THE GEOLOGY OF THE OSAGE COUNTRY

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Introduction

This paper on the Osage Country is a result of a speech given to the Oklahoma City Geological Society during October, 1956. At a later date the same speech was presented before the Ardmore and Tulsa Geological Societies. Upon request from the editor of the Shale Shaker this speech was prepared for publication. It should be noted that all of the illustrations were prepared during October, 1956, and carry this date for this paper.

Osage County, Oklahoma, is the largest county in Oklahoma, and is one of the most active from the oil production standpoint. The recorded oil produced has now exceeded 700,000,000 barrels and gas production has exceeded one trillion cubic feet. This county was the site of some of the earliest drilling in the State with the first dry hole being drilled in 1896 and a third well, which was the first producer, was completed from the Bartlesville sand in 1897. This county has a present daily production of 69,000 barrels of oil. It offers a great deal of hope and the best illustration of this is the fact that more than one hundred leases that were not considered worthy of testing in 1950 have since become productive and will yield the owners in excess of $5,000,000 each. Other advantages of drilling in this county are the shallow depth of the objectives, clear title leases, one million acres of nonproductive acreage, low cost of drilling and last but not least, the highest discovery rate in the State. Some of the big disadvantages are the 1/6 royalty payment, the fact that the royalty is owned by the Osage tribe and the surface owners consist of many individuals, a location fee which can only increase and the highly competitive system of bidding and acquiring acreage which probably results in a higher lease cost. General Statistical Information for 1956

During 1956, 1,526 wells were drilled in Osage County, and this figure is approximately 19% of the total for the state of Oklahoma and 2.62% of the Nation’s total. The total footage drilled in Osage County was 3,575,000 which was 13% of Oklahoma’s total and 1 1/2% of the Nation’s total. The percentage of oil completions was 67.5% and the percentage of wildcat completions was 17%, however, the effective percentage which includes oil, gas, and water flood was 84%. The only other area in the United States with a better over-all completion average was California which had a 73% oil and gas completion record. The entire State of Oklahoma had a completion percentage of 60%.

The daily average production for the entire year of 1956 was 65,181 barrels. This was 11% of Oklahoma’s total and 91% of the United States’ total. The total number of producing wells in Osage County was 8,828 which was 11.65% of Oklahoma’s total and 1.62% of the entire United States. The daily average production for a well was 7.4 barrels which compares to 7.7 for Oklahoma and 13.1 for the United States.

In secondary recovery there were 41 active water flood projects in Osage County, 10 pressure maintenance projects, 2 water flood projects being plugged, 1 pending water flood project, 2 pending pressure maintenance projects and 6 water flood projects which were considered as being uneconomical. The total amount of oil that was considered as being secondary oil being produced at the end of the year was 35,000 barrels out of a total of 69,000 barrels. Of this, 17,000 was produced from the North Burbank Unit.

At the end of 1956 the per well allowable was 31 barrels of oil per day. The average number of completions per week was 20 wells and this represented a decline from the previous year at which time the number of completions was 28 wells per week. During 1956 a total of 97 wildcats was drilled, 16 were oil discoveries, 2 were gas discoveries and 79 were dry holes. Leases are sold 4 times per year with sales held during January, April, July and October.

Geological Information on Osage County

A tremendous amount of information is available to geologists desiring to evaluate the geology of Osage County. Since surface structure was one of the most important criteria for justifying drill sites in the early days, the USGS decided to completely map the County. This decision resulted in a most excellent piece of work which was published as USGS BULLETIN 686. Since there is no major angular unconformity between the surface beds and the base of the Pennsylvanian, the structure on the surface conforms very well with the structure on most of the Pennsylvanian producing horizons. Thus, this surface work is a very valuable tool. During the W. P. A. days, the USGS in cooperation with the State Geological Survey and with other organizations and oil companies, saw fit to do a tremendous amount of work in Osage County. Elevations of all locations that could be found were determined by a large group of surveyors. Sample logs acquired from most of the major oil companies were plotted and used in subsurface mapping of the entire county. A structural map

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