plying filters to the signature prior to the design of the wave shaping operators. We used an average cable ghost operator in this run and designed a single operator for each shot to enhance the wavelet in the zone of interest. The results were encouraging, so we decided to try removing residual effects in a separate pass on a trace-by-trace basis after the normal signature correction. The output obtained was disappointing; therefore, we decided to use prefiltering of the signature before operator design on a trace-by-trace basis.

This proved to be much less sensitive to noise on the input data and results show the small faults in the oil reservoir.

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Indian Creek Field, Fall River County, South Dakota

The original well drilled at Indian Creek in the southwestern corner of South Dakota was abandoned at a total depth of 3,874 ft (1,181 m) in the Desmoinesian part of the Minnelusa Formation in 1969. No shows of oil were encountered in this well, Ackman-Schulein & Associates 9-13 Federal-Martin, SW¼ SW¼ Sec. 9, T12S, R1E, and it was abandoned without any drill-stem tests. Log calculations of the Missourian age 2nd Leo sand (3,644 to 3,659 ft; 1,111 to 1,115 m) indicated low-water saturations and the well was reentered in 1978. A drill-stem test of the 2nd Leo in this well gauged 4 MMcf of gas per day. In June 1979, gas and oil were recovered from the 2nd Leo sand at the P & M Petroleum Management 1-9 Statecoach Government well, SE¼ SW¼ Sec. 9, T12S, R1E. Two oil wells with low gas-oil ratios have been completed in the NW¼ NW¼ and NE¼ NW¼ Sec. 16, T12S, R1E, flowing 200 and 170 bbl of oil per day, respectively. These two wells are currently producing 300 bbl of oil per day and additional development drilling is planned.

The field is located on the southeast flank of the Cottonwood Creek anticline. Subsurface control shows 2° of dip to the southeast. The 2nd Leo is a clean, fine-grained, well-sorted marine or marginal marine sandstone with a maximum known thickness of 18 ft (5.5 m) in the field area. This sand has excellent reservoir quality with a porosity range from 12 to 28% and maximum permeability exceeds 2 darcys.

The gas at Indian Creek field is a rare occurrence of gas associated with 2nd Leo or Minnelusa oil. The gas has a Btu value of 615 and contains 56% nitrogen. The oil is typical undersaturated 2nd Leo or Minnelusa oil.

The Indian Creek field is 15 mi (24 km) east of the nearest oil production which is on the Hartville uplift in Wyoming.

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Exploration in Great Salt Lake

The first offshore oil discovery in the Great Salt Lake was made by Amoco Production Co. in late November 1978. The discovery well, No. 1 West Rozel Unit, flowed heavy asphaltic oil using a gas-lift system at a rate of 2 to 5 bbl of oil per hour from perforations at 2,280 to 2,410 ft (695 to 735 m) in a Pliocene basalt. In June 1979, the No. 2 West Rozel Unit, using a water-powered hydraulic pump, had recovery rates from the basalt reservoir of 480 to 1,512 bbl of oil per day from a slotted liner from 2,345 to 2,367 ft (715 to 712 m). Additional production testing is planned to determine if the oil reserves are large enough for commercial development of this discovery.

At present, a total of seven wells have been drilled in the Salt Lake including the two wells drilled at West Rozel. No pre-Miocene Tertiary rocks have been encountered in these wells. Paleozoic and Precambrian rocks have been penetrated below the Miocene sediments.

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Paleoenvironmental Analysis of Disconformity and Condensed Bed at Contact of Austin and Taylor Groups (Upper Cretaceous), East-Central and Northeastern Texas

A disconformity and overlying condensed bed at the Austin-Taylor contact were examined in eight outcrops over a distance (Austin-Dallas-Roxton) of 450 km. Results of the analysis incorporate information from petrologic, foraminiferal, and trace-fossil studies. Both disconformity and condensed bed formed in a continental shelf environment; shallowest water depths were at Austin. Proceeding northward from Austin, water depth (1) gradually increased to Temple; (2) increased greatly from Temple to Waco; and (3) decreased from Waco to Roxton, to depths similar to those at Temple. Assemblages of omission suite trace fossils that reflect these depth changes include: (1) large *Thalassinoides,* shallowest depths; (2) small *Thalassinoides* and *Rhizocorallium,* intermediate depths; and (3) small *Thalassinoides,* greatest depths. The condensed bed, in which thickness is as great as 18 cm, is characterized by abundant nodular phosphates that are synsedimentarily phosphatized steinkerns.

Halt of Austin sedimentation and formation of the disconformity was probably due to early Campanian regression, which caused: (1) shallowing; and (2) constriction of the southern aperture of the Western Interior seaway, which was directly northwest of the outcrop area. This constriction may have caused an increase in the velocity of currents through the aperture which, combined with shallowing, increased the energy level of bottom waters in the outcrop area and led to periods of erosion and minimal net sedimentation. Subsequent transgression caused an increase in water depth and a widening of the adjacent aperture. This may have resulted in a reduced energy level for bottom waters, which raised sedimentation rates and led to deposition of the condensed bed and overlying rocks of the Taylor group.

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