

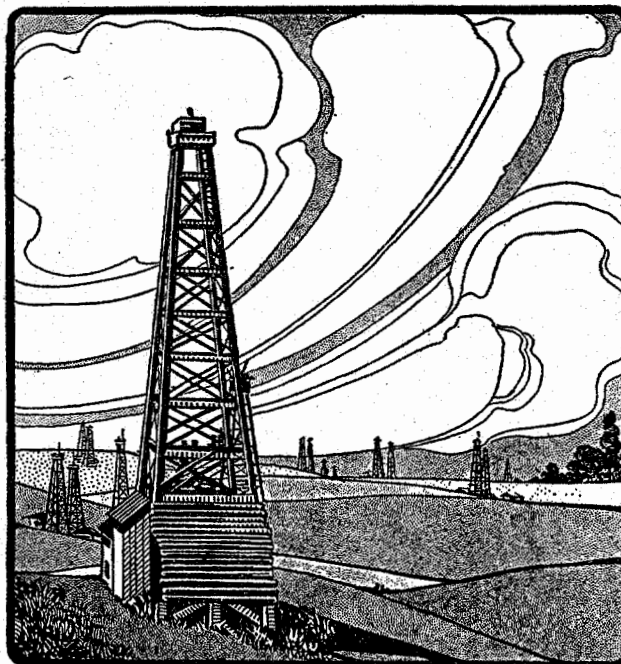
SUMMARY OF OPERATIONS
California Oil Fields

THIRTY-FIFTH ANNUAL REPORT
OF THE
STATE OIL AND GAS SUPERVISOR
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PLACERITA OIL FIELD

By CECIL L. BARTON ^a and NORMAN N. SAMPSON ^b

INTRODUCTION

The Placerita oil field is located in the northwestern part of Los Angeles County between $1\frac{1}{2}$ and $2\frac{1}{2}$ miles east of the center of the town of Newhall. It is situated along and adjacent to Placerita Canyon and is easily accessible by means of the Sierra Highway, which crosses the field, or by an oiled county road extending up Placerita Canyon from Newhall. The proved area of the field, comprising approximately 540 acres, is divided into two distinct productive areas known as the Kraft-York and Juanita areas.

Plate I is a map of the area covered by this report, showing the locations of the wells and the contours on the top of the Lower Kraft Zone. Plates II and III are cross-sections through the Kraft-York and Juanita areas, respectively; and Plates IV and V are production curves of the same areas.

ACKNOWLEDGMENTS

The writers wish to thank the various engineers and geologists for their valuable assistance in the preparation of this report. Special thanks are due Mr. Robin Willias, Consulting Geologist, for data furnished and Mr. Gordon B. Oakeshott, Associate Geologist, California State Division of Mines, whose report ¹ on the Placerita oil field has been freely referred to.

History of Development

The early history of the area is described briefly in U. S. Geological Survey Bulletin 753.² A more complete history, confined principally to the Kraft-York area will be found in Summary of Operations, California Oil Fields, by Mr. R. W. Walling.³ Both of these reports describe the geology of the area to some extent. They also describe the so-called schist area which is located in the NW $\frac{1}{4}$ of Sec. 3 and the NE $\frac{1}{4}$ of Sec. 4, T. 4 N., R. 15 W., S. B. B. & M., several miles to the east of the area shown on Plate I.

Kraft-York Area

In 1935 Yant Petroleum Corporation acquired four old wells in Placerita Canyon which were, or had been, producing a small amount of low gravity oil for several years. This operator's well No. "Yant" 5, in Sec. 36, T. 4 N., R. 16 W., was drilled to a depth of 2,735 feet and completed in September, 1936, for 10 barrels of 11.8-degree gravity oil per day. While these operations were being carried on by Yant Petroleum Corporation, Mr. M. R. Yant, the president, purchased the N $\frac{1}{2}$ of the NE $\frac{1}{4}$

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¹ Oakeshott, Gordon B., Geology of the Placerita Oil Field, Los Angeles County, California: California Journal of Mines and Geology, Vol. 46, pp. 43-79.

² Kew, W. S. W., Geology and Oil Reserves of a Part of Los Angeles and Ventura Counties, California: U. S. G. S. Bull. 753, pp. 153-158.

³ Walling, R. W., Newhall Oil Field: Summary of Operations, California Oil Fields, Vol. 20, No. 2, pp. 46-50.

of Sec. 31, T. 4 N., R. 15 W. The new owner subdivided and sold the property in parcels as small as one-tenth of an acre. All of the descriptions in the deeds were by metes and bounds and were based upon the assumption that the property contained 80 acres and that the section lines were true east-west and north-south. The lines were subsequently found to be off considerably, and the 80 acres was actually only 71 acres. Consequently, all of the parcels bordering on the exterior lines of the $N\frac{1}{2}$ of the $NE\frac{1}{4}$ of Sec. 31 were shortened by the overlap in the deeds. In most of the transactions a community oil and gas lease was taken in the name of Yant Petroleum Corporation. Drilling operations were not commenced upon any of the properties within the community lease, and in the latter part of 1936 Yant Petroleum Corporation was declared to be a bankrupt.

Following the collapse of Yant Petroleum Corporation, there were no further development operations in the area until March, 1948. At that time Nelson-Phillips Oil Company well No. "Kraft" 1, located in the $SE\frac{1}{4}$ of Sec. 31 was spudded in and drilled to a depth of 2,222 feet. A fault zone was encountered, and the hole was plugged back to 718 feet. A string of 7-inch casing was landed at 718 feet and cemented through perforations at 580 feet. The well was completed on April 20, 1948, for an initial production of 70 barrels of 16.4-degree gravity clean oil per day.

The successful completion of Nelson-Phillips Oil Company well No. "Kraft" 1 at such a shallow depth was the incentive for the beginning of an active drilling campaign. All of the activity during the early development period was confined to Placerita Canyon itself in what has been designated as the Kraft-York area. Initial productions varied from 25 to 175 barrels of 11- to 17-degree gravity oil per day. Production in this area appears to be coming almost entirely from the Upper Kraft Zone.

Juanita Area

News of the drilling activity in Placerita Canyon finally reached Mr. Yant, who was then living in Hollister, California. Mr. Yant, still the owner of a considerable amount of land in the $N\frac{1}{2}$ of the $NE\frac{1}{4}$ of Sec. 31, made a deal with a rancher named Ramón Somavia to drill a well. As a result of this agreement, Ramón Samavia well No. "Juanita" 1 was drilled and completed nearly one year after the completion of Nelson-Phillips Oil Company well No. "Kraft" 1. The well was completed for 340 barrels of 22.8-degree gravity oil per day from a depth of 1,831 feet. Its successful completion opened up an entirely new productive area of higher gravity oil which has been designated the Juanita area.

The discovery of the Juanita area started a new leasing and drilling campaign. It was soon discovered by those engaged in leasing that the portion of the Juanita area which was in the $N\frac{1}{2}$ of the $NE\frac{1}{4}$ of Sec. 31 had been highly subdivided. It was also learned that in a great many cases the legal titles were very much involved and, in addition, the deeded parcels lapped over into adjoining lands even up into Sec. 30 to the north. In some cases, as many as three claimants to the same $\frac{1}{10}$ -acre parcel appeared.

The Division of Oil and Gas enforced the provisions of the Spacing Act ⁴ in the Placerita field and thus maintained a one-acre spacing until

⁴ Sections 3600-3608, Public Resources Code of the State of California.

the latter part of September, 1949. However, since wells were being drilled and completed in one week with initial production as high as 3,000 barrels of 18- to 25-degree gravity oil a day, it was inevitable that sooner or later the constitutionality of the Spacing Act would be challenged. This situation actually arose and on September 23, 1949, in the case of *People vs. Metcalfe Oil Company*, Judge Clarence M. Hanson denied the application for an injunction pending trial. Judge Hanson's decision, resulted in one of the most intensive drilling campaigns ever witnessed in any California oil field. It is almost certain that many of the late comers in the parade of wells will never recover their investment.

GENERAL GEOLOGY

Stratigraphy

The geology of the Placerita field is complex. The formations exposed in the area include the following:

- I. Pre-Tertiary
 - A. Basement Complex
- II. Eocene
 - A. Domengine
 - B. Martinez
- III. Upper Miocene
 - A. Mint Canyon (continental beds)
- IV. Lower Pliocene
 - A. Repetto
 - 1. Elsmere member
 - 2. Repetto siltstone
- V. Middle Pliocene
 - A. Lower Pico (marine beds)
- VI. Upper Pliocene
 - A. Upper Pico
 - 1. Marine beds
 - 2. Sunshine Ranch member (continental beds)
- VII. Lower Pleistocene
 - A. Saugus
- VIII. Upper Pleistocene
 - A. Terrace gravels
- IX. Recent
 - A. Alluvium

The basement complex, which outcrops about a mile from the southeast portion of the field, consists of a series of metamorphic and granitic intrusive rocks. The oldest rocks in this series are irregular remnants of Placerita crystalline limestone and other metasedimentary rocks which have been intruded by Rubio diorite gneiss, both of which have later been intruded by granitic rocks. In the schist area described by Walling⁵ these metamorphic rocks have provided a reservoir for a small amount of high gravity oil.

Overlying the Pre-Tertiary basement complex is a major unconformity upon which the Eocene formations have been deposited. The Eocene in this area is composed of the Domengine and Martinez formations, which are essentially hard sandstones and conglomerates. These

⁵ Walling, R. W., *op. cit.*

formations may have had an important bearing on both the source and accumulation of oil in this area.

The Mint Canyon formation, which is widely exposed north of the San Gabriel fault, is of continental origin. South of the San Gabriel fault it is not exposed at the surface. This formation consists of coarse to fine-grained sandstones, conglomerate, red beds, clays, mudstones, siltstones, and thin beds of tuff. North of the San Gabriel fault in the Placerita area the Mint Canyon formation has a measured thickness in excess of 2,400 feet. The Modelo formation of Upper Miocene age, consisting of conglomerate, pebbly sandstone, dark greenish sandstone, mudstone, clay shales, and beds of white vitreous tuff, lies unconformably upon the Mint Canyon formation.

The Lower Pliocene sedimentary rocks are of marine origin and have been given the name, Repetto formation. In this area the Repetto formation consists of two members, the Elsmere and Repetto siltstone. The Elsmere member, which is commonly oil saturated, consists of coarse sandstone, conglomerate, siltstone, and mudstone. The Repetto siltstone member consists of gray and brown shale, siltstone, mudstone, and thin-bedded calcareous sandstone.

Three members of the Pico formation have been recognized in the Placerita area: the Lower Pico marine member of Middle Pliocene age, the Upper Pico marine member of Upper Pliocene age, and the continental Sunshine Ranch member of Upper Pliocene age.

The Lower Pico marine member, which appears south of the San Gabriel fault, consists of white pebble conglomerate, coarse sandstone with fine sandstone lenses, and thin brown siltstone. This member has not been recognized north of the San Gabriel fault. Between the San Gabriel fault and Placerita Canyon it is overlain with apparent conformity by the Upper Pico member; while south of the fault it is overlain unconformably by the Saugus formation.

The Upper Pico marine member also only appears south of the San Gabriel fault. It consists of well-stratified, coarse brown and buff sandstones, medium-grained sandstone, and conglomerate. At least a part of the oil which is being produced in the Placerita field is probably coming from oil sands in the upper part of this member.

The Upper Pliocene continental beds which overlie the Upper Pico marine member have been referred to as the Sunshine Ranch member.⁶ There is a local conformity between this member and the underlying Upper Pico marine member. The Sunshine Ranch member includes continental and brackish water conglomerate, greenish sandstone and mudstone, thin fresh-water limestone, and red beds. It is probable that some of the basal beds of this member include oil sands which are contributing to the production in the Placerita field.

Above the Sunshine Ranch member is the Saugus formation which is considered to be of Lower Pleistocene age. Between the Saugus formation and the overlying Upper Pleistocene terrace gravels is an angular unconformity. This formation, which is widely distributed on both sides of the San Gabriel fault, consists of predominantly light-colored conglomerate and sandstone. In the Placerita field all of the wells have either started in the Saugus beds or have penetrated that formation.

⁶ Oakeshott, Gordon B., Geology of the Placerita Oil Field, Los Angeles County, California: California Journal of Mines and Geology, Vol. 46, p. 59.

Two stages of Upper Pleistocene terrace gravels are recognizable in the Placerita area. The older of these, which covers most of the productive area of the field, is affected by minor folding and faulting. However, the younger of the terrace gravels does not appear to be thus affected. It is interesting to note that the site of the discovery of gold in California in 1842 was in alluvium at the base of these gravels in Placerita Canyon.

Structure

Two structural features in the Placerita area have had the most effect upon the accumulation of oil. The best known feature is the San Gabriel fault which has a general strike of N. 65° W. and which is also the limit of production on the north. It would be more accurate to refer to this as a fault zone rather than a fault since any single fault plane can be traced for only a distance of two or three miles. Horizontal displacement along the San Gabriel fault appears to be approximately 2½ miles.

The second feature is the Whitney fault which has a north-south strike approximately along the centerline of the east half of Sec. 31. This fault which extends from Whitney Canyon on the south to the San Gabriel fault on the north was first mentioned by Walling.⁷ It has been found to limit production to the east in the Placerita Canyon area as well as in the Whitney Canyon area to the south. This fault has been referred to by Willis⁸ as the Swall-Ferrier fault. The surface expression of the Whitney fault is not as evident as the San Gabriel fault; however, it can be traced in the Placerita area on aerial photographs.

In addition to the two faults described, several minor faults occur within the productive area of the field. While these minor faults probably do not have enough displacement to have had any major effect upon the oil accumulation, they have had a definite effect upon the gravity of the oil. The higher gravity pool of the Jaunita area is separated by the Orwig fault from a narrow strip which produced 13- to 16-degree gravity oil. This narrow strip is separated by another fault, parallel to the Orwig fault, beyond which the production is 12-degree gravity oil.

The main Placerita structure has been referred to by Oakeshott⁹ as a poorly defined nose. In the Kraft-York area, production is coming from the Placerita anticline. The axis of this anticline, which was recognized by Kew,¹⁰ has a strike of N. 70° E. and crosses the Sierra Highway at its junction with Placerita Canyon. There is a good closure on the east against the Whitney fault which cuts across the Placerita anticline. In this area most of the production is coming from the Upper Kraft Zone. In the Juanita area the structure may also be a part of what has been referred to as a "poorly defined nose." However, locally the structure appears to be a faulted monocline with dips of from 15 to 25 degrees to the northwest. This structure has a good closure on the north against the San Gabriel fault and, on the east, against the Whitney fault. Production in the "Juanita" area is from the Lower Kraft Zone.

Two producing zones have been designated as the Upper and Lower Kraft Zones. The combined thickness of the productive section is about 900 feet.

⁷ Walling, R. W., op. cit.

⁸ Willis, Robin, Placerita Oil Field: Munger Oilgram, Annual Report, 1949.

⁹ Oakeshott, Gordon B., op. cit.

¹⁰ Kew, W. S. W., op. cit.

Upper Kraft Zone

Above the Upper Kraft Zone there is a well-defined shale which varies in thickness from 70 to 100 feet. The Upper Kraft Zone itself varies from 170 to 250 feet in thickness. It is productive only in the Kraft-York area and has a closure of approximately 1,000 feet. In the Juanita area this zone is much less sandy. All of the wells completed in the Upper Kraft Zone have had small initial productions, varying from 25 to 175 barrels per day, with gravities varying from 11 to 17 degrees. Gas production from this zone has been almost non-existent. The initial water level in the Kraft-York area was found to be at the minus 250-foot contour.

Lower Kraft Zone

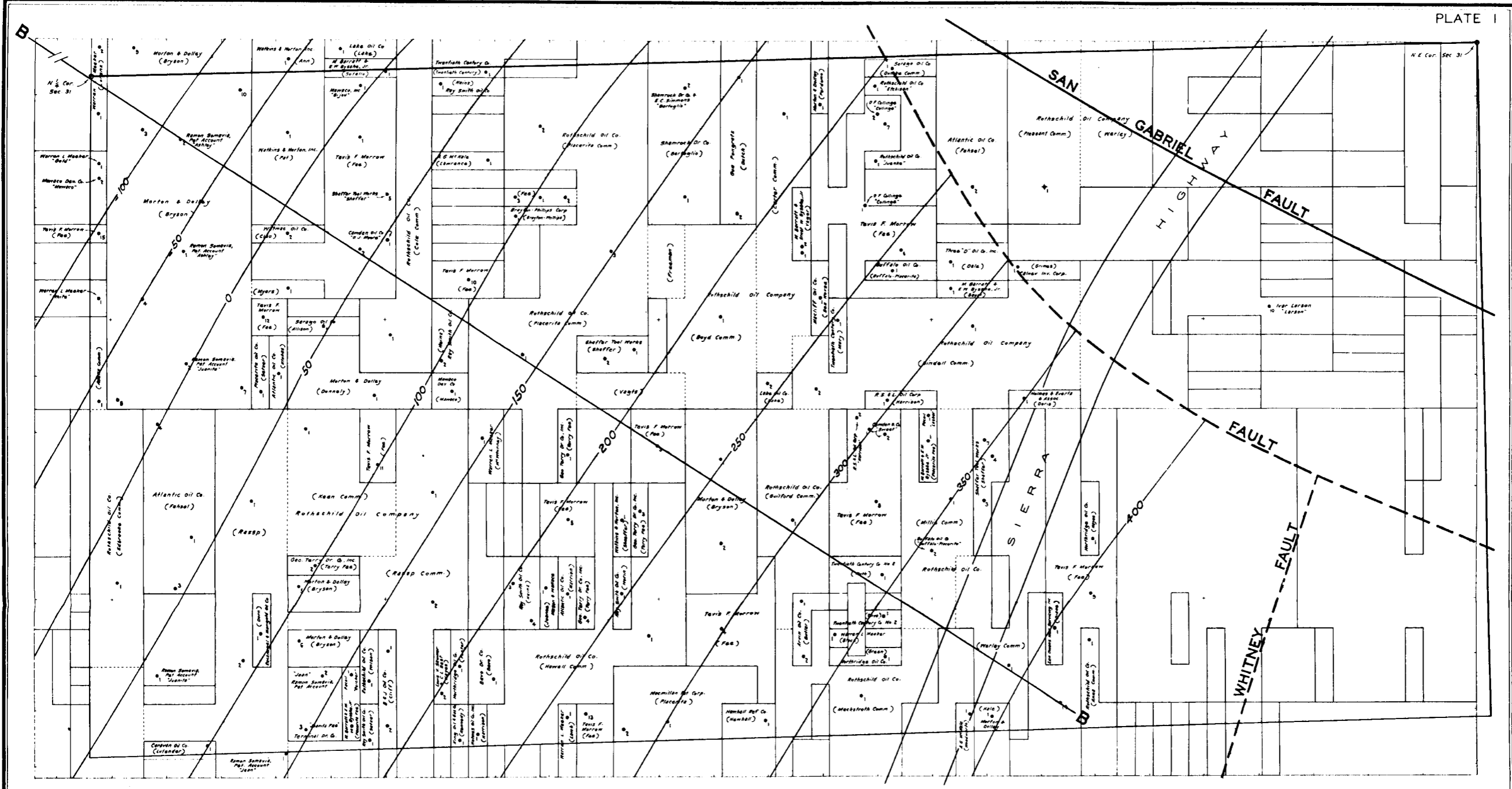
Separating the Upper and Lower Kraft Zones is a fairly uniform shale which varies from 20 to 50 feet in thickness and which has been termed the Lower Kraft Shale. The Lower Kraft Zone has a thickness of from 300 to 450 feet. Below this zone is a series of siltstones of Pico age, shales, sandstones, and conglomerates. Several wells have encountered the Eocene formation or the granite. Very little coring has been done throughout the field. On the basis of the few cores which have been taken, both the Upper and Lower Kraft Zones appear to lie in the basal Sunshine Ranch and Upper Pico members of the Upper Pliocene formation. The formations consist of highly lenticular, cross-bedded sandstone, siltstone, sandy mudstone, and conglomerate with a closure of approximately 1,100 feet in the Juanita area.

The Lower Kraft Zone is productive in a few of the wells in the Kraft-York area. However, it is the source of all of the production in the Juanita area and, therefore, a discussion of the zone will be confined to that area. While the discovery well in this area only produced at the rate of 340 barrels of oil per day, subsequent wells were completed for as high as 3,000 barrels of 18- to 25-degree gravity oil per day.

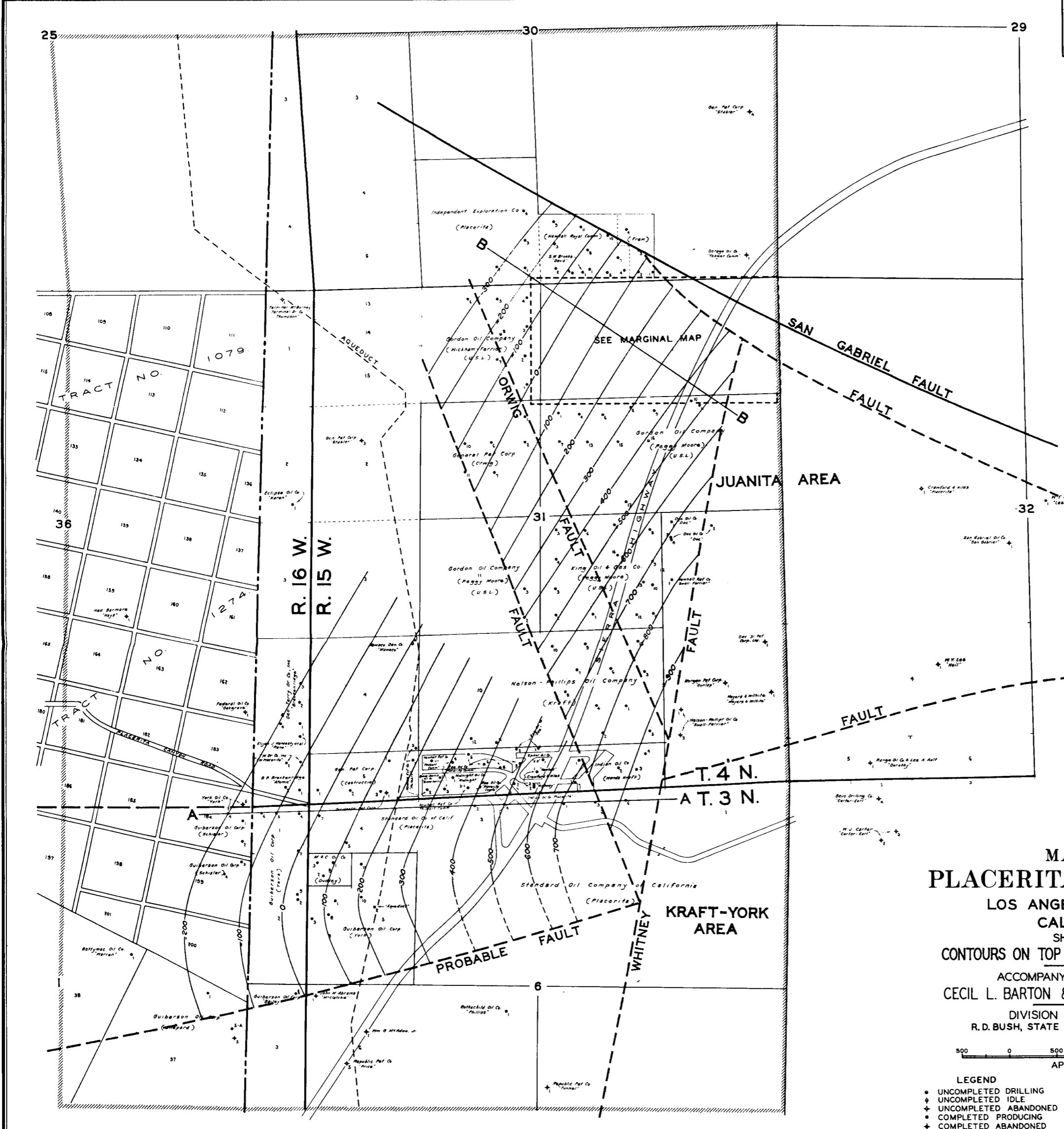
The fact that wells were being completed for such high initial productions from depths averaging from 2,000 to 2,200 feet was the incentive for an intensive drilling campaign. Over 200 wells have been drilled in an area of less than 125 acres. Of the 253 notices of intention to drill new wells filed for the Placerita field during 1949, 197 were for wells in this area. At one time 26 wells were drilling within an area of approximately 60 acres.

The oil in the Lower Kraft Zone was probably understaturated with no gas cap. All of the early wells were completed as flowing wells with pressures from 0 to 100 p.s.i. only, however, the intensive drilling campaign soon had its effect upon production. By the latter part of October, 1949, most of the wells had ceased to flow, and by the end of the year vacuums were being used extensively.

The initial water table for this zone has not been found in the Juanita area. An examination of the electric log of Gordon Oil Company well No. "Wickham-Ferrier" 6, located on the minus 300-foot contour, indicates that the water table is probably located at about the minus 400-foot contour. So far as is known, none of the wells in this area have had any water trouble caused by a failure of water shut-off. A few wells have encountered bottom water at different sub-sea depths below the oil sand, and in some cases this has caused considerable difficulty. It

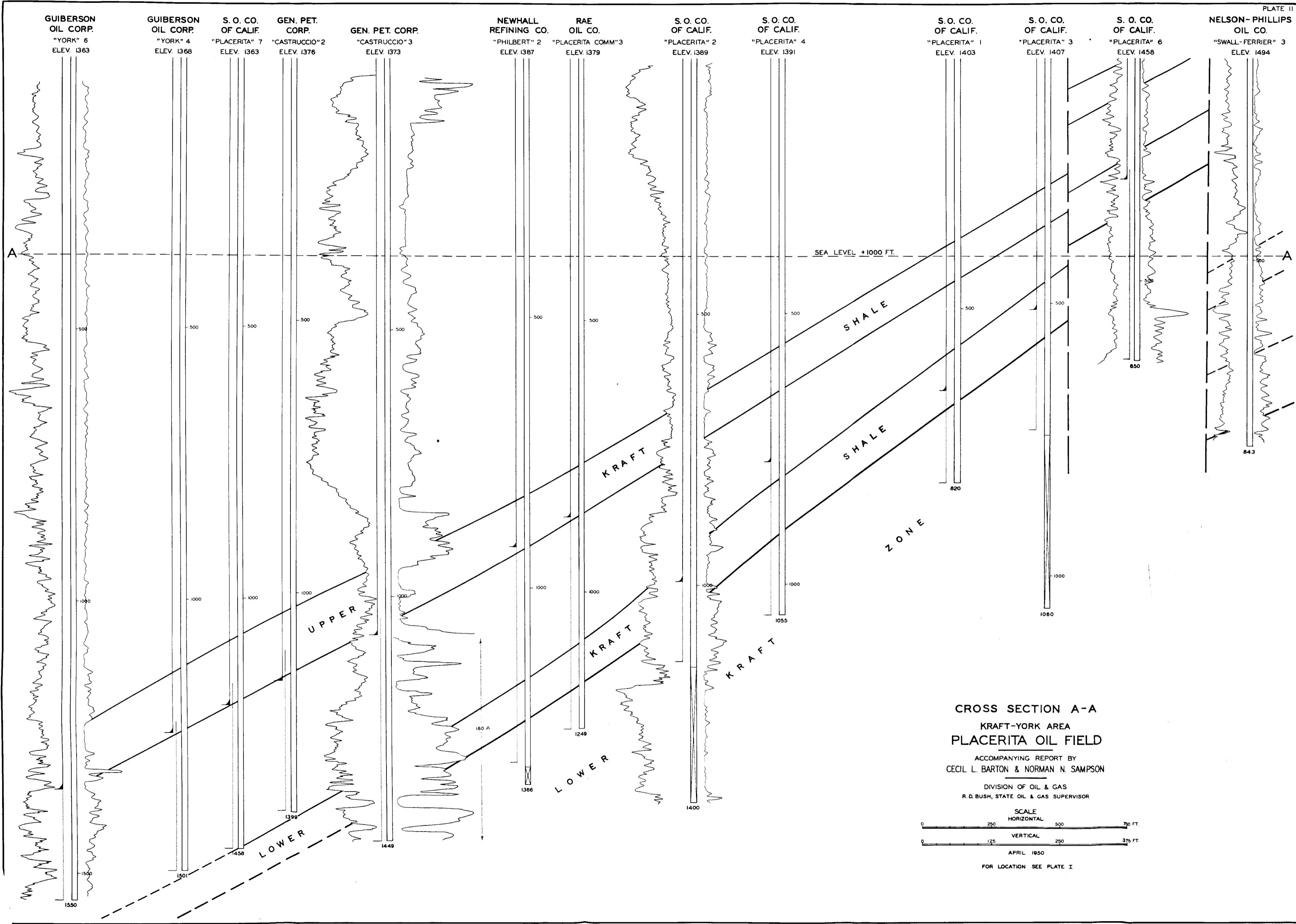


MARGINAL MAP
 N 1/2 NE 1/4 SEC. 31
 SCALE 0 100 200 300 400 FT.



MAP OF
PLACERITA OIL FIELD
 LOS ANGELES COUNTY
 CALIFORNIA
 SHOWING
 CONTOURS ON TOP OF LOWER KRAFT ZONE
 ACCOMPANYING REPORT BY
 CECIL L. BARTON & NORMAN N. SAMPSON
 DIVISION OF OIL & GAS
 R.D. BUSH, STATE OIL & GAS SUPERVISOR
 SCALE 0 500 1000 1500 2000 FT.
 APRIL 1950

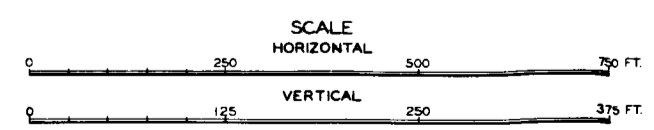
- LEGEND
- UNCOMPLETED DRILLING
 - ◊ UNCOMPLETED IDLE
 - ◊ UNCOMPLETED ABANDONED
 - ◊ COMPLETED PRODUCING
 - ◊ COMPLETED ABANDONED
- DATUM - SEA LEVEL
 CONTOUR INTERVAL 100 FT.



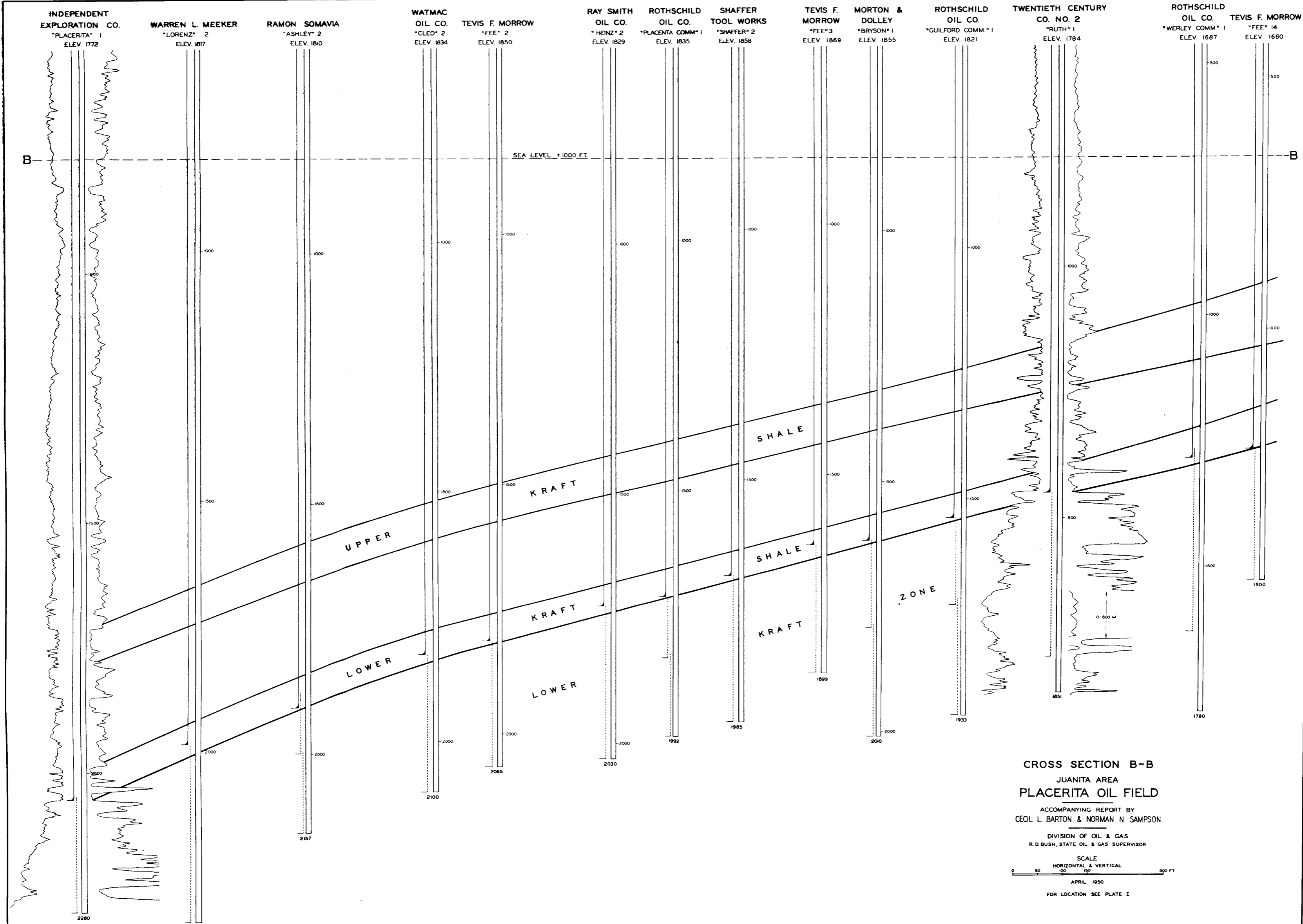
CROSS SECTION A-A
KRAFT-YORK AREA
PLACERITA OIL FIELD

ACCOMPANYING REPORT BY
 CECIL L. BARTON & NORMAN N. SAMPSON

DIVISION OF OIL & GAS
 R. D. BUSH, STATE OIL & GAS SUPERVISOR



APRIL 1950
 FOR LOCATION SEE PLATE I



CROSS SECTION B-B
 JUANITA AREA
PLACERITA OIL FIELD
 ACCOMPANYING REPORT BY
 CECIL L. BARTON & NORMAN N. SAMPSON
 DIVISION OF OIL & GAS
 R. D. BUSH, STATE OIL & GAS SUPERVISOR
 SCALE
 HORIZONTAL & VERTICAL
 0 50 100 150 200 300 FT
 APRIL 1950
 FOR LOCATION SEE PLATE I

appears that there is no active edge water or gas drive and that gravity drainage will be the dominant reservoir mechanism in the future.

TECHNOLOGY

All of the wells in the Placerita field have been drilled with rotary equipment. With one exception, all of this equipment has been of the portable type. The only standard derrick used was at Nelson-Phillips Oil Company well No. "Kraft" 1, the discovery well, for which a steel derrick had been erected several years before actual drilling operations started.

The usual procedure has been to drill the wells to completion depths before setting casing. In most of the wells, either 8 $\frac{1}{2}$ -inch or 7-inch casing has been landed on bottom and cemented through perforations above the oil zone to be produced. A few wells have had conventional water strings cemented above the objective oil zone. In either case, the effectiveness of a water shut-off has been demonstrated by perforating the water string above the cementing ports or casing shoe and then running a formation tester. This has generally been done in one operation by running a combination gun and tester.

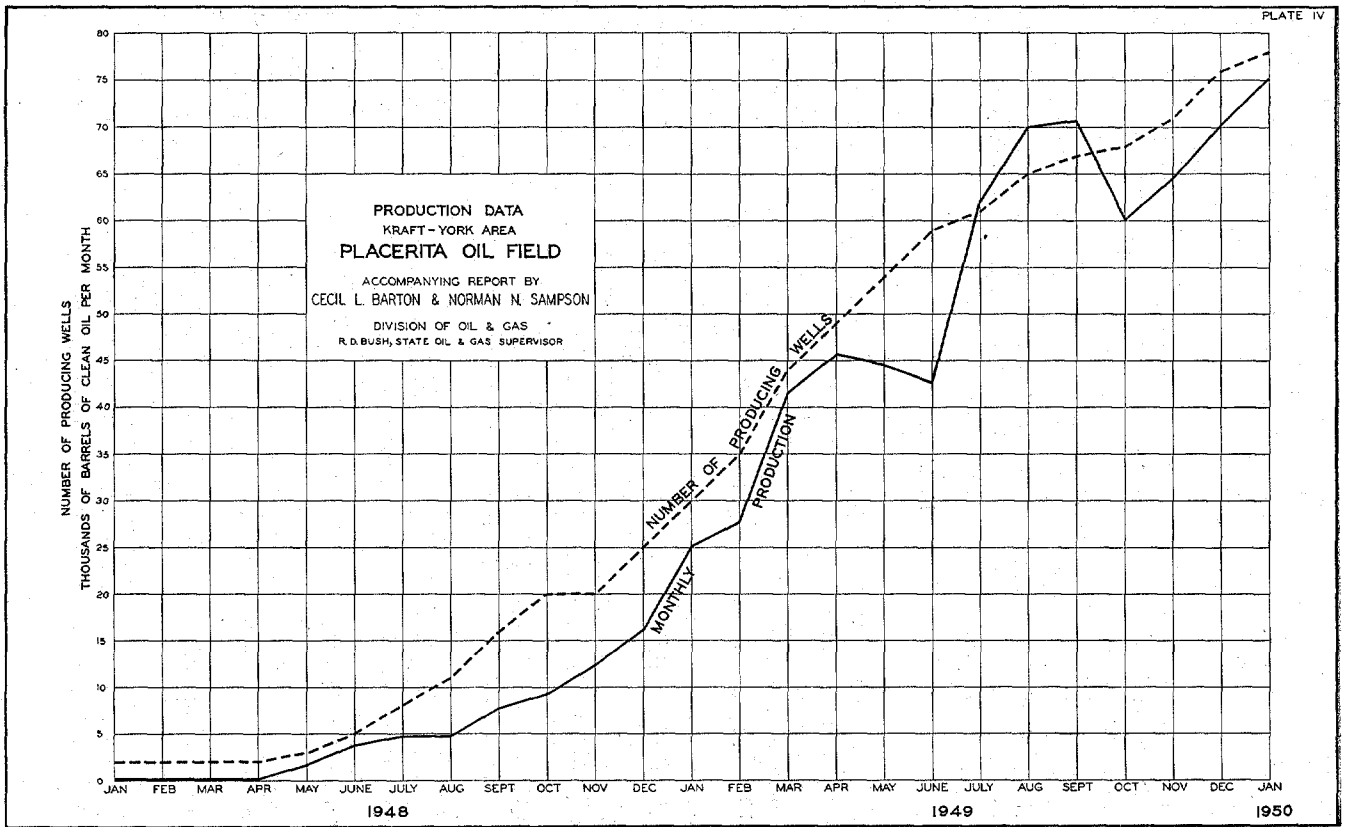
The size of perforations used in combination strings of casing or conventional liners has varied throughout the field. It has been found that in the Juanita area 80 to 100 mesh perforations have given best results; while in the Kraft-York area 120 to 200 mesh perforations have been more suitable. No particular difficulties or problems have been encountered during drilling operations, and not a single well has been lost because of mechanical difficulties. The average time required for drilling and completing a well has been from seven to ten days, and the average cost, from \$27,500 to \$30,000.

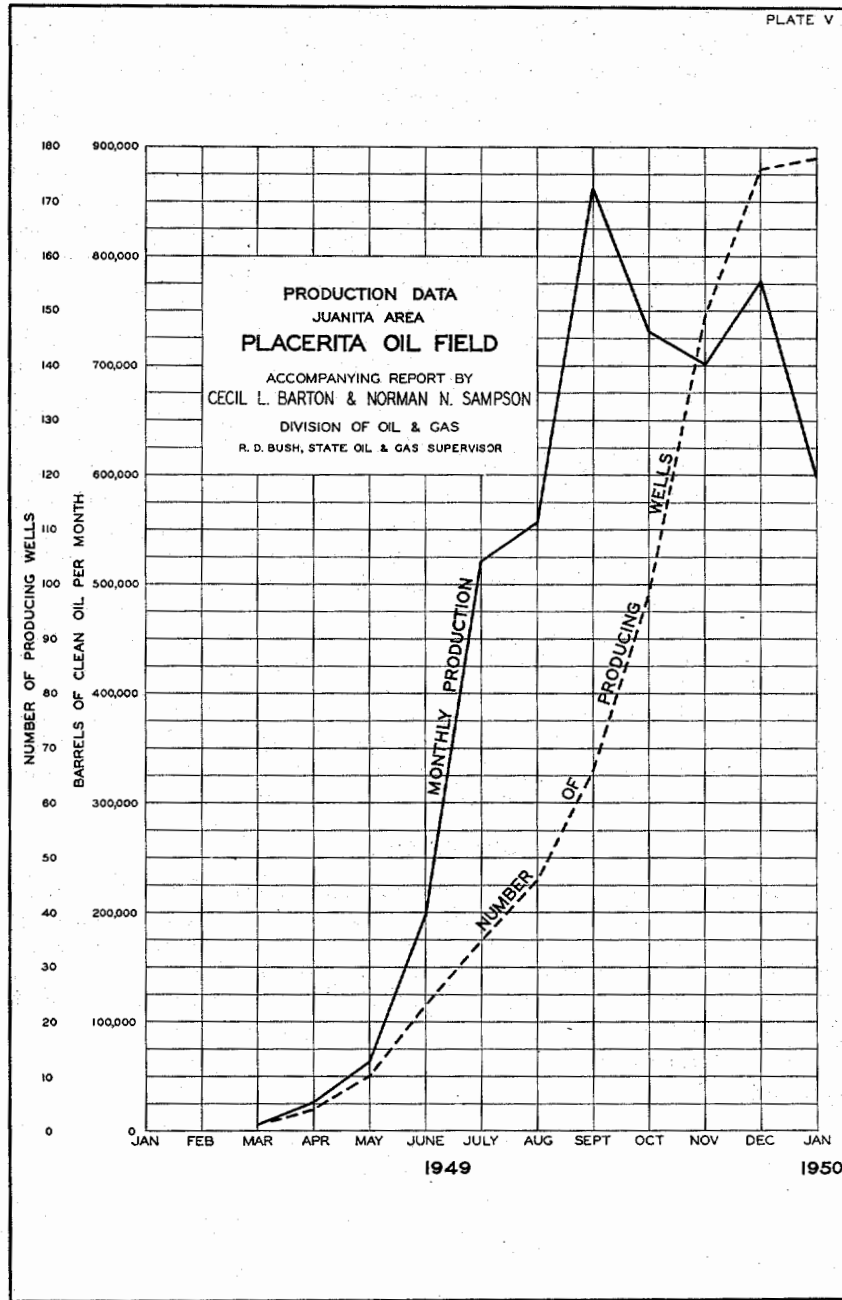
Most of the oil production has been shipped out of the field by means of tank trucks. Primarily, this was made necessary by two conditions: first, the tremendously rapid increase in daily production brought about by the drilling campaign which followed Judge Hanson's decision in the case of Metcalf Oil Company; and, second, the fact that there is only one pipeline serving the field.

PRODUCTION

The total cumulative oil production as of January 31, 1950, was 5,901,846 barrels. Of this amount, 5,221,394 barrels was produced during the period from July 1, 1949, to January 31, 1950. The peak of monthly production was reached in September, 1949, when a total of 932,133 barrels of oil was produced from 131 wells, however, the peak daily production of approximately 36,000 barrels was not reached until early the following month. The importance of the Juanita area is shown by the fact that it has produced 5,048,400 barrels of the total cumulative production of oil.

Plates IV and V are production curves of the Kraft-York and Juanita areas, respectively. A study of these curves shows that in the Kraft-York area the production is still rising. This is due to a number of factors including lower gravity of the oil, lower initial production, practically no gas production, less congested spacing of wells, and continued drilling. In the Juanita area the curve shows a rapid decline in production which will probably continue through 1950. This rapid





decline has been brought about primarily by the high and unrestricted production of both oil and gas, failure to utilize the gas production in repressuring the oil zone, and congested drilling. As has been previously stated, 197 notices of intention to drill new wells in the Juanita area were received during 1949. The sudden decline in the production curves of both areas during October, 1949, probably reflects a drop in the price of crude oil and the difficulty in finding a market for the oil which occurred about that time.

It has been estimated that the field had an original reserve of approximately 45,000,000 barrels of recoverable oil.¹¹ It has also been estimated that approximately 20,000,000 barrels of this reserve were probably contained within the Juanita area. These estimates were based upon a number of factors including the extremely high saturation and effective thickness of the productive zones.

The exact amount of gas which has been, or is being, produced is unknown inasmuch as none of the operators has installed gas meters. While gas production in the Kraft-York area has been practically nonexistent, during the last six months of 1949, the Juanita area provided a considerable amount. The estimated production for this period was 2,632,421 Mcf. With the exception of a small amount of gas which has been utilized for lease requirements, all of the gas produced has been blown to the air. A civil action was filed by the State against all of the operators in the Juanita area to enjoin them from blowing gas to the air. However, it was found that the gas had a high carbon dioxide content (from 15 to 25 percent) which appeared to be increasing, and a low B.t.u. value. These factors made it impossible to use the gas commercially. The gas waste action was therefore taken "off calendar" early in 1950.

The intensive drilling campaign in the congested Juanita area has a telling effect upon production. The later wells to be drilled have been completed on the pump for a small initial production. With the high bonuses and royalties paid by the operators, it is very doubtful if some of these wells will ever return the original investment.

CONCLUSION

Drilling activity in the field had practically ceased by the end of February, 1950. Unless a deeper zone is discovered, the only remaining wells to be drilled will be those necessary to fulfill lease requirements. It is unlikely that a deeper zone will be found in the Placerita field inasmuch as several wells have been drilled into the Eocene without finding production.

¹¹ Willis, Robin, op. cit.

April 1950