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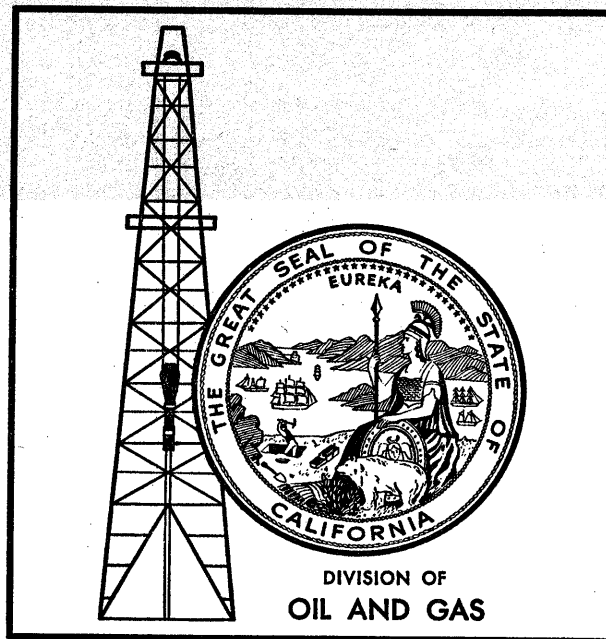
SUMMARY OF OPERATIONS CALIFORNIA OIL FIELDS

FIFTY-SECOND ANNUAL REPORT OF THE
STATE OIL AND GAS SUPERVISOR

ISSUED BY
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

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TOWSLEY CANYON AREA OF NEWHALL OIL FIELD ^a

BY JOHN L. ZULBERTI ^b

INTRODUCTION

The Towsley Canyon area of Newhall field is in northern Los Angeles County, four miles southwest of the town of Newhall. It is accessible over a narrow and tortuous road leading off U. S. Highway 99 one and one-quarter miles southeast of Lyons Avenue. Although the amount of oil produced is of minor commercial importance, the area has historical interest as the presence of oil seeps attracted numerous operators in the early days of the petroleum industry, and several others later on who made serious efforts to find deeper accumulations of oil in this area.

The five acres of proved oil land near Towsley Creek and the few acres surrounding six wells scattered along Temple Creek, a short, eastward-flowing branch of Towsley Creek (Plate II), are near the north quarter corner of Sec. 17, T. 3 N., R. 16 W., S. B. B. & M. Welburn Mayock is the only active operator.

Elevations of wells in the area range between 1,660 and 1,900 feet, but the rugged terrain in the vicinity has elevations as high as 2,900 feet. The most prominent topographical feature is Oat Mountain, one and one-half miles to the southwest, the highest point in the Santa Susana Mountains. The climate is semiarid and vegetation consists of grass and brush where rattlesnakes are not uncommon; there are oak trees in shaded valleys and on higher slopes with northern exposure, and walnut trees in Temple Canyon. During most of the year the amount of water in the creeks is small; it has a strong taste of sulphur and is used for domestic purposes other than drinking, and for watering cattle.

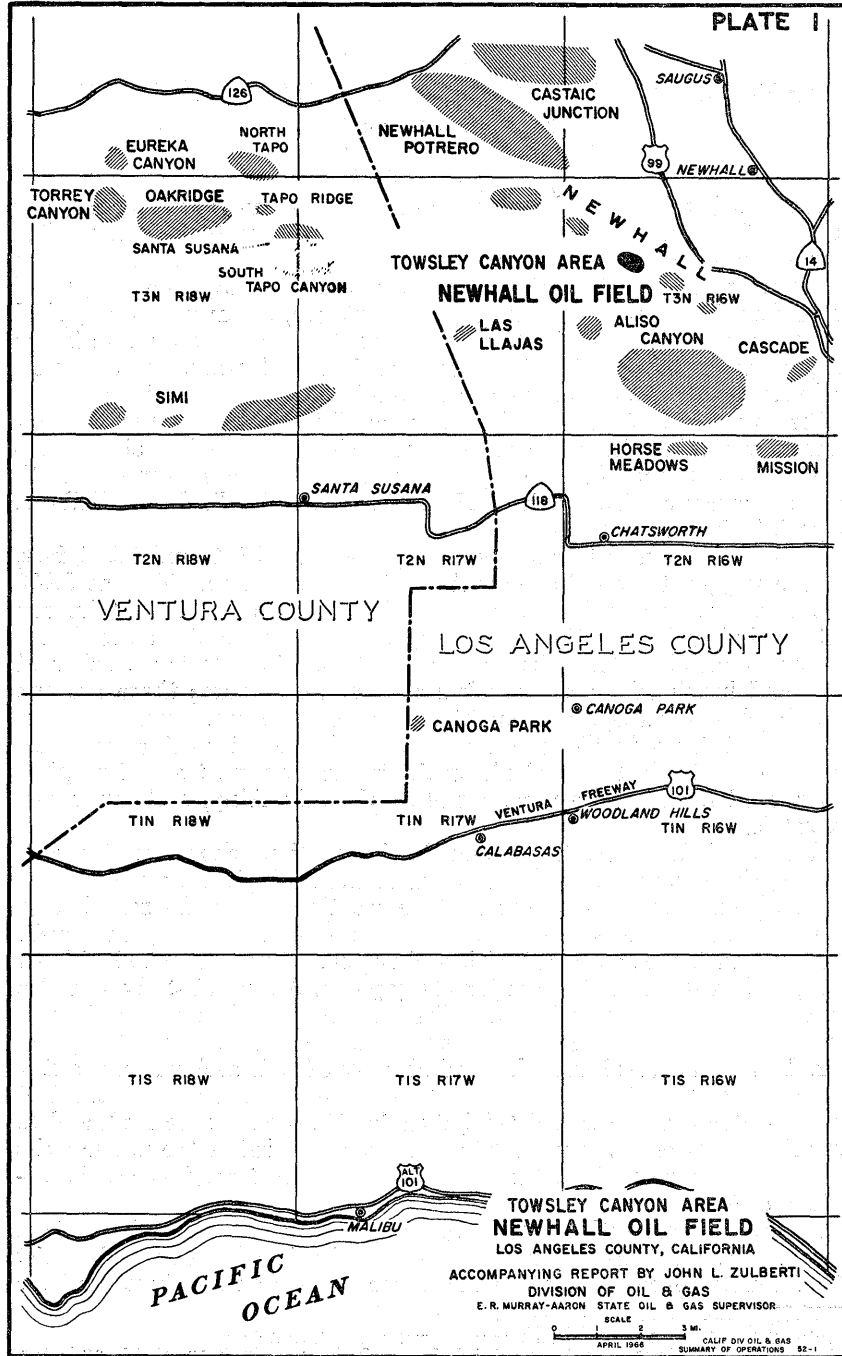
Because of the many inconsistencies in locations shown on the well records, the author spent several days in the field plotting wells on an aerial photograph from which footage locations could be scaled, and made a thorough study of the records in an effort to identify each well. The information was checked with oral reports of persons who had been living and working in the area for many years. A careful study was also made of production records in an effort to trace the history of each well, but this was not possible for various reasons: over a period of years there had been several unauthorized changes of well designations, a few of the wells drilled before the State Mining Bureau was established were re-entered and recompleted but no locations were ever filed, and to complicate matters even more, coordinates of several of the newer wells were either grossly approximated or were given from incorrectly described corners.

A previous description of the Towsley Canyon area is included in a report by R. W. Walling ¹ on the Newhall oil field with an excellent list of references. In more recent years, other reports and evaluations have

^a Manuscript submitted April 1966.

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¹ Walling, R. W., Report on Newhall Oil Field: California Division of Oil and Gas, Summary of Operations—California Oil Fields, Vol. 20, No. 2 (Reprint No. 2) (1934).



been prepared, including a study made by Thomas L. Bailey in 1957 for Waterflood Oil Company. Bailey and his staff mapped the surface geology in sufficient detail to find bedding contacts and the principal faults, and prepared maps and cross sections for a study of the feasibility of reservoir stimulation by water flooding.

The plates accompanying this report reflect Bailey's interpretations. They are:

- Plate I. Location map
- Plate II. Surface geology by Thomas L. Bailey
- Plate III. Contours on "D" electric log marker
- Plate IV. Cross section A-B
- Plate V. Cross section C-D

HISTORY

The history of the Towsley Canyon area begins with the time when Indians were using for domestic purposes oil gathered by wringing out the fluid from blankets that had been soaked in oil seeps. Later on, at least one pit was dug at the site of a seep from which oil was removed with buckets. Still later, a hole was drilled from the bottom of the pit to an unknown depth and cased. This pit still exists and is presently covered by a junked truck bed.

In 1876, Caswell, Ellis and Wiley filed a claim on Lot 40, also known as the Towsley Petroleum Mine. The sketch attached to the mineral certificate issued by the General Land Office shows two oil wells already on the claim, plus an oil tank, an "old" chimney and an "old" house, all near the bed of Towsley Creek, indicating that illuminating oil had been distilled quite a few years before the date the claim was filed. This type of activity would have been contemporaneous with the exploration and exploitation of asphalt deposits in the Pico Canyon area of Newhall field, which started as early as 1850.

C. T. Lester wrote a letter to the Division of Oil and Gas in 1938, with the following comments:

" . . . This claim was patented during the presidency of Rutherford B. Hayes, as a petroleum mine. Some time prior to that time, of course, the discovery of petroleum in paying quantities must have been made, and I understand from the owners of this property, who are old ladies, that oil from this property was put in kegs and transported on the backs of burros from the property to San Pedro Harbor, where it was shipped around the Horn to Pennsylvania. I am also reliably informed that when the black liquid was first discovered a sample of it was sent around the Horn to Pennsylvania for analysis, and that after a wait of many months, word was received from Pennsylvania to the effect that the sample was petroleum. The discoverer became incensed at the report, tore it up and stamped on it, and at the same time stated, 'Petroleum! What the hell is petroleum?'

"I understand that the development of this section was made prior to any development by the Standard Oil Company in Pico Canyon, and I understand that the Pico Canyon field is one of the

oldest in the State. I am almost inclined to believe that the Towsley Canyon field probably antedates the discovery of petroleum in Pico Canyon."

In 1890, Charles Cabot filed a claim on Lot 50, also known as the Temple Oil Placer claim, on which an oil well, shown on Plate III as "Climax" 1, had already been drilled. According to Bulletin 63 of the California State Mining Bureau:

"The first recorded work was done by Washington Oil Company in 1893 and 1894. The first well of this company drilled immediately on the outcrop was 200 feet deep, and found a little heavy black oil, presumably heavy only as compared with the light oils at Pico. The second well was about 400 feet deep, and got the same results. The third well of the company was further down the dip and, when reported in 1894, had found some green oil of about 30-degrees Baumé at a depth of 600 feet. The final depth of this well is not known but is probably approximately 1,000 feet."

The first notice of intention to drill a new well was filed by Towsley Canyon Oil Company in 1915 for well No. 1, Sec. 17, now "Towsley" 1 (old). (This company is not to be confused with another of the same name which was organized in 1937 to deepen well No. 1, now "Hammon" 1.) It is still producing a small quantity of fresh water with a scum of oil and enough gas for domestic uses and for the operation of a generator.

More significant activity is represented by the drilling of well No. "Hammon" 1, Sec. 8, by Consolidated Oil Company to a depth of 3,270 feet in 1929; between 1937 and 1939, Towsley Canyon Oil Company and J. E. O'Donnell deepened it to 5,225 feet. Quoted from a report prepared by John H. Wents, Jr., in 1948, the following comments are of interest:

". . . The log shows that showings of oil were found between 215 and 340 feet, 861 and 872 feet, 1,147 and 1,178 feet, 2,183 and 2,208 feet, and 2,555 and 2,610 feet. Attempts to produce the sands below 1,147 feet were made prior to 1934 and were unsuccessful. Subsequently, the well was deepened in 1938-39 by the J. E. O'Donnell interests to a depth of 5,225 feet with rotary tools. For practically the entire depth the dips in the cores were greater than 70 degrees. O'Donnell made several attempts to produce the well as drilling progressed. The best showing had on these tests was of the interval 3,915 feet to 3,990 feet, where a pumping test indicated approximately 35-40 barrels of net 24° gravity oil along with about an equal quantity of water. In spite of the fact that the hole was in bad mechanical condition and restricted in size, the well was completed and has yielded a considerable quantity of oil. There are no surveys of this hole; however, from the high dip angles shown by cores and the character of the formations penetrated, it is clearly indicated that the well drifted down-dip and probably penetrated less than 2,000 feet of section."

About another interesting well, Wents reports:

“More recently the Barnsdall-Bandini-Ambassador Companies jointly drilled well No. ‘Limbocker’ 1, near the center of the North-east Quarter of Section 17, 3 N., 16 W. This well was spudded on August 7, 1941, and was abandoned at a depth of 7,056 feet on February 19, 1942. A 13 $\frac{3}{8}$ -inch surface string of casing was cemented at 306 feet and a 9 $\frac{5}{8}$ -inch protective string was cemented at 4,040 feet. Difficulty was had in keeping the hole straight and, before a depth of 1,600 feet had been reached, two plug-backs were made for the purpose of straightening. At 2,850 feet, 45-degree dips were shown in the cores, at 3,060 feet, the dips were 60 degrees, and at 3,500 feet, shale showing 80-degree dips was cored. From the latter depth to bottom, steep dips were indicated in all cores. Commencing above 1,400 feet, oil showings on the ditch were had. From 1,400 feet to 4,125 feet, the formation consisted predominantly of shale and thin streaks of oil sands; in the interval 4,125 feet to 5,300 feet, hard, tight oil sands, sandy shales and shales were logged with the sand predominating; between 5,300 feet and 6,700 feet to bottom at 7,056 feet, hard sandstone, hard tight oil sand and hard shale were found. A formation test was made of the interval 4,040 feet to 4,186 feet, shortly after running the 9 $\frac{5}{8}$ -inch casing, with recovery of seven stands of gassy mud, no oil or water, on a 45-minute valve opening. No tests were made below 4,186 feet; however, before abandoning the hole, several attempts were made to obtain a cement job behind the casing string above 2,230 feet for the purpose of testing the shallower oil and gas showings. These cementing operations were ineffective and the well was abandoned after the 9 $\frac{5}{8}$ -inch casing had been pulled from 285 feet. Single shot survey records indicate the hole was 163 feet East and 70 feet North of its surface location at a depth of 7,000 feet. It was opined by the Barnsdall geologist in charge of the well that the drill crossed the axis of the fold at 6,291 feet and from there to bottom the hole followed down-dip on the north flank of the fold. The section penetrated by the well consisted entirely of the Modelo formation. The older, objective formations were not reached and, consequently, retain their untested possibilities.”

The last attempt to find deep zones on this portion of the Pico anticline was made by Santa Paula Drilling and Development Company with well No. “Foster” 1, Sec. 17. In 1951, Stanley and Stolz prepared a report on the Towsley Canyon area in which these comments were made:

“‘Foster’ 1 spudded July 16, 1950, and completed drilling about November 24, 1950. The well was drilled to about 3,515 feet; 14-inch surface casing was cemented at ± 200 feet and 6 $\frac{5}{8}$ -inch casing was landed on a bridge at 1,560 feet and cemented through perforations at 1,030 feet. The original shut-off was evidently a failure, and the well was recemented. The well was drilled with clay-base mud and some cores and sidewall samples were taken in the process of drilling; a Schlumberger electric log to 3,505 feet was taken. Such core or ditch samples as were obtained were

poorly preserved and accurate descriptions of the same in a fresh state were not available; very steep dips were indicated in the cores. Available reports on faunal evidence indicates that the well penetrated sediments no older than middle or possibly lower Mohnian stage.

"A single shot sub-surface survey indicates that at 3,500 feet the well was 26.34 feet north and 92.23 feet east of the surface location.

"The well was completed on November 26, 1950, for a reported daily rate of 35 barrels. It is at present reportedly producing 12 B/D oil, 24 B/D water, 30.9° gravity—the well pumps off; that is, it pumps a few hours each day to make its production.

"Taking the reported present production at its face value, the lease would produce 30 B/D. Mr. Ellsworth reports that in 1938, seven of the old wells on the property produced 1,600 B/mo., or 53 B/D."

Altogether, about 30 wells were drilled in the area, 18 of which produced some oil at one time or another, and 9 are still producing.

GEOLOGY

The Towsley Canyon area is almost midway between the ends of the Pico anticline, which is a tight fold characterized by near-vertical, vertical, and overturned beds. In this area the anticline is very sharply folded: the south flank dips about 55 degrees and the north flank from 65 to 70 degrees. The tightness of this folding has caused the Modelo shale, exposed in a strip 800 feet wide along the axis of the anticline, to be highly fractured and distorted. The hade of the axial plane, as inferred from the dips of the outcropping beds, should be about 10 degrees towards the south. The Modelo shale exposed at the crest of the fold is of Miocene age (Mohnian) and is equivalent to the shale found between the Fourth and Fifth oil zones of the Newhall-Potrero field, according to Wents' report.

A more detailed description of the structure in the immediate vicinity of Towsley Canyon appears in Bailey's report, here related in part with pertinent changes:

There is a pronounced surface doming along the anticlinal axis and the crests of the double domes (Plate II) are near wells No. "Hammon" 1 and "Guaranty" 2. The plunge of the anticline is strongly northwest in the area of well No. "Hammon" 2 and strongly east at the eastern edge of the Security Bank lease. The structurally highest point is apparently on the east side of Towsley Canyon at well No. "Guaranty" 2, where a triangular fault block has been raised several hundred feet above the rest of the oil field. This has exposed the shallow oil zone above the "D" marker and allowed most of the oil to escape at the surface and form tar or asphalt deposits.

The structural map contoured on electric log marker "D", the base of the shallow oil zone, shows the subsurface structure as well as can be interpreted from available surface and the more reliable subsurface information. It is over-simplified, especially in the neighborhood of well No. "Hammon" 2, where so many sur-

face faults were observed, but probably shows the principal structural features. Although some sharp anticlines like this flatten out into broad crested folds at depth, this one does not appear to do so, at least above 4,000 feet, so that 50- to 90-degree dips are to be expected, even within a few feet of the axis.

The axis of the anticline is cut by at least four good-sized faults, as shown on Plate II. Apparently the most important is the Climax fault which dips 68 degrees to the west or southwest; it is a steep thrust or compression fault, and the west or southwest side has moved up and northeastward. The Climax fault has apparently offset the axis of the anticline so that it appears to have a double axis on the west side of Towsley Canyon. The axis near well No. "G. P.-Towsley" 7 has apparently been cut by this fault and shifted northwest about 600 feet.

Between the surface and the top of the Topanga formation, which is not shown in the literature as containing important oil or gas zones in this part of the Ventura basin, there is 8,500 feet of Modelo shales and sands, the uppermost portion of which is characterized by the interlayering of medium to coarse sandstone or grit and conglomerate. This portion of the Modelo formation is also known as Towsley or Santa Margarita. The alternating coarse and fine sediments that comprise this formation are quite lenticular in many places at the surface and the rapid pinchout of certain members makes it difficult to determine whether or not they were cut off by faults. Paleontologic reports by Goudkoff indicate that the strata down to a depth of 5,000 feet all belong to the upper Mohnian stage of the Miocene.

PRODUCING ZONES

It is not possible to speak of producing zones in this area in the true meaning of the word, at least at shallow depths. The fracturing of the shale has essentially destroyed the cap rock, permitting movement of fluids across bedding planes; faulting has facilitated migration of oil into offsetting sands, which originally might have been barren, and to the surface where it collected as brea deposits. In Bailey's report, certain marker beds were named and correlated by comparing surface outcrops with subsurface lithology and electric logs:

TECHNOLOGY

Both old and new methods were used to drill wells in the Towsley Canyon area. The last cable tool hole was drilled in 1935 and the first rotary hole in 1937. Surface casing and blowout-prevention equipment were used on some of the exploratory wells which were also cored and logged electrically. Some of the old wells had wooden casing, and in one of the more recent wells the casing was not cemented. Some of the difficulties to be overcome in this area were the many natural seepages which seemed almost impossible to stop, and oil would run into the creek and create a fire hazard. Lester stated the problem and gave his solution:

"There are visible on the lease . . . six other wells and two open pits. All of these eight openings, I presume, were at one time wells. Sometimes they will head up and flow. Last fall, one of the old

wells headed up and shot a column of oil 10 to 12 feet in the air. This kept up for about 40 minutes, during which time the well produced, I might say, 150 barrels of oil. Most of this we recovered and shipped from the premises. I have had cement blocks put over the top of the other wells and have inserted a one-inch pipe through the cement block into the casing opening. The other end of these pipes I have led to a tank. These wells shoot some gas, some oil and water intermittently. They are a nuisance on the premises and I wish they did not exist. This is the only method of control that I know of which will prevent the product from these wells from becoming a dangerous fire hazard to the whole property.

"The two pits in question probably also were old wells, and these bubble and produce at intervals. I have had pits dug around them, and when the product has reached a certain height in the pit, it is either drained off into tanks or pumped out by hand so as to leave room for more. I do not think I would characterize these pits as oil wells, although they probably had such a character at one time."

STATISTICS

The yearly amounts of oil, water, and gas produced are shown in Table I. Prior to 1923, sufficient 20- to 30-degree gravity oil was collected from seeps and from some of the old wells to supply the fuel requirements of drilling rigs, but no records exist of amounts produced. Scout reports and estimates indicate that the only production between 1923 and 1934 was about 4,000 barrels from January 1923 to 1927, inclusive, and 5,000 barrels between September 1932 and December 1934, inclusive. The first official report was filed with the State Division of Oil and Gas for the month of January 1934; it shows oil produced, no record of water produced, and contains this statement about gas: "Sufficient gas is produced to supply two houses with the amount necessary for domestic use, as well as fuel for a pumping engine and drilling rig. No gas is going to waste." Some gas is still being used for similar purposes but is not being reported because the amount is negligible. The amount of water produced reflects more the attitude of the various lease foremen than the actual water-cut of the wells.

CONCLUSIONS

Shallow sand stringers and fractured shale drained of their oil through seepage or by wells over a period of many decades would hardly be worth the effort of additional development work, especially on the Towsley lease, but on the Hammon lease these same sands appear to be deeper and there could be accumulations of oil against one of several faults that might have formed a barrier to migration of oil before it reached the fractured zone at the apex of the anticline. Because of the steepness of the dips, such an accumulation would be more likely to be commercial but more difficult to find. On the Towsley lease, it might be worthwhile to deepen some of the old wells to sands at or near the apex, or to drill new wells on the flanks of the anticline in hope of finding a fault trap.

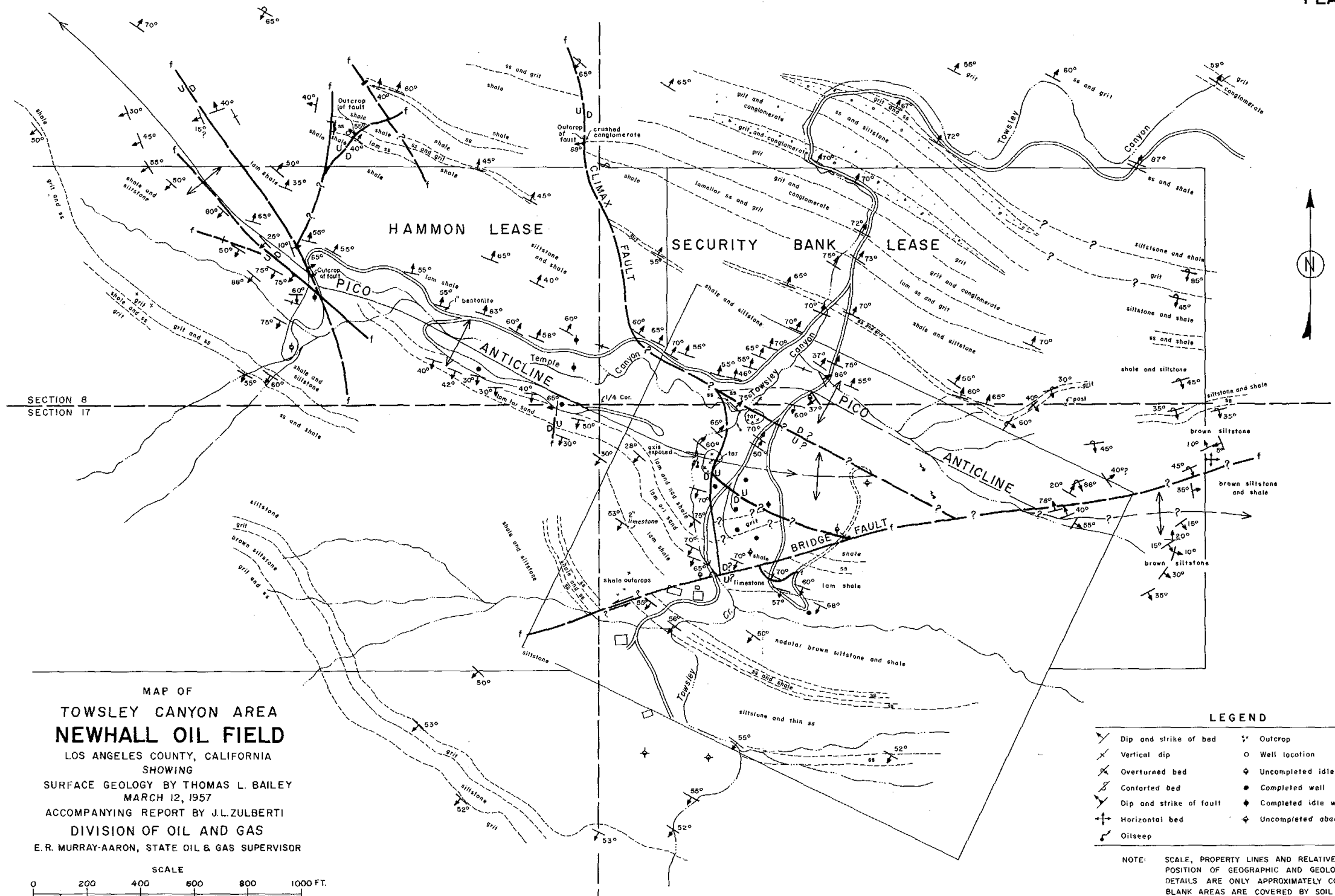
TABLE 1
PRODUCTION STATISTICS—TOWSLEY CANYON AREA, NEWHALL FIELD

Year	Number of producing wells	Oil (bbl.)	Water (bbl.)	Gas (Mcf.)
1893-1922	?	?	?	?
1923-1927	?	4,000	?	?
1928-1931	0	0	0	0
1932-1933	?	1,978	?	?
1934	3	3,022	0	0
1935	5	2,205	3,120	1,382
1936	3	2,566	3,478	980
1937	2	2,160	5,980	385
1938	3	2,707	14,909	0
1939	5	1,985	17,316	0
1940	4	2,313	11,647	0
1941	4	2,207	10,255	0
1942	1	2,777	10,235	0
1943	4	1,685	5,800	0
1944	4	1,970	6,540	0
1945	4	2,320	7,435	0
1946	4	2,950	9,375	0
1947	5	2,235	6,565	0
1948	4	1,910	6,000	0
1949	4	2,440	6,975	0
1950	5	2,480	3,585	0
1951	7	3,244	2,151	0
1952	6	2,522	1,827	0
1953	5	1,824	1,729	0
1954	4	1,867	3,212	0
1955	6	3,349	51,977	0
1956	8	2,065	25,955	0
1957	6	1,763	13,122	0
1958	2	777	4,483	0
1959	2	32	65	0
1960	5	1,373	1,165	0
1961	6	2,734	1,825	0
1962	8	2,341	745	0
1963	6	1,046	5,331	0
1964	8	1,721	7,305	0
1965	10	3,191	12,625	0
Totals		75,759	262,712	2,747

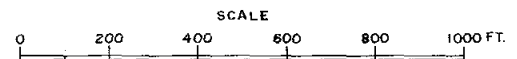
Considering the many oil fields producing from sands in the Modelo formation, it is difficult to rule out the possibility of major accumulations of oil along the axis of the Pico anticline at depths until now unexplored.

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6. Winterer, E. L., and D. L. Durham, Geology of Southeastern Ventura Basin, Los Angeles County, California: U. S. Geol. Survey Prof. Paper 334-H, p. 342 (1962).



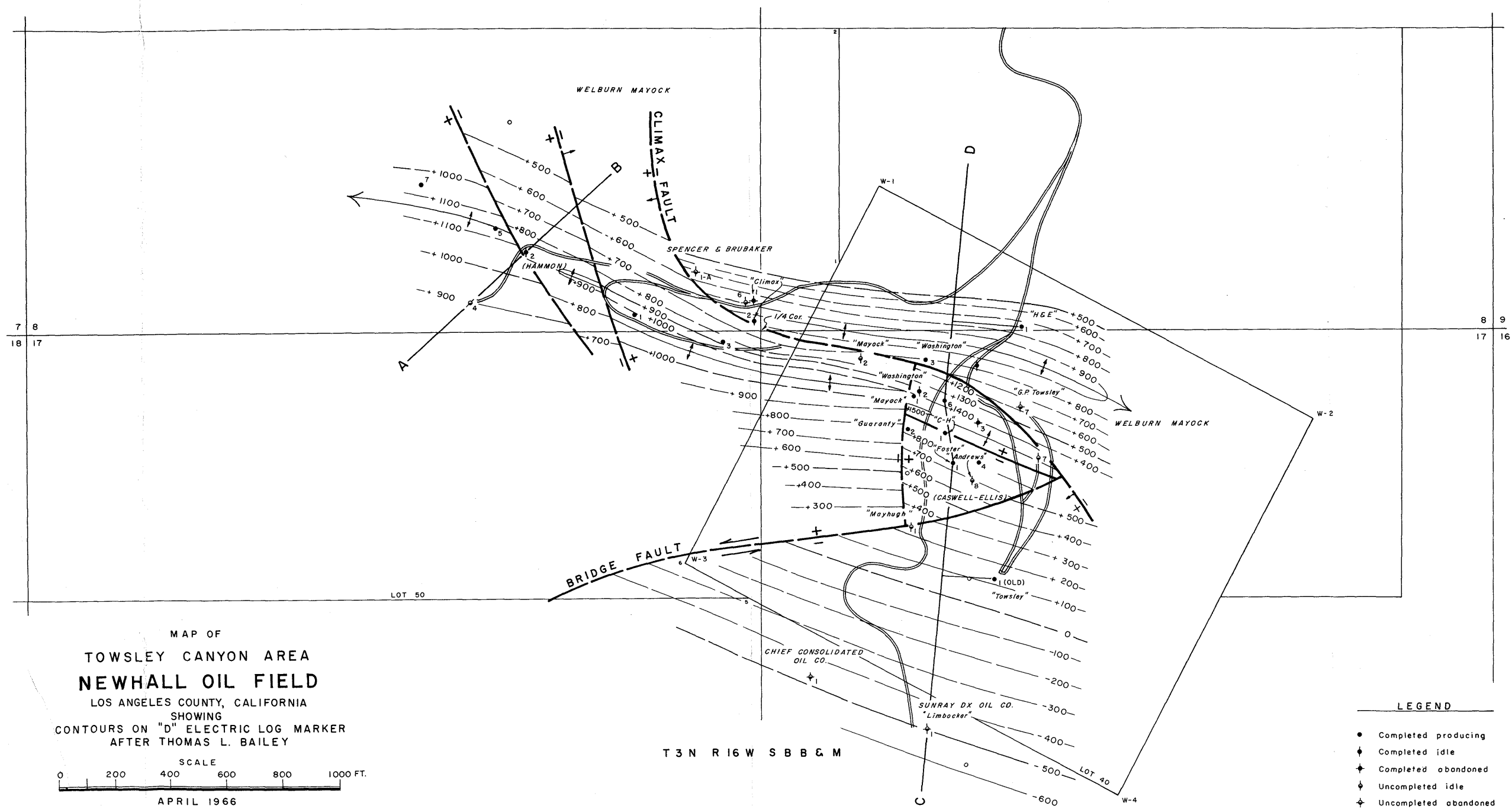
MAP OF
TOWSLEY CANYON AREA
NEWHALL OIL FIELD
 LOS ANGELES COUNTY, CALIFORNIA
 SHOWING
 SURFACE GEOLOGY BY THOMAS L. BAILEY
 MARCH 12, 1957
 ACCOMPANYING REPORT BY J.L.ZULBERTI
 DIVISION OF OIL AND GAS
 E.R. MURRAY-AARON, STATE OIL & GAS SUPERVISOR



APRIL 1966

T 3 N R 16 W S.B.B.&M.

NOTE: SCALE, PROPERTY LINES AND RELATIVE POSITION OF GEOGRAPHIC AND GEOLOGIC DETAILS ARE ONLY APPROXIMATELY CORRECT. BLANK AREAS ARE COVERED BY SOIL AND BRUSH.



MAP OF
TOWSLEY CANYON AREA
NEWHALL OIL FIELD
LOS ANGELES COUNTY, CALIFORNIA
SHOWING
CONTOURS ON "D" ELECTRIC LOG MARKER
AFTER THOMAS L. BAILEY

SCALE
0 200 400 600 800 1000 FT.
APRIL 1966

CONTOUR INTERVAL: 100 FT.
DATUM: SEA LEVEL

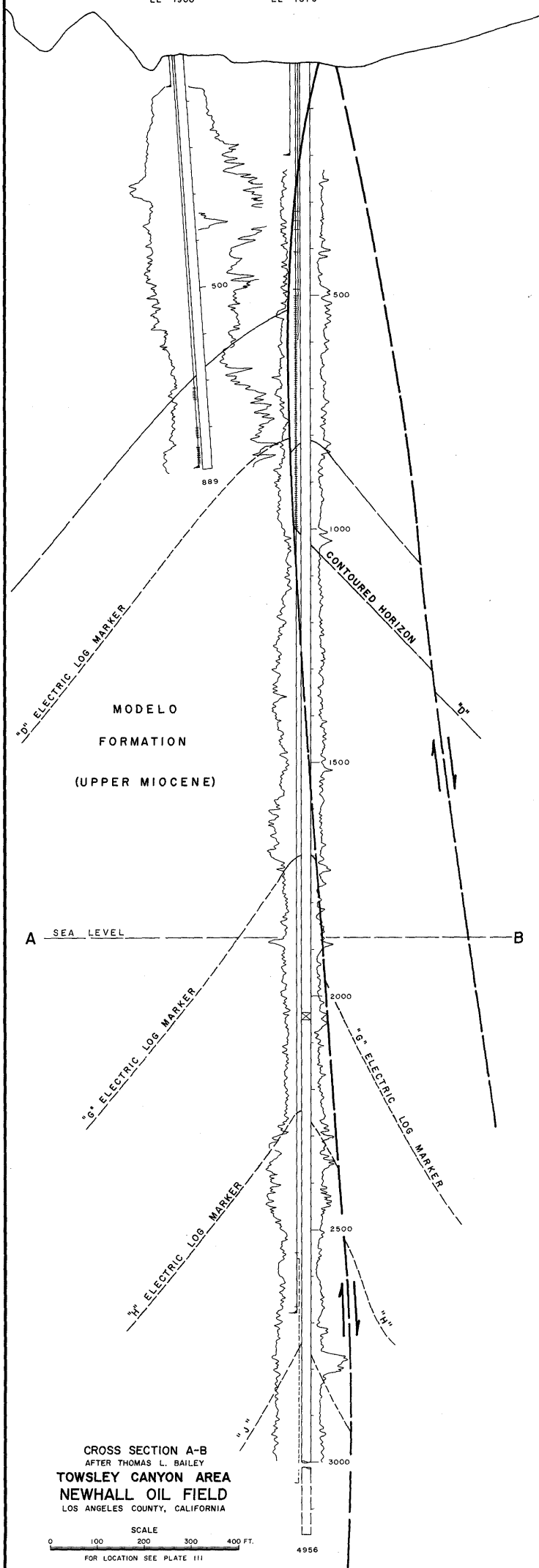
T 3 N R 16 W S B B & M

- LEGEND
- Completed producing
 - ◊ Completed idle
 - ⊕ Completed abandoned
 - ◊ Uncompleted idle
 - ⊕ Uncompleted abandoned
 - ⊗ Wastewater disposal
 - Well location

"HAMMON"

NO. 4
EL 1900

NO. 2
EL 1875



CROSS SECTION A-B
 AFTER THOMAS L. BAILEY
 TOWSLEY CANYON AREA
 NEWHALL OIL FIELD
 LOS ANGELES COUNTY, CALIFORNIA

SCALE
 0 100 200 300 400 FT.
 FOR LOCATION SEE PLATE III
 APRIL 1966

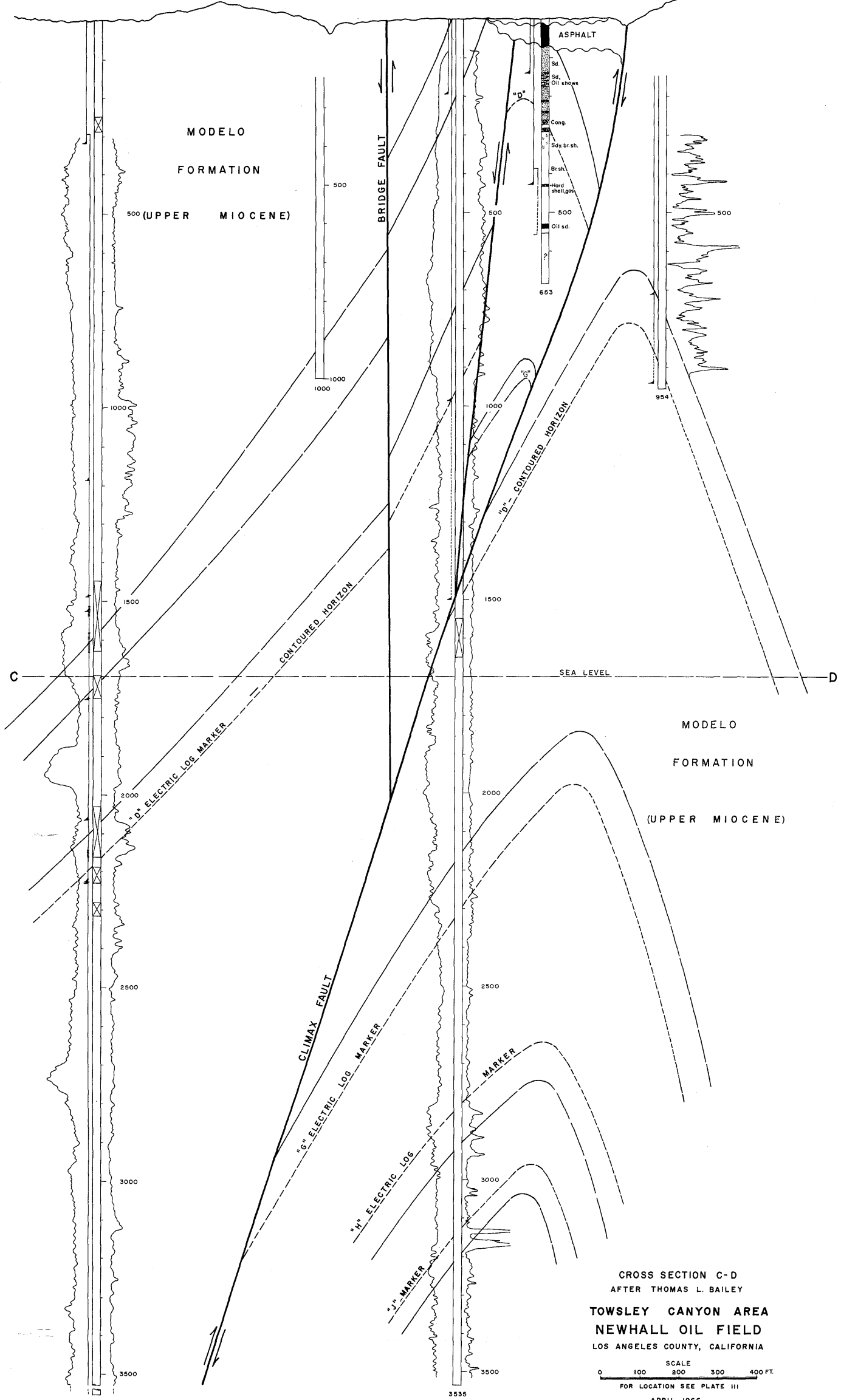
SUNRAY DX OIL CO
"LIMBOCKER" 1
EL 1692

WELBURN MAYOCK
"TOWSLEY" 1 (OLD)
EL 1770

WELBURN MAYOCK
"FOSTER" 1
EL 1700

WELBURN MAYOCK
"CASWELL-ELLIS" 6
EL 1700

WELBURN MAYOCK
"H. E. E." 1
EL 1700



CROSS SECTION C-D
AFTER THOMAS L. BAILEY
TOWSLEY CANYON AREA
NEWHALL OIL FIELD
LOS ANGELES COUNTY, CALIFORNIA
SCALE 1" = 100 FT.
FOR LOCATION SEE PLATE III
APRIL 1966