

Scholars' Mine

Professional Degree Theses

Student Theses and Dissertations

1928

Irregularities in the productivity of the Fry sand in the Smith-Ellis pool of Northwest Brown County, Texas

Willard Ardell Schaeffer Jr.

Follow this and additional works at: https://scholarsmine.mst.edu/professional_theses

Part of the Mining Engineering Commons Department:

Recommended Citation

Schaeffer, Willard Ardell Jr., "Irregularities in the productivity of the Fry sand in the Smith-Ellis pool of Northwest Brown County, Texas" (1928). *Professional Degree Theses*. 300. https://scholarsmine.mst.edu/professional_theses/300

This Thesis - Open Access is brought to you for free and open access by Scholars' Mine. It has been accepted for inclusion in Professional Degree Theses by an authorized administrator of Scholars' Mine. This work is protected by U. S. Copyright Law. Unauthorized use including reproduction for redistribution requires the permission of the copyright holder. For more information, please contact scholarsmine@mst.edu.

IRREGULARITIES IN THE PRODUCTIVITY OF THE FRY SAND IN THE SMITH_ELLIS POOL OF NORTHWEST BROWN COUNTY

TEXAS.

By

WILLARD ARDELL SCHARFFER, JR.

A

THESIS

submitted to the faculty of the

SCHOOL OF MINES AND METALLURGY OF THE UNIVERSITY OF

MISSOURI

in partial fulfillment of the work required for the Degree of

ENGINEER OF MINES

Rolla, Mo.

1928

C.L. Dalce Approved by Professor of Geology

TABLE OF CONTENTS

	Pag ●
INTRODUCTION	1
GENERAL DISCUSSION OF THE SMITH_ELLIS POOL	3
REUMERATION OF FEATURES POSSIBLY CONNECTED	
WITH IRREGULARITIES IN PRODUCTION FROM	
WELLS IN THE SMITH-FLLIS POOL	5

8

CONCLUSIONS

MAP OF THE SMITH_ELLIS AREA

INTRODUCTION

The Fry Sand of Northwest Brown County, Texas, as ordinarily defined, consists of irregularly distributed lenticular sand bodies of varying thickness, ranging up to more than thirty feet in some localities. It is quite generally conceded to be a member of the upper Strawn Group of the Fennsylvanian of Texas.

The Fry Sand is highly unconformable with relation to the strata both above and below, and is subject to abrupt changes of thickness within distances of but a few yards. It generally occurs as a light grey to white, fairly fine-grained, quite pure quarts sand, and where it is present it is almost always highly porous, producing water when no oil is present.

It occurs in the western portion of Brown County and the eastern part of Coleman County between the depths of 1100 and 1600 feet, varying with locality. It is quite readily reached with various portable drilling machines, which are used to the almost complete exclusion of standard drilling rigs.

Where the Fry Sand occurs in any appreciable thickness and favorable structural conditions pre-

vail, the chances for production of petroleum therefrom are good. The oil from this sand will average between 42 and 43 degrees Baume', and hence is eagerly sought. Flowing wells producing as high as 2000 barrels daily have been encountered in this horison.

The Smith Pool is one of several producing from the Fry Sand, and was discovered early in 1927. During the drilling campaign which followed, in the course of which the writer had charge of the drilling in of some 24 wells in the pool, and observed the drilling of most of the others, various deviations from the normal in sand conditions were noted. These will be treated in the following discussion.

GENERAL DISCUSSION OF SMITH_ELLIS POOL

The Smith-Ellis Pool of Northwest Brown County lies on a generally northwesterly dipping monoclinal flexure. The apparent extent of the productive area is about one and one-half miles in a mortheastsouthwest direction, and is a trifle over one-half a mile in width. The Fry Sand in the field itself is rather flat, with highly local irregularities caused rather by the unconformable nature of the sand than by possible folding. As may be seen on the accompanying map, the difference in elevation on the Fry between the highest and lowest producing wells is only 63 feet.

During the development of the area it was noticed that various of the wells flowed comparatively heavily, while others, although having encountered quite as good poresity in the sand as those first mentioned, and being equally favorably situated structurally, failed to flow at all. This was at first believed to be the result of a general lowering of the gas pressure over the field as a whole, caused by continued production of oil and gas therefrom, but after consideration of all the facts, which follow, it is believed that the variation in pro-

duction has quite another aspect.

ENUMERATION OF FEATURES POSSIBLY CONNECTED WITH IRREGULARITIES IN PRODUCTION FROM WELLS IN THE SMITH_ELLIS POOL

1. The earliest wells in the field, on the extreme west edge of production, although but very little lower structurely than the heaviest producers, were light wells.

2. Wells but slightly higher on the sand than those mentioned in 1. were, for the Fry Sand, prolific producers. These wells encountered no more favorable porosity than the others, and had no really significantly greater thickness of pay sand.

3. Some wells in the central portion of the field, although not brought in excessively late in the development of the pool, failed to flow. Inasmuch as there seemed to be an abundance of fluid available in many of the wells, which could be produced by swabbing and later by pumping, it is obvious that their failure to flow was not caused by a lack of petroleum in the sand, by the absance of perosity or by inferior structural position. Lack of pressure, therefore, caused by a deficiency in production of gas from the well, would be a

logical reason for their failure to flow naturally.

In wells marked thus: (C) on the accom-4. panying map a very fine grained, practically dry, gray gas sand was found to overlay the main body of pay sand. This sand varied from the smallest perceptible thickness up to about five feet, and ordinarily produced from fifty thousand to as high as one hundred thousand cubic feet of gas daily. This is of course a very small amount of gas, but when the fact is taken into account that experiment has shown that only two to three hundred cubic feet of gas are necessary to raise one barrel of oil, the smaller figure often applying to the higher gravity oils. it may be readily seen that this gas could play an important part in flowing the shallow wells of this area.

5. Wells in which this sand occured were almost without exception flowing wells, and the greater the quantity of gas encountered the heavier the flow. Wells where the gas sand was not present flowed but very little, if any, oil, although much fluid could often be produced otherwise.

6. Further evidence of the actuality of the gas sand is shown by Phillips Newsome Well No. 3. This we!

encountered about five million cubic feet of dry gas in fifteen feet of practically dry gas sand of the same nature of, and apparently corresponding to, the thin stratum of gas sand overlaying the pay in other parts of the field. This well was drilled into lime below the gas sand, thus showing the main body of the Fry pay to have lensed out near this point.

7. Several dry holes were drilled, some of which, notably the Rex-Tex Smith No. 1 and E. L. Smith Smith No. 6, failed to encounter the Fry horizon. The small production from other wells in the immediate vicinity of the above dry holes seems to be the result of tightness of the sand, which was lime-cemented, and which the drillers logged as lime. On the Cast side of the pool, E. L. Smith Moore No. 3, which likewise was plugged and abandoned as dry, did not miss an oil bearing horizon, but found in place of the Fry Sand a stratum of sandy shale with only a show of oil therein. The foregoing wells are mentioned as examples of exceptions to general conditions prevailing in the field.

CONCLUSIONS

When the foregoing points have been taken into consideration, there seems to remain but little doubt that the following conclusions are well founded.

1. The main pay body of the Fry Sand of the area does not contain gas in sufficient quantities to flow wells in anything but the most erratic manner.

2. When the pay is overlain by the gas sand, the gas emanating therefrom acts as a natural gas lift and will cause a well to flow as high as some hundreds of barrels daily.

3. The degree of productivity of the individual well does not depend at all upon its structural position, and only in isolated cases upon the porosity of the petroliferous horizon.

4. There must of necessity be a thin impervious break, probably shale, between the gas sand and the pay, otherwise the Phillips gas well would have produced oil with the gas. This break likewise prevents the dissipation of the gas through the pay into wells in which the gas sand was not penetrated.