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Double A Wells Field - A Prolific "Sleeper" in the Downdip Woodbine Trend in Texas

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Preeminence of Woodbine sandstones as lucrative exploration targets has once again been underscored by the discovery and development of Double A Wells Field, Polk County, TX (Fig. 1). Twenty eight wells, completed mostly since 1992 in overpressured reservoirs, have already produced 148 BCFG and 8.7 MMBC (April 1998) - less than one half of its initial calculated reserves.

The alignment of the field with other fields updip records the trace of a stream that originated on the Sabine Uplift and flowed in a sand-transport channel across the marine shelf and down the adjoining slope (Fig. 2). Detailed field studies indicate that the transported sands were deposited in the following environments: Damascus - delta front; Hortense - proximal upper slope turbidite fan; and Double A Wells - mid-slope turbidite fan. East-west elongation of the fields (Fig. 2) is attributed to spreading of sands by marine currents flowing normal to the input channel and parallel to pre-existing Lower Cretaceous shelf edges. Judging from high production rates and sand permeabilities (up to 1.3 darcies) in the mid portion of Double A Wells Field, these marine currents apparently winnowed much of the finer clay fraction from the very fine-to fine-grained reservoir sands, resulting in "cleaner" reservoirs than those in updip fields.

The trap is a sandstone pinchout across a structural nose. The pinchout is beneath a seismically defined discontinuity that separates a seaward offlapping sequence from an overlying landward onlapping sequence (Fig. 3). The pinchout is the apparent result of either clay plugging of the channel after sand discharge or marine erosion of sand remaining in and proximal to the feeder channel and its replacement by shale affording an updip seal.

The sandstone reservoir sequence, lies immediately below 20 to 40 feet of Rapides shale, which is in turn, overlain by organic-rich, Austin chalk (Fig. 3) - a lime mudstone containing very abundant planktonic microfossils, an apparent rich source of kerogen. This source rock conforms in its lenticular configuration with that of a four square mile "sweet spot" in the underlying reservoir. This superposition of source rock and optimum reservoir comprises an excellent dynamic model of hydrocarbon expulsion downcharging through a thin shale cover into a contiguous reservoir. Present day burial temperature of around 350° F favors the thermal expulsion of wet gas from the source rock. It will be interesting to see if, late in the producing life of the field, cumulative production surpasses ultimate reserves calculated from reservoir parameters. Is this a fill-as-you-go producing model?

Other rewarding fields similar to Double A Wells remain to be discovered in the downdip Woodbine trend.

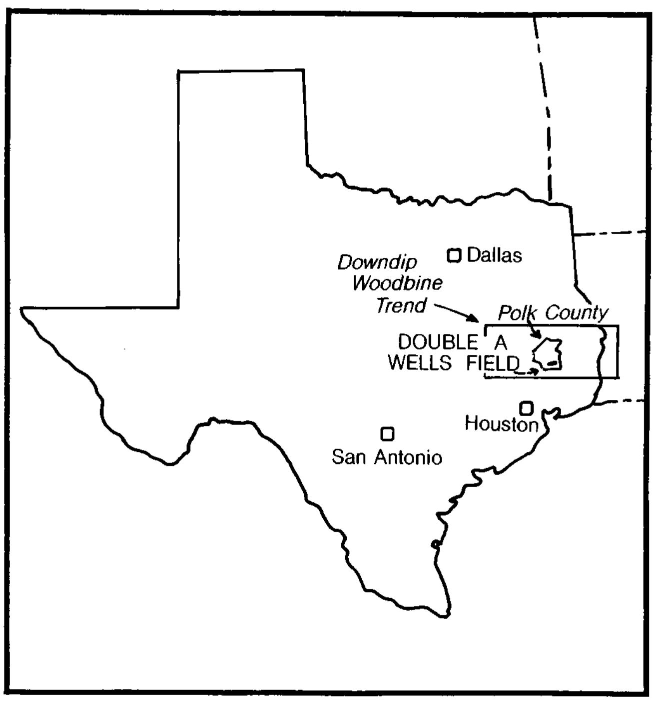

Figure 1. Index map showing location of Double A Wells Field in the downdip Woodbine trend, Polk County, Texas.

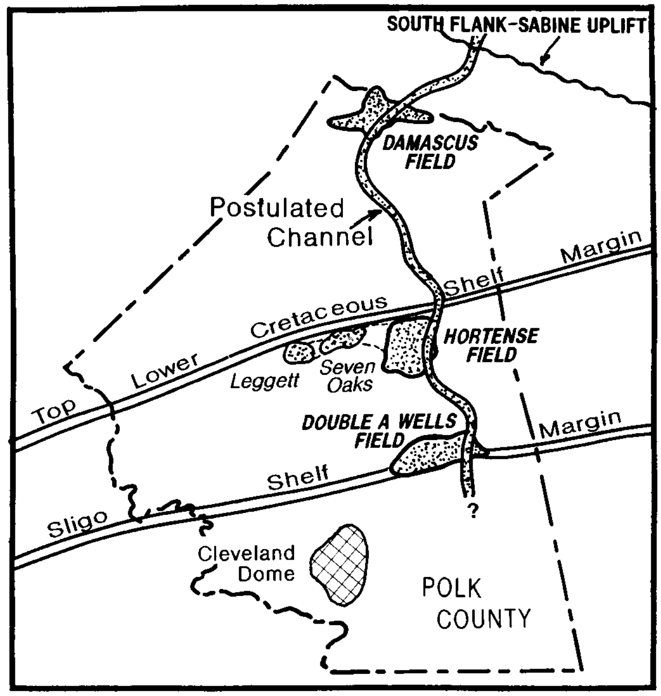

Figure 2. Map showing the geographic setting of Double A Wells in relation to other updip fields. A sand feeder channel for the fields is postulated based on their geographic and stratigraphic relationships, as well as sand input feeder channel locations determined for each field by detailed field studies.

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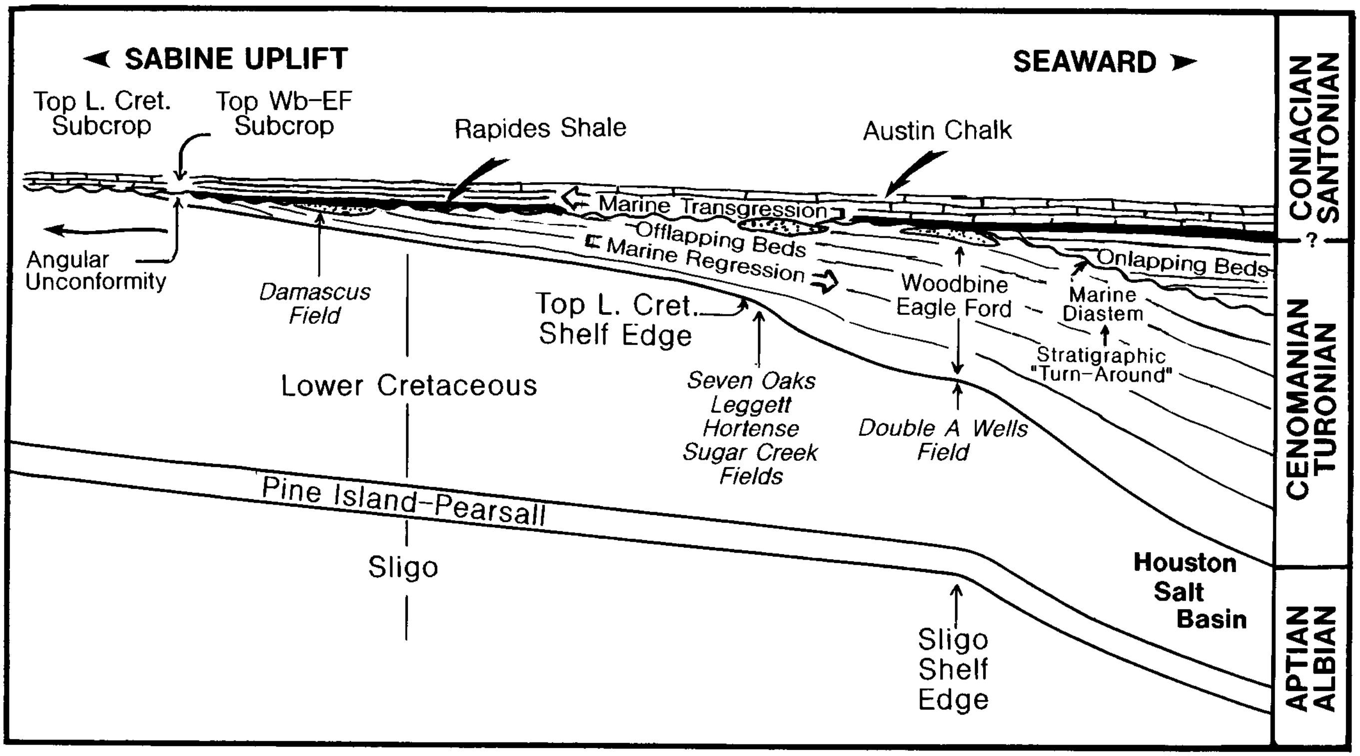

Figure 3. Stratigraphic diagram showing overall depositional relationships of Double A Wells Field. Note that the turbidite fan postulated for the field and the updip Seven Oaks-Leggett-Hortense complex are situated above Lower Cretacous shelf margins which apparently survived as slope gradient breaks during Woodbine sand deposition. Also note the close stratigraphic proximity of Austin Chalk source rock to the underlying Woodbine fields.