RECOMMENDATIONS FOR DRILLING AND COMPLETING OLMOS WELLS IN SOMERSET FIELD, BEXAR AND ATASCOSA COUNTIES

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Introduction

The Olmos Formation of Bexar and Atascosa Counties is a member of the Upper Cretaceous Navarro Group. It is a non-marine fine sand containing clay and organic materials. Strike is from northeast to southwest (fig. 1), and the formation dips southeast (fig. 2). The position in the geologic section of the Olmos sand producing at Somerset field is shown in figures 2 and 3.

Permeability of the Olmos sand in Somerset field ranges from 1.0 to 35 millidarcies, porosity from 14% to 50%, and water saturation from 40% to 80%. The sand is poorly cemented and contains up to 60% bentonite and montmorillonite, two highly hydratable clays that can swell and cause blockage of permeability. The procedures for drilling and completing the sand that are outlined in this paper are recommended to prevent the problems that can be caused by swelling clays.

History of Development

Water well drillers in Atascosa and Bexar Counties in the early 1900's often encountered problems with oil contaminating water-bearing sands at depths between 800 and 1600 feet. These sands belonged to the Midway and Navarro Groups (fig. 3), and included the Olmos. These discoveries stirred an interest in shallow oil exploration in the area. Many small independent oil companies that were formed throughout the vicinity were involved in the discovery of gas and oil fields there.

At that time, completion of the Olmos sand was by open-hole techniques. The drilling took weeks and sometimes months, due to the state of equipment and technology, and production ranged from 1/2 barrel per day to 4 BOPD without fracturing or otherwise stimulating the formation. Even today, some of the wells drilled during the early 1900's are still producing one to two BOPD. Later, when casing and improved completion technologies were available, production from Olmos wells was expected to increase to 4 to 7 BOPD. However, much of the technology that was used was inconsistently applied, and results were inconsistent.

During the Depression of the 1930's, many wells in the Somerset field were abandoned. In the 1940's, during World War II, many oil operators were removing casing from the ground to sell for scrap iron. Later, especially since the 1970's, shallow exploration has again been in a boom there, and with the more modern equipment and technology available today, drilling for the Olmos has become more rewarding.

Drilling Procedures

In recent wells drilled with native mud, the Olmos has had a steady decline in production. For example, a well with flush production of 20 barrels per day will after two days drop down to 14; after three days it will drop to 7; and after