Morrow pay was tight. Instead, the 1 Forehand encountered three new Atoka pays and one new Morrow pay. When completed, the well sold in excess of 13 MMCFGD until pipeline takes were curtailed. Subsequent drilling in this section yielded two more producers and one new pay, which resulted in establishing proven reserves of approximately 25 bcf of gas in this section.

All production from the Furgerson field is dry gas from 11 different Pennsylvanian sands at depths less than 6,500 ft. Cumulative production for the field is 16 bcf of gas, and remaining reserves are approximately 44 bcf. At the time of this writing, the field contains 22 producers and 5 dry holes. Field boundaries are not fully defined, and development drilling continues to result in economically attractive wells. Few, however, could be as pleasant a surprise as 1 Beard and 1 Forehand.

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Recognition and Correlation of Morrowan-Age Wash Reservoirs in Roger Mills and Beckham Counties, Oklahoma

Upper Morrowan-age "washes" in Roger Mills and Beckham Counties, Oklahoma, are prolific yet elusive targets for exploration and production geologists. Hydrocarbon reserves can average 14 bcf of gas/well from net reservoir sand thicknesses of less than 20 ft; however, precise sand trends are difficult to predict consistently. This unpredictability is directly related to the complex depositional history of the wash sediments. Upper Morrowan-age washes represent the initial sedimentary response to uplifting, overthrusting, and erosional unroofing of the ancestral Wichita Mountains. Prograding fan deltas largely overwhelmed normal basin sediments close to the mountain front. Farther basinward, interfingering of the two systems led to rapid vertical and lateral facies changes within the wash sequence.

Successful exploration in this sequence depends on recognition of reservoir facies and physical distribution, along with an understanding of the evolutionary nature of the wash sedimentary environment. Detailed correlation of individual sand bodies within the wash is essential. Core and cuttings data may then be integrated with log response to determine sand facies and reservoir characteristics. Reservoir quality is highly dependent on diagenetic history. High-resolution stratigraphic seismic control is useful in delineating sand trends. All available information should be integrated in an overall sedimentary response model for the area that reflects the structural and depositional evolution of the wash sedimentary wedge from its mountain front source to its distal basinward margin.

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Development and Economic Significance of Springer-Britt Sandstone, Eakly Field, Caddo, Custer, and Washita Counties, Oklahoma

In the fall of 1981, Lear Petroleum commenced drilling a seismic wildcat prospect in the deep Anadarko basin. The well was located in an area previously thought to be a poor prospect because of the small number of tests in the proximity and the low success ratio of drilled wells. The Lear wildcat discovered the Eakly field of the Pennsylvanian Springer-Britt sandstone at a depth of 15,450 ft. Because their leasehold in the offsets was expiring, four additional wells were drilled immediately, resulting in only one dry hole. During this period, Amoco also found production from the Britt sandstone along depositional strike approximately 10 mi southeast of the Lear discovery.

By the fall of 1982, it was evident that the trend had enough areal extent to potentially become one of the Anadarko basin's giant fields. With a market value of about $4.00/mcf, initial flow potentials from 2.5 to 12 MMCFGD at 7,000 to 9,000 psig, and depths under 16,000 ft, the Eakly trend became one of the most attractive exploration targets in the Mid-Continent region. Representative wells in the Eakly field today produce at rates up to 18 MMCFGD, and ultimate recoveries are estimated at 5-30 bcf of gas/well. The trend is still being developed and extends approximately 30 mi. Reserves estimated at 910 bcf of gas from 50 wells make the Eakly Springer trend one of the Anadarko basin's true giants.

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Relation of Lower Morrow Sandstone and Porosity Trends to Chester Paleogeomorphology, Persimmon Creek Field Area, Woodward County, Oklahoma

Thickness and porosity trends of several lower Morrow sandstone units were strongly influenced by the paleogeomorphology of the subjacent Mississippian Chester limestone in a study area near Persimmon Creek field in T20N, R22W, southwestern Woodward County, Oklahoma. Pre-Pennsylvanian streams flowing south-southwest across the Anadarko basin shelf had created a dendritic drainage pattern with paleogradients of about 40 ft/mi (7.5 m/km), and intervening stream divides were 50-100 ft (15-30 m) above the valley floors. As the sea transgressed the area in the Early Pennsylvanian, cyclic transgressions and regressions led to deposition of four prominent lower Morrow sandstone members separated by shale units that are approximately parallel lithologic time markers.

The two lower members—a prograding beach complex and a delta front complex—experienced thicker sand deposition above the paleovalleys. In the overlying member (Brown sandstone), also a delta-front complex, thickest sand accumulation and best porosity development occur above the Chester paleodivides. The uppermost member shows little relationship to Chester paleotopography.

Persimmon Creek field is a small stratigraphic trap accumulation that occurs above a prominent southward-plunging nose or paleotopographic high on the Chester limestone surface. Four wells produce from two Brown sandstone units, a stream-mouth bar and an overlying channel sand that has prograded across the bar. Although the geometry of individual sandstone bodies such as these is almost impossible to predict prior to field development, Morrow sandstone prospects can be defined by locating the most likely sites of thick, porous sand accumulation controlled by Chester paleotopography.

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Geology of Puryear Member of Upper Morrow Formation at Cheyenne Field, Roger Mills County, Oklahoma

The Puryear member of the Pennsylvanian upper Morrow formation is the most prolific gas-producing unit in the deep Anadarko basin. The Puryear sandstone, a quartz sandstone and chert conglomerate, is the major depositional cycle in an overall regressive upper Morrow sandstone-shale sequence.

At Cheyenne field, the Puryear trends northwest-southeast, subparallel to the Amarillo-Wichita uplift, which is about 25 mi to the southwest. The unit pinches out to the north and northeast and is water-bearing to the south and southwest in the local area. Productive sandstone thickness ranges from 10 to 45 ft, with porosities of 14 to 18% and permeabilities averaging 0.5 to 1.5 md at drilling depths of 14,800 to 16,000 ft. Textural interpretations of the cored Puryear sandstone at El Paso's 1-6 Berry (Sec. 6, T13N, R24W) show a coarsening-upward, poorly sorted, matrix-supported conglomerate consisting of fine to coarse-grained quartz sandstone with pebble to cobble-sized, angular and subrounded chert clasts.

The Puryear member at Cheyenne field is interpreted as a delta-front deposit associated with a fan-delta system sourced from the Amarillo-Wichita uplift.