Queen Tidal-Flat Sandstone (Play 131)

The 17 reservoirs in the Queen Tidal-Flat Sandstone play, which produce from the middle Guadalupian Queen Formation (fig. 3), had produced 179.6 MMbbl (2.86×10^7 m^3) of oil through 2000 (table 37). In the *Atlas of Major Texas Oil Reservoirs*, this play was called the Queen Platform/Strandplain Sandstone (Galloway and others, 1983). Queen Formation reservoirs in this play occur within eolian-sand-sheet, tidal-flat, tidal-channel, and shoreface deposits located on the east and south margins of the Central Basin Platform (fig. 114) (Tyler and others, 1991).

The vertical sequence of siliciclastic and evaporite sediments is the product of upward-shoaling environments. Sandstone facies are overlain by sabkha dolomudstones and massive anhydrite, and the massive anhydrite is commonly overlain by eolian sheet sands (Tyler and others, 1991). Queen sandstones at Yates field on the south part of the Central Basin Platform are interpreted as having been deposited on a coastal mud flat fed by eolian sands (Spencer and Warren, 1986). Some of the sands were probably reworked in tidal channels and ponds.

Table 37. Queen Tidal-Flat Sandstone play (play 131). Production shown for fields that have had others combined into them represents the totals; combined fields are highlighted.

RRC RESN	RRC	FLDNAME	RESNAME	STATE	COUNTY	DISCYR	DEPTHTOP	2000 PROD	CUMPROD
20004666	8	CONCHO BLUFF	QUEEN	TX	CRANE	1956	4131	47,654	8,689,957
20006500	8	CONCHO BLUFF, NORTH	QUEEN	TX	ECTOR	1956	4490	547,809	15,394,816
39242333	8A	HARRIS	QUEEN	TX	GAINES	1957	4148	16,438	1,672,816
56822625	8	MAGUTEX	QUEEN	TX	ANDREWS	1958	4862	87,928	4,868,087
59419664	8	MCFARLAND	QUEEN	TX	ANDREWS	1955	4790	201,349	42,782,895
59420500	8	MCFARLAND, EAST	QUEEN	TX	ANDREWS	1955	4789	26,551	2,560,021
60137500	8	MEANS	QUEEN SAND	TX	ANDREWS	1954	4024	77,759	39,045,231
60139500	8	MEANS, N.	QUEEN SAND	TX	GAINES	1955	4341	40,834	8,270,696
62781500	8	MOOSE	QUEEN	TX	ECTOR	1958	4512	255,601	9,078,764
65674001	7C	NOELKE		TX	CROCKETT	1940	1133	779	5,595,084
73167500	8	PRIEST & BEAVERS	QUEEN	TX	PECOS	1957	2180	7,958	2,387,501
82570700	8	SHAFTER LAKE	YATES	TX	ANDREWS	1952	3054	7,293	1,951,628
88562001	8	TAYLOR LINK		TX	PECOS	1929	1800	14,399	15,896,612
93958525	8	VIREY	QUEEN	TX	MIDLAND	1988	4299	151,810	1,991,053
94747001	8	WALKER		TX	PECOS	1940	2016	10,627	9,482,673
96875001	8	WHITE & BAKER		TX	PECOS	1934	1100	9,742	5,575,897
99295333	8	YATES	SMITH SAND	TX	PECOS	1944	1100	12,970	4,356,435
		Totals						**1,517,501**	**179,600,166**

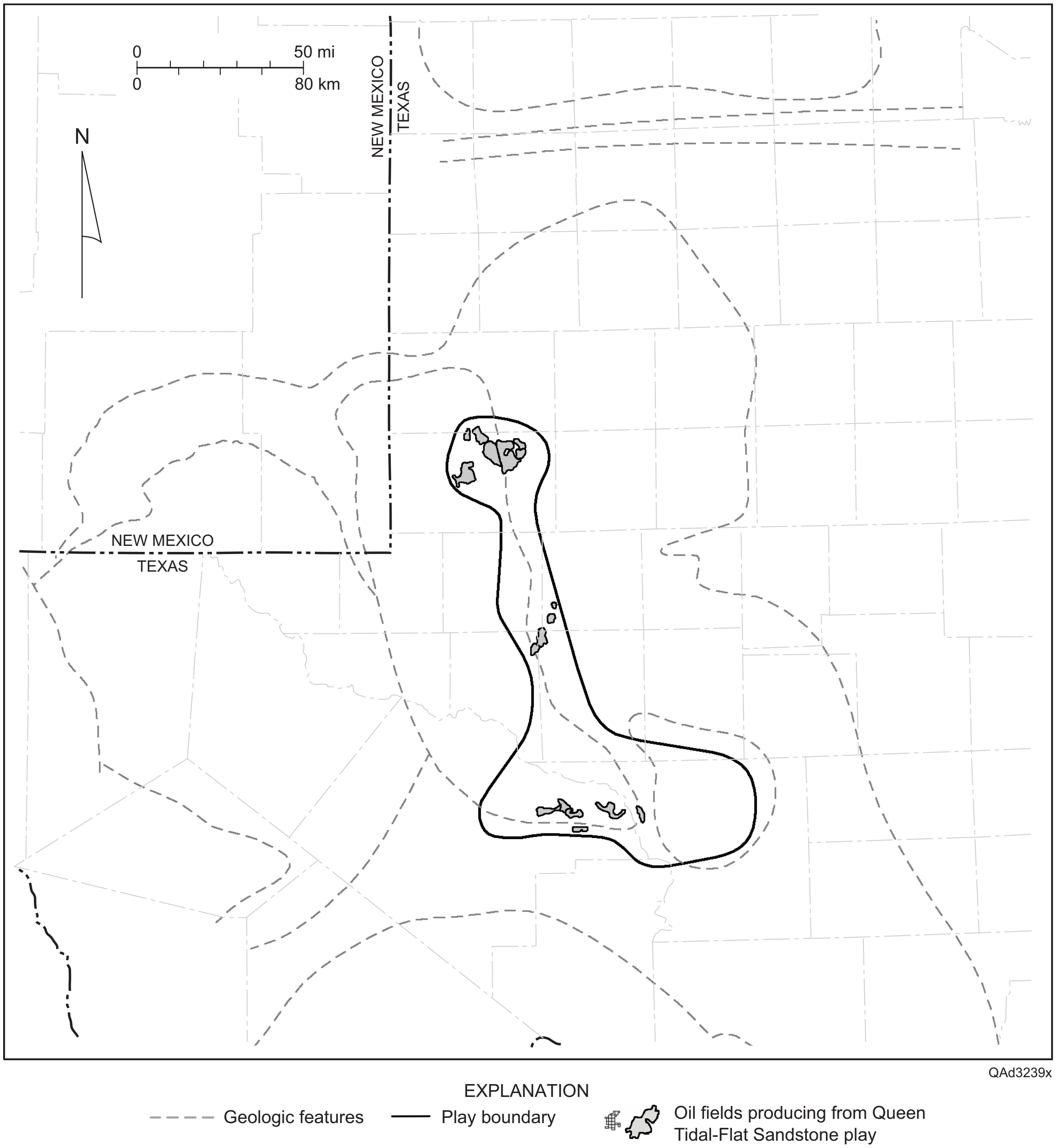

Figure 114. Play map for the Queen Tidal-Flat Sandstone play, showing location of reservoirs having >1 MMbbl cumulative production, the play boundary, and geologic features. See figure 1 for county names and figure 2 for identification of geologic features.

Production comes from multiple siltstone and very fine grained sandstone beds within the reservoirs (Price and others, 2000). Each sandstone is sealed by massive impermeable anhydrite on both the top and bottom, resulting in barriers to vertical fluid flow (Tyler and others, 1991). Thus, the sandstones act as separate reservoir units. Within the reservoir sandstones, flow continuity is further complicated by juxtaposition of tidal-channel, tidal-flat, shoreface, and eolian facies. Sandstone productivity is controlled both by depositional heterogeneities and postdepositional diagenesis. Porosity development is controlled mainly by the amount of dolomite and anhydrite cement filling intergranular pores. Porosity in productive sandstones ranges from 11 to 27 percent and averages 17 percent (Tyler and others, 1991).

Small anticlines, anticlinal noses, and irregularly shaped domes, combined with an overlapping seal of massive anhydrite, form the traps in these reservoirs (Tyler and others, 1991). The structures resulted from draping of the Queen Formation over preexisting paleotopography. Queen sandstone distribution was influenced by paleotopography associated with deep-seated structures (Trentham, 2003).

The McFarland Queen reservoir in Andrews County produces from two sandstones in the lower Queen Formation (fig. 115) (Tyler and others, 1991; Holtz, 1994). The sandstones, which form the bases of progradational, upward-shoaling cycles, were deposited in intertidal-flat, tidal-channel, and shoreface environments. They are overlain by supratidal dolomudstones and massive anhydrite at the top (Holtz, 1994). Production is highest where the sandstones are thickest, in areas interpreted to be tidal-channel deposits. Porosity ranges from 11 to 24 percent and averages 12 percent; permeability ranges from 3 to 24 md (3 to 24 $\times 10^{-3}$ μm^2) and averages 12 md (12 $\times 10^{-3}$ μm^2) (Holtz, 1994).

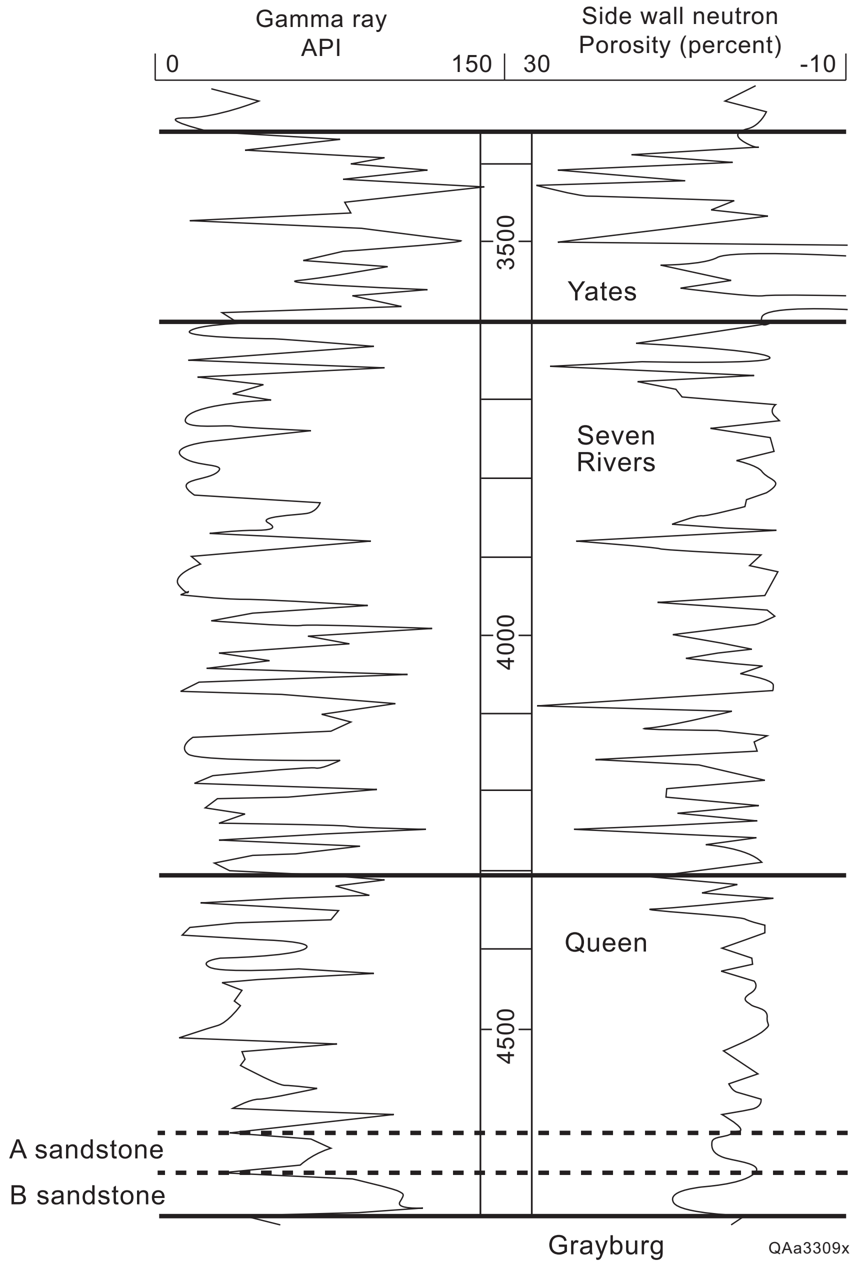

Figure 115. Typical log of upper Permian Queen, Seven Rivers, and Yates Formations in the McFarland Queen reservoir, Andrews County, showing producing Queen sandstones A and B. From Holtz (1994).

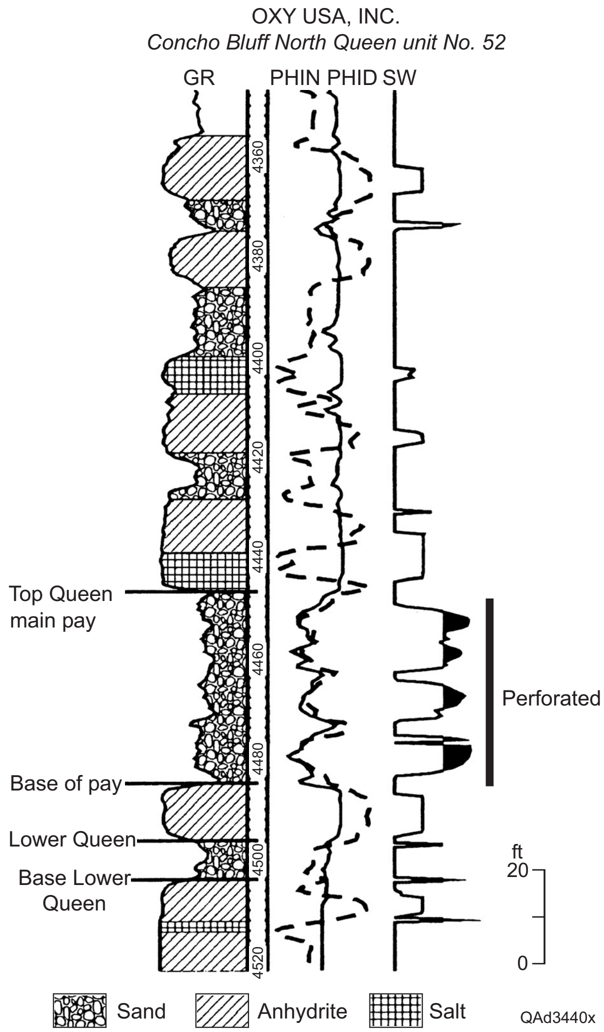

Figure 116. Typical log from Concho Bluff North Queen unit, Ector County, showing reservoir sandstones interbedded with halite and anhydrite. From Lufholm and others (1996).

The reservoir interval at North Concho Bluff field consists of several sandstones interbedded with anhydrite and salt in the upper Queen Formation (fig. 116) (Mazzullo and others, 1992; Lufholm and others, 1996). The depositional setting was a broad, low-relief shelf where clastics interfingered with evaporite deposits during lowstands of sea level. Permeability in the reservoir sandstones ranges from 1 to 1200 md (1 to 1200 × 10^{-3} μm^2) and averages 70 md (70 × 10^{-3} μm^2); porosity ranges from 9 to 26 percent and averages 16 percent (Mazzullo and others, 1992).

Production from the North Concho Bluff Queen reservoir had declined to 35 bbl/d (5.6 m^3/d) by 1994. 3-D seismic data were acquired over the field, and a seismic-guided method to estimate reservoir properties was used to populate a reservoir model with average porosity and permeability values (Lufholm and others, 1996). Reservoir simulation identified areas of “banked oil” that were poorly swept by waterflooding. After two infill wells were drilled and two existing wells were converted to injectors, production increased to 200 bbl/d (31.8 m^3/d). The reservoir model identified additional potential recoverable reservoirs of >2 MMbbl (>3.18 × 10^5 m^3) (Lufholm and others, 1994).

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