

# Blackfeet Nation

BLACKFEET INDIAN RESERVATION  
MONTANA

## OIL & GAS DEVELOPMENT OPPORTUNITIES





# Oil and Gas Development Opportunities on the Blackfeet Indian Reservation, Montana

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## Introduction

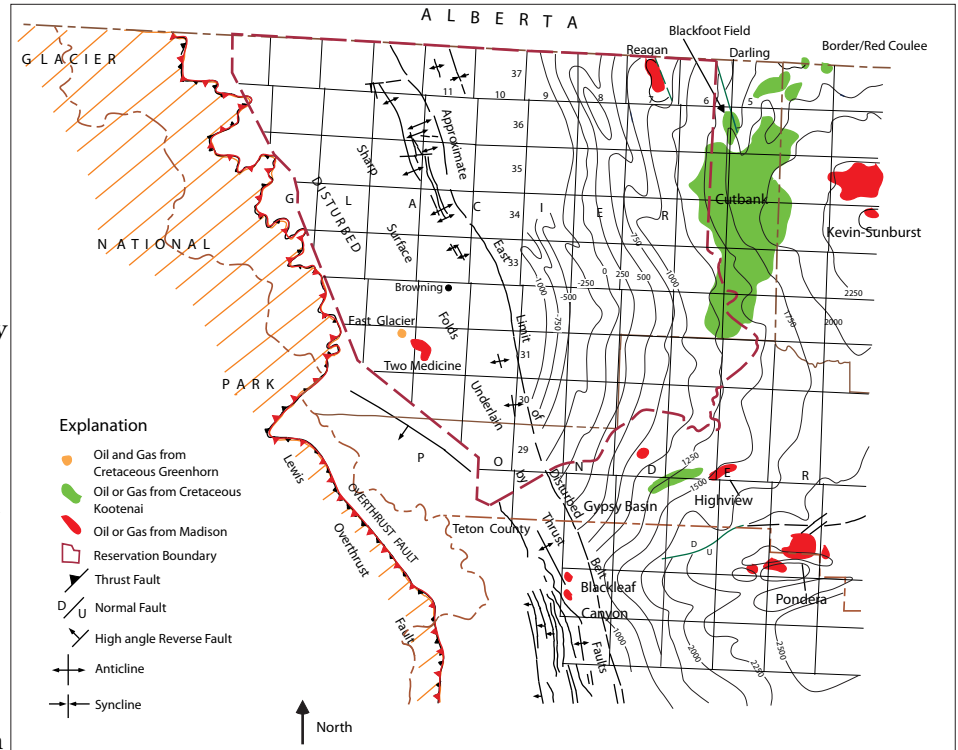
The Blackfeet Indian Reservation is located in Glacier and Pondera Counties, Montana. It lies within the southern end of the Alberta Basin and contains three distinct geologic provinces: the Disturbed Belt in the west, a foreland basin in the middle, and the Sweetgrass Arch in the east (see Figure 1). Current play types vary with geologic province (refer to Figure 2), where Cretaceous sands and Greenhorn-equivalent targets exist in the structurally complex Disturbed Belt while older, fractured zones of Devonian/Mississippian age (such as the Bakken and Three Forks) exist in the central and eastern portions.

## New Oil and Gas Plays Developing

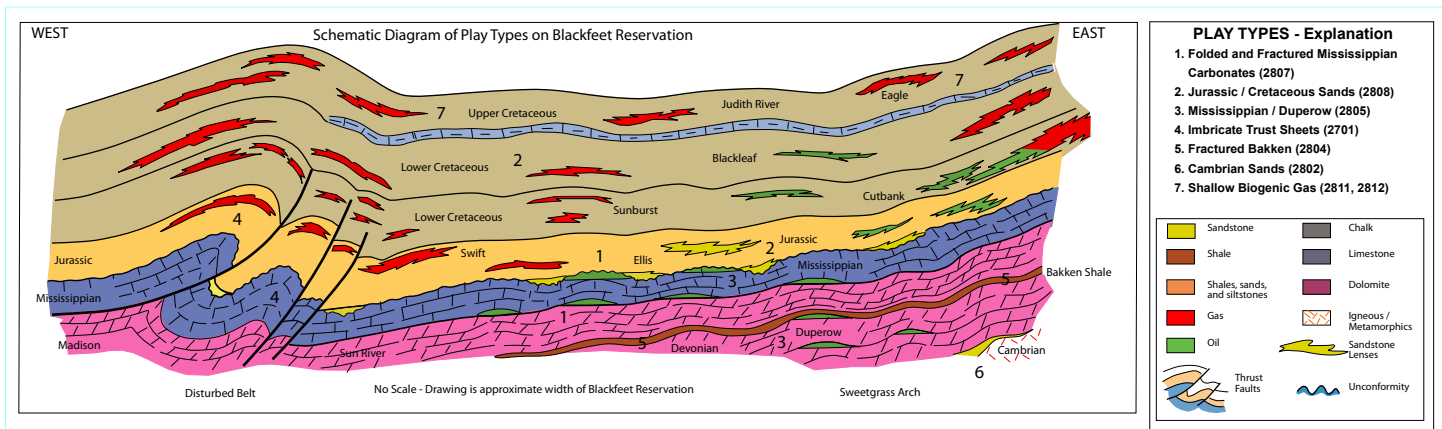
A few years ago, there was new exploration activity by several oil companies. Three companies leased a large portion of the reservation, although two have recently withdrawn. The reason for the leasing activity is that the Bakken Shale, known for the oil boom occurring in North Dakota and Montana, is present on the reservation.

The Devonian-Mississippian Bakken Shale is a widespread, organic-rich marine source rock. It is a known prolific

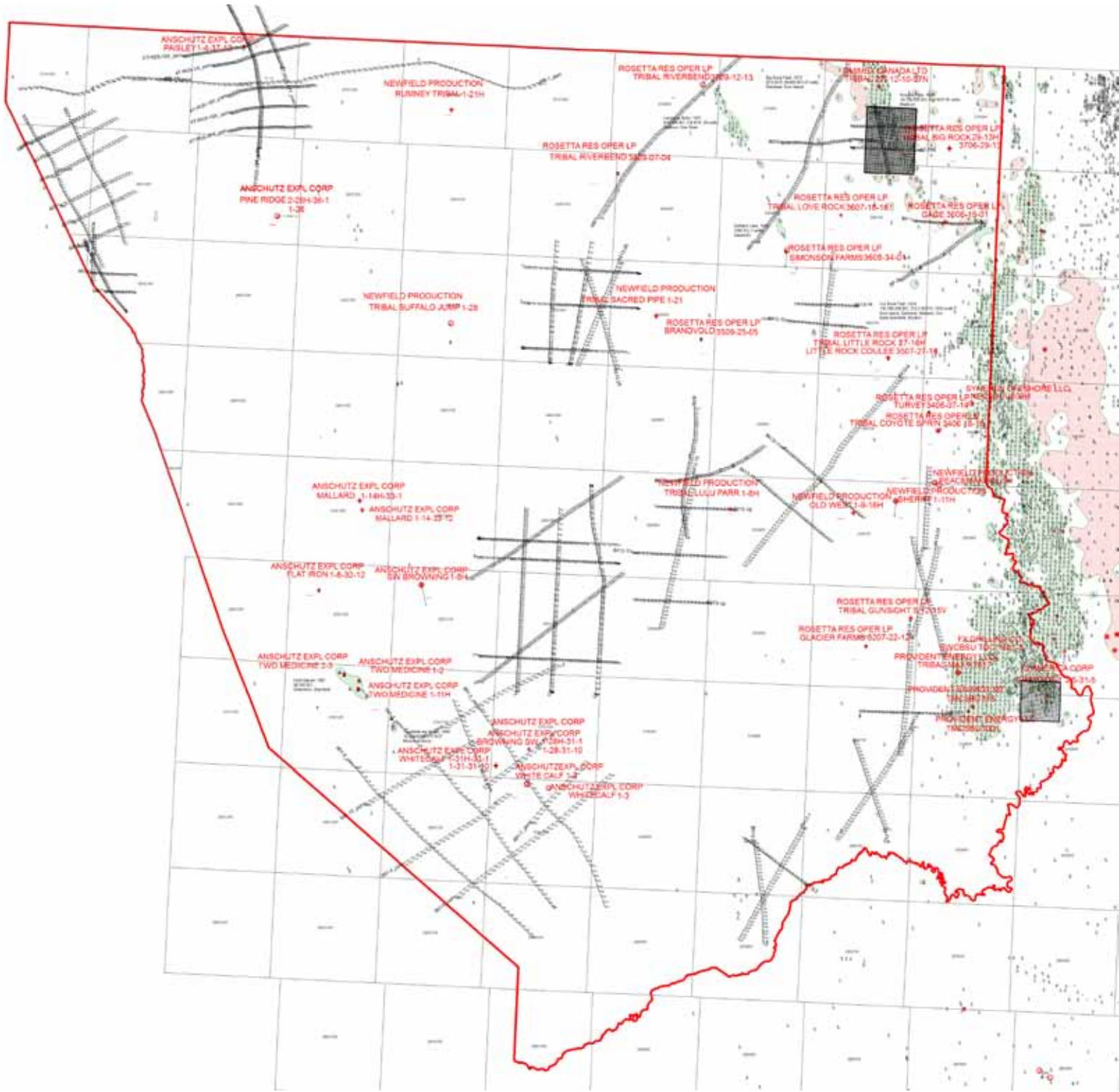
producer in the Williston Basin (North Dakota and eastern Montana) and has produced hundreds of thousands of barrels due to the use of hydraulic fracturing technology and horizontal drilling. Recently three exploration companies, Rosetta Resources, Newfield Exploration, and Anschutz Corp. actively pursued developing the Bakken fractured shale-oil



**Figure 1.** General structure map of the Blackfeet Reservation, showing major fields and fault systems. (Map from the Division of Energy and Mineral Development Publication, Oil and Gas Atlas of American Indian Reservations, Anderson et al. 1997.)



**Figure 2** Schematic of the many different oil and gas play types that exist on the Blackfeet Reservation. (Map from the Division of Energy and Mineral Development Publication, Oil and Gas Atlas of American Indian Reservations, Anderson et al. 1997.)



**Figure 3:** Basemap of the Blackfoot Indian Reservation showing locations of recently drilled Cone and Bakken formations by Anschutz, Newfield and Rosetta. A detailed summary of the well completion and production results are shown on Table I, page 7-8.

play concept on the Blackfoot Reservation. The Exshaw Shale is considered the age- and facies-equivalent of the Bakken in Alberta Basin (Figure 4). The Exshaw is commonly referred to as the Bakken by most operators in the Alberta Basin.

Another developing play on the Blackfoot Reservation that was recently explored by Anschutz Corp. is the Upper Cretaceous Cone Member of the Marias River Shale. The Cone, depending on locality, is part of the Greenhorn, Second White Specks, and Belle Fourche units.

## Exploration History

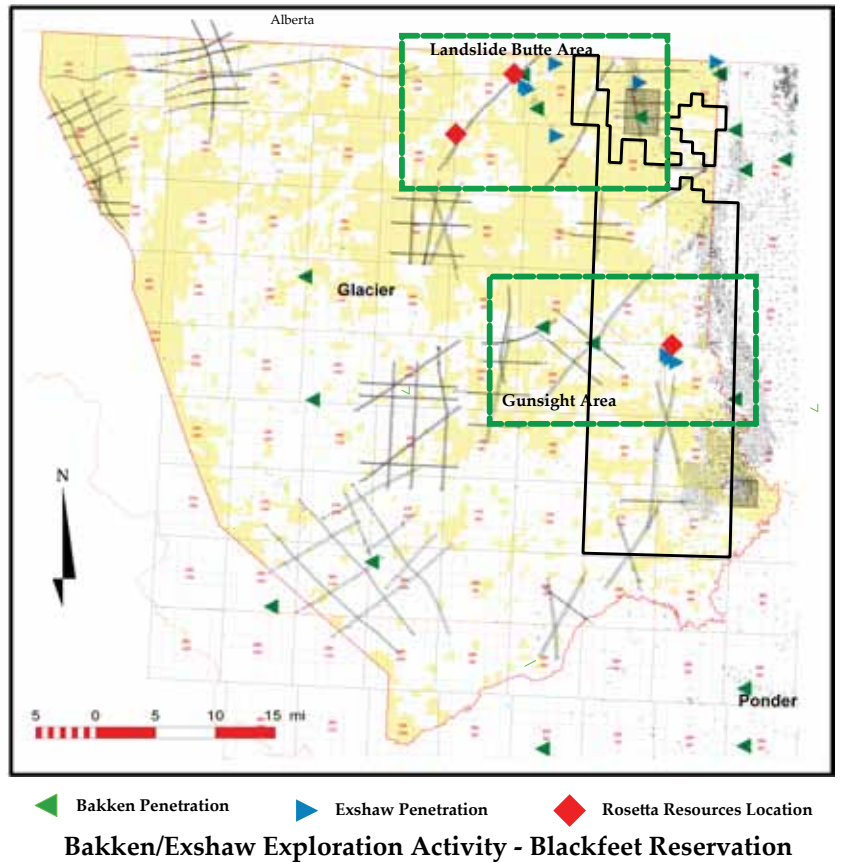
**Rosetta Resources.** Rosetta Resource had leased 286,000 net acres in Alberta Basin and has been actively exploring the basin's potential since 2008. They have drilled three vertical test wells on different portions of their acreage. Two wells were drilled on strike 28 miles apart, and one well was drilled 8 miles down dip, refer to Figure 5. Also shown on the figure are the many seismic lines that the DEMD stores for the Tribe. Rosetta used the seismic data in their lease area to

**Figure 5.** Bakken exploration activity and seismic lines on the Blackfoot Reservation. Landslide Butte and Gunsight areas are outlined in green.

determine locations of their wells (an interpretation of one of these lines at Rosetta's Landslide Butte area is shown in Figure 6).

Although the Bakken was considered their primary objective, Rosetta reported “oil-saturated and over-pressured Banff, Bakken and Three Forks intervals, and an oil-saturated Nisku section” (source: Rosetta website). Based on the results from the three delineation wells, Rosetta estimates the original oil in place (OGIP) between 13 and 15 million barrels oil equivalent (BOE) per square mile. Rosetta had then planned to drill eight additional vertical tests across their acreage to better determine reservoir properties. Eventually horizontal wells were to be used for development.

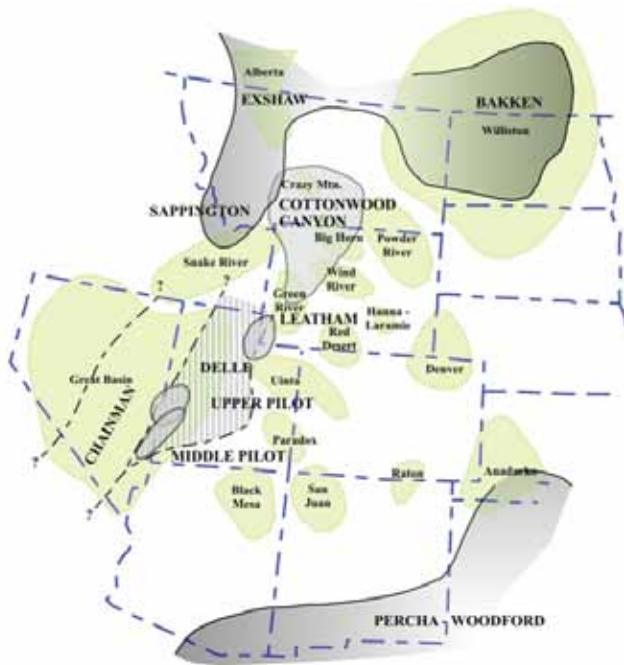
Rosetta's Tribal Riverbend W 07-4H (7-36N-9W) and Tribal Riverbend 12-13H (12-37N-9W), located in the Landslide Butte Area, and their Tribal Gunsight 31-16H (31-34N-6W), located in the Gunsight Area, are shown in Figures 5 along with seismic lines supplied by DEMD. The seismic lines in which Rosetta used to determine the location of their wells are interpreted in Figures 6. It is known that the Tribal Gunsight 31-16H was spud in August 2009 and drilled to a total depth of 9,206 feet with a 4,100' lateral. Although information on the #31-16H has been difficult to obtain,



field sources have indicated that the well was hydraulically frac'd and oil was recovered. However the well was plugged and abandoned on July 27, 2012.

**Newfield Exploration.** In late 2009, Houston-based Newfield Exploration reached an agreement with the Blackfoot tribe for approximately 156,000 net acres. The company currently holds 224,000 net acres on the eastern portion of the reservation. Newfield's agreement with the tribe required the drilling of eight exploratory wells by the end of 2010 and at least one deep well per year. According to Grinnell Day Chief, Director of the Tribe's Oil and Gas Department, “this agreement was the largest oil exploration and development agreement ever signed by the Tribe”.

Newfield's play strategy was similar to Rosetta's, with plans to drill vertical and horizontal wells in order to evaluate the potential of the Bakken, Three Forks, Nisku, and Lodgepole (Banff equivalent). The horizontal tests will evaluate the Bakken at true measured depths between 9,100' and 10,042'. The Peacemaker 1-5H, a 9,166' horizontal test, is part of their multiwell program. The active drillsite is located in 5-33N-6W, approximately a half-mile southeast of Rosetta's Tribal Gunsight #31-16H. The Peacemaker was completed in Nisku and produced 141 BO, 358 mcf/g and 661 BW through June, 2011. The well is apparently shut-in. Three newly staked locations are within nine miles of the Peacemaker 1-5H and include the Sheriff #1-11H, nw-ne 11-33N-7W; the Old West #1-9-16H, se-sw 9-33N-7W; and the Land Run #1-26H, nw-ne 26-34N-8W.



**Figure 4.** Extent of Bakken/Exshaw Shales and similar ages and facies in the northern Rocky Mountain region (from Fred R. Meissner, Jane Woodward, and J. L. Clayton, 1984).

The Sheriff #1-11H location is two miles southwest of the Bugbee #1 (se-sw 6-33n-6w), a dry hole with good oil shows in the Devonian. The Bugbee was perforated in the Three Forks (5,028' to 5,030') and swabbed up to 10 gallons of oil per hour. The well was abandoned in 1958. The Sheriff well was completed in Nisku and produced 6,914 BO, 21 MMcfcg, and 35 MBO through October 2011.

Approximately a quarter-mile southeast of the Bugbee #1 is the Miller Tribal #1 (nw-ne 7-33N-6W), which is considered the opener for Cadmus Field. Before being abandoned in 1954, the Miller Tribal #1 produced 1,173 BO from the Three Forks at a vertical depth near 4,735'. The Cut Bank and the Madison also had oil and gas shows.

Newfield's Old West #1-9-16H and the Land Run #1-26H locations are about two miles from Arco's South Cutbank Creek #1X-6 (ne-nw 6-33N-7W). The South Cutbank Creek #1X-6 was drilled to 5920' (Duperow) and abandoned in 1986. A DST recovered 3,669.3' of mud, 30' of mud and gas-cut oil, and 65' of oil- and gas-cut mud from the Sun River (5,409' to 5,413'). The Old West well was plugged and abandoned September 27, 2012 without a horizontal leg being drilled. The permit for the Land Run well was allowed to expire.

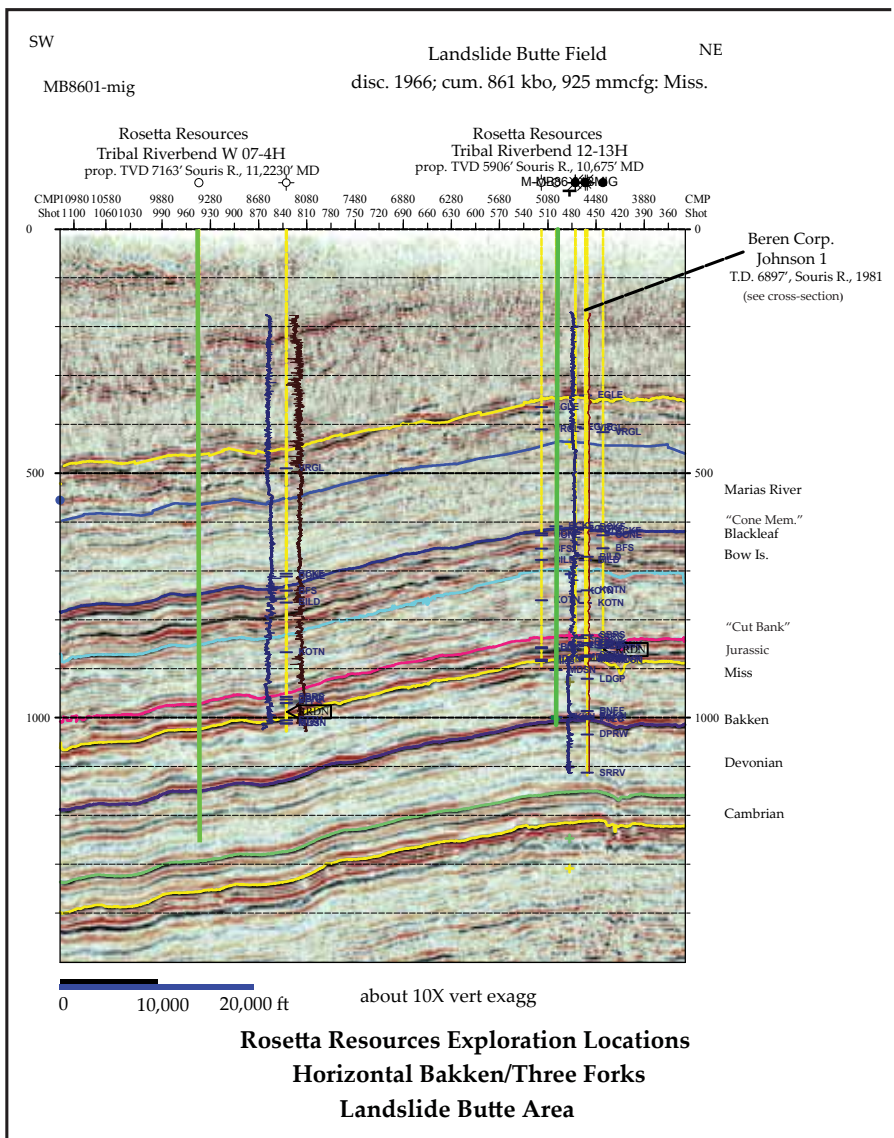
**Anschutz Exploration Corp.:** Anschutz Exploration Corp. was one of the first companies to lease a large part of the Blackfeet Reservation (refer to Figure 3). Anschutz, whose leases lie along the western margin of the reservation, is primarily targeting Upper Cretaceous reservoirs - presumably the Cone Cretaceous Member of the Marias River Shale. Figure 7 highlights drilling activity and seismic lines for the Willow Creek and East Glacier exploration areas. Interpreted seismic lines are shown in Figures 8 and 9.

Anschutz's Willow Creek 1-14H was drilled to 8,916' in the northwestern portion of the reservation (shown in the Willow Creek Area – Figure 7). The well was cored in the Bow Island section (8,075 to 8,135). Details on the core are not known. The well was abandoned November 2008.

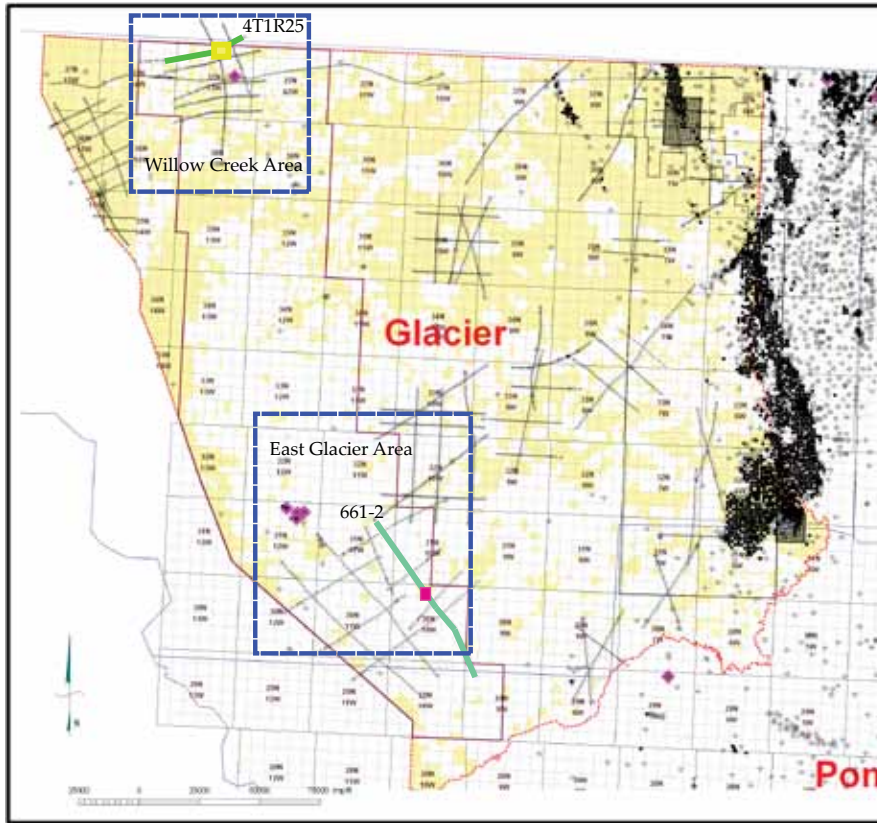
Approximately ten miles northwest of the Willow Creek 1-14H, Anschutz has staked the Paisley 1-4H (4-37N-13W). This location is about a half-mile north of the bottom-hole location of Conwest Exploration's Blackfeet #1 (Figure 9), a 8,645' dry hole abandoned in September 1994. IHS

Energy reports that 4 inches of oil were recovered in a DST in the Blackfeet #1. The tested interval and other details are not stated. The Paisley was spudded February 12, 2012. No additional information is available on the state website.

On the southwest portions of Anschutz's leasehold (shown in the East Glacier Area – Figure 7), Anschutz drilled the Two Medicine 1-11H (11-31N-12W) as a twin to Rainbow Resources Two Medicine 1-11H. Rainbow Resources well was drilled to a total depth of 9,514 and was completed in November 1980. The well produced 2,712 BO from its completion to December 1982 from the Greenhorn. Anschutz completed their 11,500' twin in September 2009. The well produced 295 BO from the Greenhorn and is now listed as a dry hole/temporarily abandoned. The well was plugged



**Figure 6.** Seismic section interpretation showing Rosetta Resources' exploration locations for the horizontal Bakken/Three Forks play, Landslide Butte Area, Blackfeet Reservation.



**Figure 7.** Cone Member exploration activity and seismic lines for the Blackfoot Reservation. Willow Creek and East Glacier areas are outlined in blue.

back and the Cone Calcareous Member was perforated in the vertical portion of the well bore. It has produced 1,590 BO, 2,991 Mcfg, and 3,375 BW in 11 months in 2012.

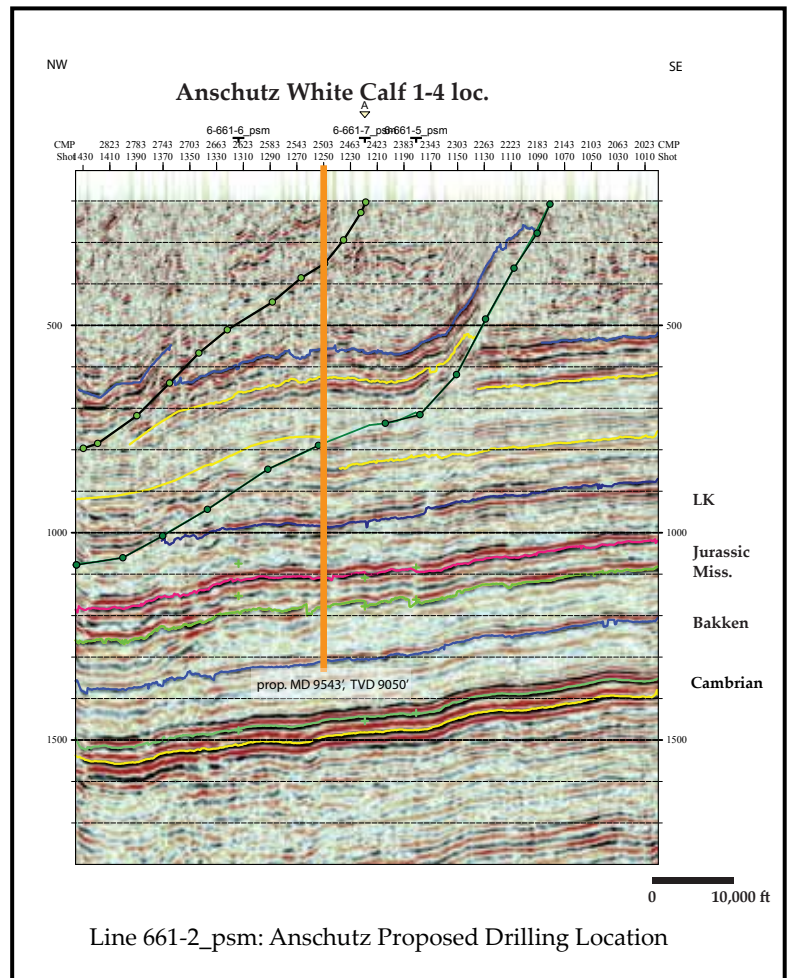
About three miles north and five miles northeast of the Two Medicine 1-11H, Anschutz staked the Two Medicine 1-2H (sw 2-31N-12W) and the Two Medicine 2-2H (se 2-31N-12W), respectively. These locations were less than 6 miles east of two marginal oil wells, the Two Medicine #1-3 and the Federal #2-3. The Two Medicine #1-3 produced 25,993 BO intermittently from 1/1981 to 9/2008 from the Greenhorn. The Federal 2-3 produced 3,071 BO from 1/1998 to 12/2009. Production was from the Blackleaf and later from Greenhorn. Both locations were permitted in April 2009. The Two Medicine 1-2 [not H] produced 4,755 BO, 457 Mcfg, and 5,411 BW through October 2012. The original permit for the Two Medicine 2-2H was allowed to expire, but the well has been re-permitted.

In the southernmost portion of Anschutz's acreage, also labeled within the East Glacier area of Figure 7, Anschutz completed three wells in Sun River Dolomite including the White Calf 1-4 (Sec. 4 30N 10W). The well was completed in Sun River Dolomite and produced 176 BO, 4953 Mcfg, 924 BW, during 2 months in late 2010. Two

wells were completed in 2012. The White Calf 1-3 (Sec. 3 30N 10W) produced 688 BO, 16,217 Mcfg, 9,660 BW in 3 months, 2012. The White Calf 1-31-31-10 (Sec. 31 31N 10W) produced 686 BO, 366 Mcfg, 9,066 BW in 4 months in 2012.

Another well in the East Glacier area is the Southwest Browning 1-28H- 31-10 (Sec. 28 31N 10W) which was spudded October 28, 2011. Some difficulty was encountered in drilling and completing the well. Also in the area the Mallard 1-14H-31-12 (Sec 14 31N 12W) was spudded 1/9/2012. Another well in the same section, Mallard 2-14-33-12 spudded May 28, 2012. A well six miles west of the previous wells, Mallard 1-14-33-13 was permitted November 13, 2012.

A number of additional wells are permitted in the southwest area in the vicinity of the previous drilled wells.



**Figure 8.** Seismic section interpretation showing Anschutz's White Calf 1-4 Location.

# SUMMARY OF WELL ACTIVITY

(updated October 23, 2013)

## NEWFIELD

Newfield filed 16 permits.

Two completed wells currently shut-in.

- Peacemaker 1-5H (Sec. 5 33N 6W) completed in Nisku, produced 141 BO, 358 Mcfg, 601 BW. 3 months, 2011.
- Sheriff 1-11H (Sec. 11 33N 7W) completed in Nisku, produced 6,905 BO, 21,362 Mcfg, 33,886 BW, 10/2010 – 10/2011. Last production, 10/2011, reported 201 BO that month. Intent to abandon filed October, 2013.

Five other wells drilled:

- Tribal Lulu Parr1-8 (Sec. 8 33N 8W), requested horizontal permit, and tight hole status, 12/28/2012, results? No well file available. Intent to abandon filed October 2013.
- Tribal Sacred Pipe 1-21 (Sec. 21 35N 9W), P&A, 10/19/2011. Completed, no well file available.
- Tribal Buffalo Jump 1-28 (Sec. 28 35N 11W), P&A, 9/13/2012. Completed, no well file available.
- Old West 1-9-16H (Sec. 9 33N 7W) P&A, 9/27/2012, not drilled horizontally. Cored Lodgepole-Banff-Exshaw-Bakken-Three Forks, TD in pC. Core Lab plug analyses.
- Tribal Rumney 1-21H (Sec. 21 37N 11W), P&A, 9/14/2012. Plugging record shows perfs in Middle Bakken, Nisku, Duperow.

Nine other permitted wells were not drilled.

## ANSCHUTZ

Seven wells competed in Cone Calcareous Member:

- Two Medicine 1-2 (Sec.2 31N12W) 10,327 BO, 2,252 Mcfg, 6,783 BW, 12/2010 - 8/2013. (Originally a horizontal permit.)
- Two Medicine 1-11H (Sec. 11 31N 12W) 1,641 BO, 3,036 Mcfg, 3,710 BW, 12/2011 – 2/2013. Vertical completion? 2009. Produced 295 BO from Greenhorn, 4 months, 2009. Drilled lateral in Cone Member, plug back lateral, drill second? To be P&A.
- Two Medicine 2-3 (Sec. 3 31N 12W) 3,062 BO produced 2009-2011. To be P&A.
- SW Browning 1-8H (Sec. 8 32N 11W) 5,738 BO, 5,923 Mcfg, 6,133 BW, 9/2011 – 6/2013. 523,470 lb. 30/50 ISP, 16,546 bb. X-linked gel, 19,859 bbl breaker. , IP 100 BO, 210 BW. Cone member was cored.
- Pine Ridge 2-26H-36-13 (Sec 26 36N 13W) 12,789 BO, 6,932 Mcfg, 6,939 BW, 10/2011 – 8/2013. Cut a number of faults. In and out of zone.
- Flat Iron 1-8-32-12, (Sec. 8 32N 12W) Vertical well. 5,877 BO, 1,519 Mcfg, 32 BW, 11/2012 – 8/2013. 12 BOPD last month of production. No well file available.
- Paisley 1-4-37-13 (Sec/ 4 37N 13W) 168 BO, 318 Mcfg, 17 BW, 3-5/2013. To be P&A. No well file available.

Three wells competed in Sun River Dolomite. (No well files available.)

- White Calf 1-3 (Sec. 3 30N 10W) Produced 688 BO, 16,217 Mcfg, 9,660 BW, summer 2012. To be P&A.
- White Calf 1-4 (Sec. 4 30N 10W) Produced 176 BO, 4953 Mcfg, 924 BW, 2 months, 2010. In October and November, 2011, well produced 693 BW. To be P&A.
- White Calf 1-31-31-10 (Sec. 31 31N 10W) Produced 686 BO, 366 Mcfg, 9,066 BW, 4 months, summer 2012. To be P&A.



One well completed in Bakken:

Pine Ridge 1-26 (Sec. 26 36N 13W) 2,556 Mcfg, 514 BW in 2 mo., 2012. (No well file available.)

Eight wells are to be plugged, including a 1980 Greenhorn well, Two Medicine 1-3, which was an attempted unsuccessful Cone Completion, 2011.

Twelve permitted wells were not drilled.

## ROSETTA

Rosetta permitted 26 new wells for the Bakken Formation in the project. Eight permitted wells were not drilled, the permits having expired or will shortly. Results of those drilled wells are as follows:

- Brandvold 35-09-25-05 (Sec. 25 38N 9W) 21 BO, 90 Mcfg, 225 BW in 2 months, 2011. Plugged and abandoned 5/17/2012.
- Gage 3606-19-01 (Sec. 19 36N 6W) 107 BO, 2,613 Mcfg, 736 BW in 3 months, 2011. Intent to abandon was approved.
- Glacier Farms 3207-22-12 30 BO, 1,760 Mcfg, 263 BW in 3 months, 2011. Plugged and abandoned 5/14/2012
- Little Rock Coulee 27-16H Sec. 27 35N 7W) 3 BO, 148 Mcfg, 320 BW in 3 months, 2011. Plugged and abandoned 3/2/2012.
- Little Rock Coulee 3507-27-16H, Sec. 27 35N 7W, 1910 BO, 27,384 Mcfg, 1936 BW, in 4 mo. 2012.
- Simonson 3608-34-01 (Sec. 34 36N 8W) 1,123 BO, 1,150 Mcfg, 575 BW in 5 months, 2011. Core analysis on website. Intent to abandon filed 4/11/2012.
- Simonson Farms 3608-34-01HB (Sec. 34 36N 8W) 2,207 BO, 8,263 Mcfg, 1,135 BW in 6 months, 2011-12. Plugged and abandoned 8/14/2012.
- Tribal Big Rock 29-13H (Sec. 29 37N 6W) 107 BO, 1013 Mcfg, 583 BW 3 months 2011. Plugged? No record on website.
- Tribal Big Rock 3706-29-13H (Sec. 29 37N 6W) No production reported. Plugged and abandoned 10/2/2012.
- Tribal Coyote Springs 3406 18-16H, Sec. 18 34N 6W, 916 BO, 14,307 Mcfg, 4,637 BW in 5 mo. 2012.
- Tribal Gunsight 31-16H (Sec. 31 34N 6W) No completion data filed. No production reported. Plugged and abandoned 7/27/2012.
- Tribal Gunsight S 12-15V (Sec 12 32N 7W) 87 BO, 1,915 Mcfg, 377 BW in first 3 mo. 2011. Plugged and abandoned 5/16/2012.
- Tribal Love Rock 3607-18-16H (Sec. 18 36N 7W) Drilled, not completed. Intent to abandon filed 7/25/2013.
- Tribal Riverbend 12-13H (Sec. 12 37N 9W) Drilled, completed, no production reported. Plugged and abandoned 5/26/2011.
- Tribal River Bend 3609-07-04H, Sec. 7 36N 9W, 7193 BO, 29231 Mcfg, 3032 BW, 10 mo. in 2012.
- Tribal River Bend 3709-12-13H, Sec. 12 37N 9W, 5547 BO, 48,595 Mcfg, 4037 BW, in 8 mos. 2012.
- Tribal Riverbend W 07-4H (Sec. 7 36N 9W) No completion or production data reported. Plugged and abandoned 5/25/2011.
- Turvey 3406-07-14 (Sec. 7 34N 6W) 180 BO, 217 Mcfg, 974 BW in 3 months, 2011. It was apparently a Middle Bakken/Banff attempted completion. Plugged and abandoned 5/17/2012.

Rosetta took over operations of two 3800-foot gas wells in 2009:

- Wave Chalk Buttes 1-27 (Sec. 27 36N 8W). No production or other information was reported. Intent to abandon 7/25/2012.
- Wave Landslide Butte 4-4 (Sec. 8 36N 8W) Plugged and abandoned 8/17/2010. No production was reported.

For more information about the Blackfeet Nation and access to geology and geophysical data, please contact:

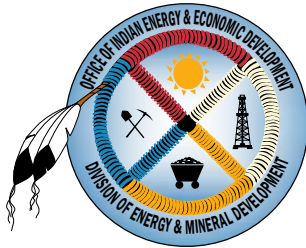


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