
Anschutz Ranch East Field— U.S.A. Utah-Wyoming Thrust Belt

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FIELD CLASSIFICATION

BASIN: Utah-Wyoming Thrustbelt
BASIN TYPE: Thrustbelt
RESERVOIR ROCK TYPE: Sandstone
RESERVOIR ENVIRONMENT OF
DEPOSITION: Eolian

RESERVOIR AGE: Jurassic
PETROLEUM TYPE: Oil
TRAP TYPE: Anticline

LOCATION

The Anschutz Ranch East field is located in northeastern Utah and southwestern Wyoming in the western United States (Figure 1). The field consists of two anticlinal closures; the West Lobe closure is almost entirely in Summit County, Utah, whereas the smaller East Lobe is mostly in Uinta County, Wyoming (Figure 2). The field is within the Utah-Wyoming thrust belt near the town of Evanston, Wyoming, in the central portion of the Western Overthrust province. Surface topography is relatively rugged near the field with elevations from 7000 to 9000 ft (2131 to 2743 m) above sea level. Nearby fields include Anschutz Ranch to the west, Pineview to the southwest, and Glasscock Hollow to the northeast (Figures 1 and 3).

Anschutz Ranch East is a giant gas and retrograde gas-condensate field that produces from the Jurassic Nugget Sandstone. It is by far the largest accumulation of gas and liquids in the Western Overthrust province with an estimated 800 million barrels of oil equivalent in place. Amoco Production Co. is operator of the field, which covers more than 4500 ac (1821 ha) and includes 37 producing wells and 18 injection wells. Partners in the West Lobe of the field include Amoco Production Co., The Anschutz Corp., Mobil Exploration Inc., Union Pacific Resources Co. (formerly Champlin Petroleum), Pan-Canadian Petroleum Co., BWAB Inc. (Brownley, Wallace, Armstrong, and Bander), and Chevron U.S.A. Inc. Partners in the East Lobe include Amoco

Production Co., The Anschutz Corp., and Union Pacific Resources Co.

The West Lobe is the larger and more extensively studied of the two structures and contains approximately 90% of the total reserves for the Anschutz Ranch East field. Therefore, this paper will emphasize the technical aspects of the West Lobe structure unless otherwise indicated.

HISTORY

Pre-Discovery

The Western Overthrust province has been an area of active exploration interest for many years. The most recent and intensive exploration activity began in the Utah and Wyoming portions of the trend in 1969 when Amoco Production Company obtained an exclusive exploration agreement for the odd-numbered sections across the Union Pacific Railroad's land-grant acreage (Dixon, 1982). Approximately 200 wells were drilled in this thrust belt prior to the first major discovery at Pineview field in 1975 by the American Quasar Company on a farmout from Amoco, the Newton Sheep No. 1 well at Pineview providing the first commercially viable production in the trend. The well flowed 540 BOPD on test from only 8 ft (2.5 m) of perforated pay in the Nugget Sandstone at a depth of 9930 ft (3029 m).

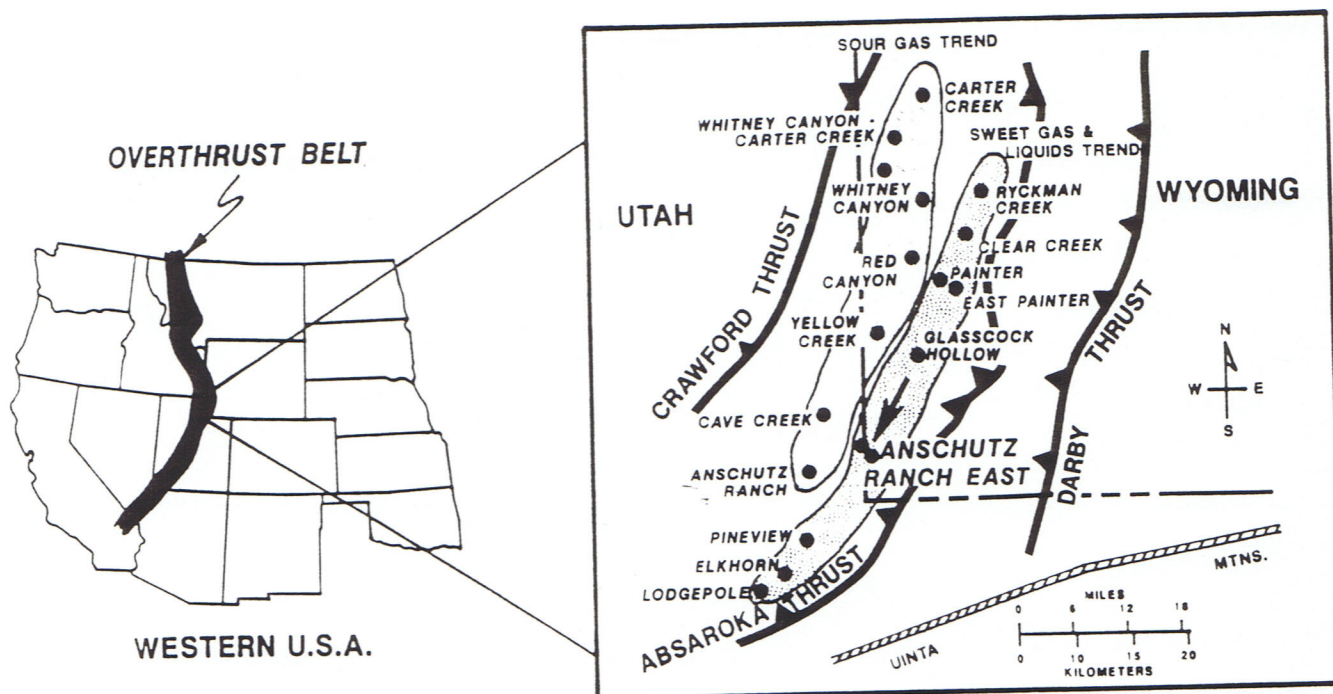


Figure 1. Location of Western Overthrust province and the Anschutz Ranch East field in the Western United States. Enlarged area shows the major producing fields

and hydrocarbon trends within the Utah-Wyoming segment of the thrust belt, after Lelek (1982). Courtesy of Rocky Mountain Association of Geologists.

Nearly 20 commercial fields were discovered in the Utah-Wyoming thrust belt between 1975 and 1985 by Amoco Production Co., Chevron U.S.A Inc., Champlin Petroleum Co., The Anschutz Corp., and others. These range from the giant Whitney Canyon-Carter Creek field in the north to Lodgepole field at the south. Two productive trends soon became evident: an eastern "sweet gas and liquids trend" that produces primarily from the Nugget Sandstone and extends from Pineview field to Ryckman Creek field, and a western "sour gas trend" that produces from Paleozoic rocks and extends from the Anschutz Ranch field to Whitney Canyon-Carter Creek field (Figure 1). The Anschutz Ranch East field lies within the eastern sweet gas and liquids trend.

Discovery

The Anschutz Ranch East field was discovered in 1979 by Amoco Production Co. with the completion of the No. 1 Bountiful Livestock well (NW NW 16-4N-8E, Summit County, Utah) (Lelek, 1982). The well spudded 29 March 1979 on a farmout lease from BWAB, Inc. and Tom Brown, Inc. and was completed 31 December 1979. The discovery well penetrated 940 ft (286.5 m) of gross pay in the Jurassic Nugget Sandstone in what is now the West Lobe of the field. The East Lobe was discovered by The Anschutz Corporation, Anschutz Ranch East No. 12-26W (26-13N-121W, Uinta County, Wyoming), completed 23

December 1980. The two lobes produce gas and gas condensate from the Nugget Sandstone and have separate gas-water contacts. The West Lobe discovery well is perforated from 12,816 ft (3909 m) to 13,515 ft (4122 m) and had an initial flowing rate of 1054 BCPD, 4053 MCFD, and 28 BWPD. The East Lobe discovery well is perforated from 14,750 ft (4499 m) to 14,910 ft (4548 m) and flowed 141 BCPD, 750 MCFD, and 96 BWPD (Lelek, 1983).

The No. 1 Bountiful Livestock well was drilled to test for the possibility of an anticlinal fold in the Nugget Sandstone as interpreted from seismic data and inferred from shallower folding in the Champlin Petroleum Co. No. 404 "A" No. 1 (35-13N-121W, Uinta County, Wyoming).

Post-Discovery

Shortly after the field's discovery it was determined that the West Lobe of Anschutz Ranch East field contained a rich retrograde gas-condensate with a dew point only 230 psia (1586 kPa) below the original reservoir pressure. Pressure depletion below the dew point would have resulted in a condensate liquid dropout of up to 40% of the hydrocarbon pore volume (HPV). Such a dropout could have led to a 75% loss of the reserves in place (Kleinsteiber et al., 1983). Because of this, a specialized plan-of-depletion was designed to optimize production while maintaining the reservoir pressure. This plan called for nitrogen