Springs, Colo., NRG Associates, Inc. Database available from NRG Associates, Inc., P.O. Box 1655, Colorado Springs, CO 80901.

Osadetz, K.G., Brooks, P.W., and Snowden, L.R., 1992, Oil families and their sources in Canadian Williston basin, (southeastern Saskatchewan and southwestern Manitoba): Bulletin of Canadian Petroleum Geology, v. 40, no. 3, p. 254-273.

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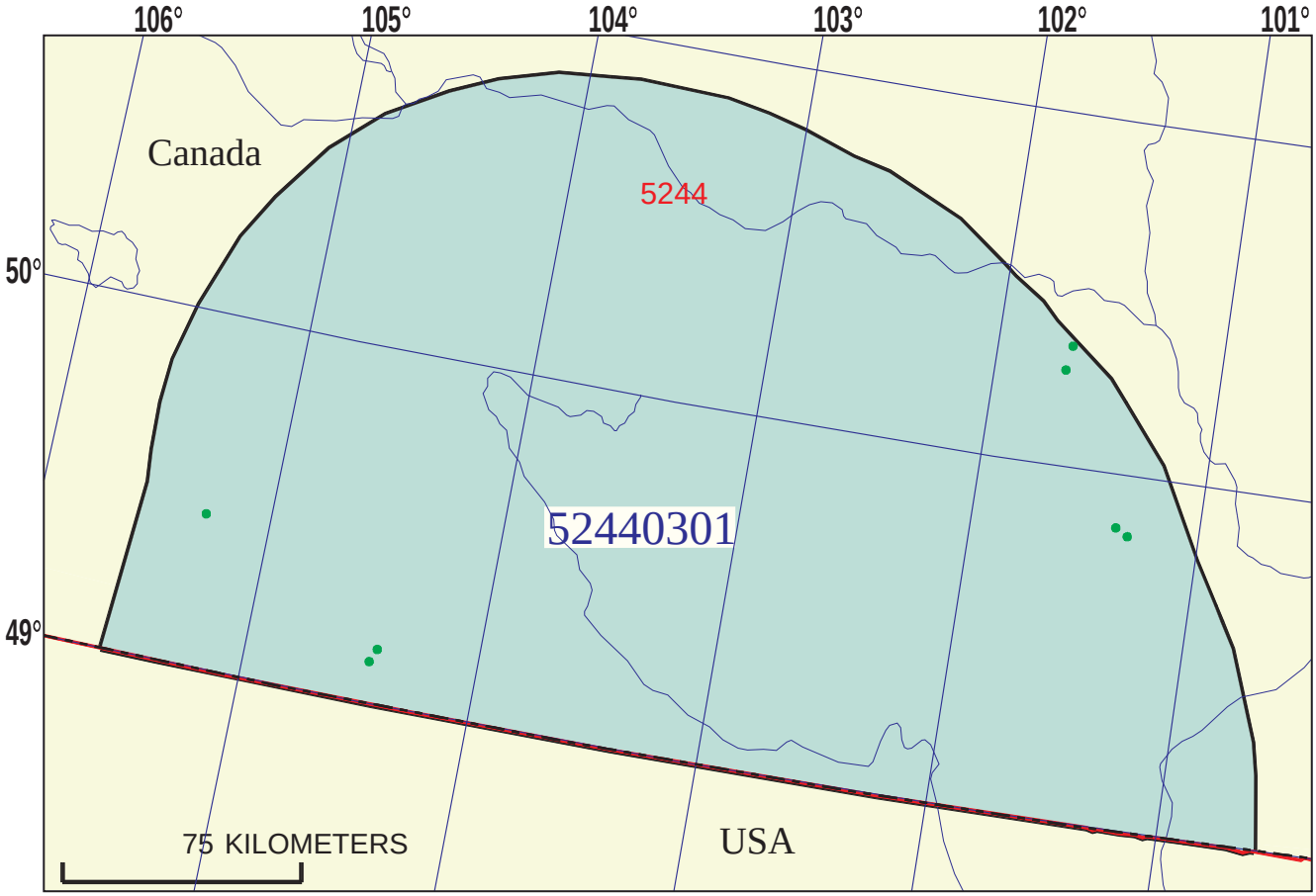

Bakken Sandstone
Assessment Unit - 52440301

EXPLANATION

- Hydrography
- Shoreline
- 5244 Geologic province code and boundary
- Country boundary
- Gas pool centerpoint
- Oil pool centerpoint
- 52440301 Assessment unit code and boundary

Projection: Lambert. Standard parallels: 49 and 77. Central meridian: -92

SEVENTH APPROXIMATION
NEW MILLENNIUM WORLD PETROLEUM ASSESSMENT
DATA FORM FOR CONVENTIONAL ASSESSMENT UNITS

Date:……..	10/19/99		
Assessment Geologist:……..	M.E. Henry		
Region:……..	North America	Number:	5
Province:……..	Williston Basin, Canada	Number:	5244
Priority or Boutique……	Priority		
Total Petroleum System:……	Bakken	Number:	524403
Assessment Unit:……..	Bakken Sandstone	Number:	52440301
* Notes from Assessor	No growth function applied. Only Canadian pools are considered.		

CHARACTERISTICS OF ASSESSMENT UNIT

Oil (<20,000 cfg/bo overall) **or** Gas (≥20,000 cfg/bo overall):… Oil

What is the minimum field size?……. 0.5 mmboe grown (≥1mmboe)
(the smallest field that has potential to be added to reserves in the next 30 years)

Number of discovered fields exceeding minimum size:…… Oil: 5 Gas: 0
Established (>13 fields) _____ Frontier (1-13 fields) X Hypothetical (no fields) _____

Median size (grown) of discovered oil fields (mmboe):
1st 3rd 0.86 2nd 3rd 0.76 3rd 3rd _____
Median size (grown) of discovered gas fields (bcfg):
1st 3rd _____ 2nd 3rd _____ 3rd 3rd _____

Assessment-Unit Probabilities:

Attribute	Probability of occurrence (0-1.0)
1. **CHARGE:** Adequate petroleum charge for an undiscovered field ≥ minimum size……	1.0
2. **ROCKS:** Adequate reservoirs, traps, and seals for an undiscovered field ≥ minimum size……	1.0
3. **TIMING OF GEOLOGIC EVENTS:** Favorable timing for an undiscovered field ≥ minimum size	1.0

Assessment-Unit GEOLOGIC Probability (Product of 1, 2, and 3):…….. 1.0

4. **ACCESSIBILITY:** Adequate location to allow exploration for an undiscovered field ≥ minimum size…… 1.0

UNDISCOVERED FIELDS

Number of Undiscovered Fields: How many undiscovered fields exist that are ≥ minimum size?:
(uncertainty of fixed but unknown values)

Oil fields:……min. no. (>0)	1	median no.	10	max no.	30
Gas fields:……min. no. (>0)	_____	median no.	_____	max no.	_____

Size of Undiscovered Fields: What are the anticipated sizes (**grown**) of the above fields?:
(variations in the sizes of undiscovered fields)

Oil in oil fields (mmbo)……min. size	0.5	median size	0.8	max. size	7
Gas in gas fields (bcfg):……min. size	_____	median size	_____	max. size	_____

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AVERAGE RATIOS FOR UNDISCOVERED FIELDS, TO ASSESS COPRODUCTS

(uncertainty of fixed but unknown values)

Oil Fields:	minimum	median	maximum
Gas/oil ratio (cfg/bo)……	150	300	450
NGL/gas ratio (bngl/mmcfg)……	30	60	90

Gas fields:	minimum	median	maximum
Liquids/gas ratio (bngl/mmcfg)……			
Oil/gas ratio (bo/mmcfg)……			

SELECTED ANCILLARY DATA FOR UNDISCOVERED FIELDS

(variations in the properties of undiscovered fields)

Oil Fields:	minimum	median	maximum
API gravity (degrees)……	15	40	50
Sulfur content of oil (%)……			
Drilling Depth (m) ……	500	1500	2500
Depth (m) of water (if applicable)……			

Gas Fields:	minimum		maximum
Inert gas content (%)……			
CO_2 content (%)……			
Hydrogen-sulfide content (%)……			
Drilling Depth (m)……			
Depth (m) of water (if applicable)……			

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ALLOCATION OF UNDISCOVERED RESOURCES IN THE ASSESSMENT UNIT TO COUNTRIES OR OTHER LAND PARCELS (uncertainty of fixed but unknown values)

1. Canada represents 100 areal % of the total assessment unit

Oil in Oil Fields:	minimum	median	maximum
Richness factor (unitless multiplier):……			
Volume % in parcel (areal % x richness factor):…		100	
Portion of volume % that is offshore (0-100%)……		0	

Gas in Gas Fields:	minimum	median	maximum
Richness factor (unitless multiplier):……			
Volume % in parcel (areal % x richness factor):…			
Portion of volume % that is offshore (0-100%)……			

Bakken Sandstone, AU 52440301
Undiscovered Field-Size Distribution