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PLACERITA OIL FIELD

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Acknowledgment

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History and Development

The Placerita oil field, situated in Township 4 N, Range 15 W, S B B & M , about two miles east of the town of Newhall in Los Angeles County, California, is the most important of a series of fields in Pliocene sediments grouped around the west end of the San Gabriel Mountains, the first of which was found in 1889

The Placerita Canyon area was discovered in 1920¹, the first well being the Equity Oil Co well No 'Daisy 1 This well is still producing and is now known as Guiberson Oil Co No York 1 It found 14^o gravity oil between 1,228 and 1,394 feet and had an initial production of six barrels per day Four producers were completed in this vicinity and produced a small amount of heavy crude for many years before there was any further development

The field was rediscovered in the Nelson-Phillips Oil Co well No Kraft' 1, which was completed on April 20, 1948, between 585 and 718 feet, flowing 70 barrels per day of 16 4^o gravity oil

After this, the area along the canyon was developed without incident until the drilling of the outpost well on the hill three-quarters of a mile to the north which discovered a higher gravity pool This was the Somavia and Yant well No 'Juanita" 1, which came in from an interval between 1737 and 1831 feet, flowing 340 barrels per day of 22 8^o gravity oil on February 28, 1949

On May 18, 1949, Rothschild Oil Co completed it well No "Raasp' 1, close to the Somavia well and started the practice of unrestricted production This well was credited with an initial of 400 barrels per day but is thought to have been much larger than this and subsequent wells, taking progressively greater sand intervals, came in for much greater initials The highest reported rate was 3120 barrels per day in Rothschild Oil Co 's Guilford' Community 1, completed on August 1, 1949

¹Report of Calif State Oil and Gas Supervisor, Vol 20, No 2, p 48, 1934

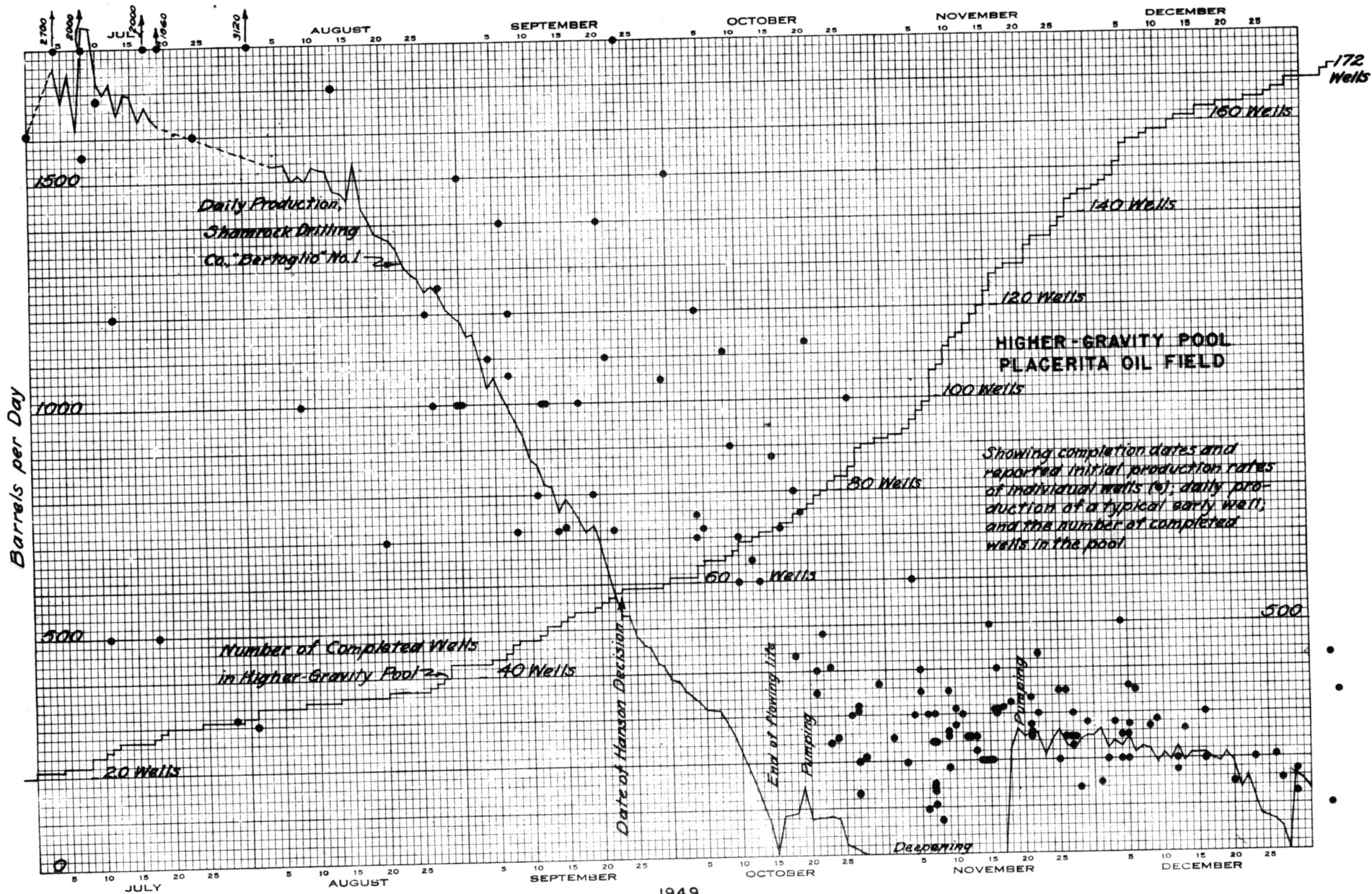
The next significant event in the history of the field was the court decision, rendered by Judge Clarence M Hanson in the California Superior Court, which declared the State's spacing act unconstitutional and opened 80 acres of highly subdivided land in the higher gravity pool for unrestricted drilling

There are now 266 producing wells in the Placerita field, of which 87 are south of the center of Section 31, with only five producing higher gravity oil (19° or better) and 179 north of the center line, of which only seven produce oil of 12° to 18° gravity

Wells in the south part of the field are completed at rates varying from 50 to 300 barrels per day and aside from mechanical difficulties, these wells, mostly properly spaced, have shown very flat declines and promise a high ultimate yield. Due to the production practice and intensive drilling in the higher gravity area to the north, wells in that part of the field have shown very rapid declines in spite of their high initial rates and it appears likely that this part of the field will be depleted very rapidly. It is already past the flowing stage and some wells actually show signs of almost complete exhaustion of the reserves tributary to them. The accompanying production chart graphically illustrates the history of this area. The 172 wells are those on and immediately adjacent to the subdivided 80-acre tract. They except the General Petroleum Co Orwig wells and the Gordon Oil Co No 'Wickham-Ferrier' 6, which are in a lower gravity block

The daily production curve of the Shamrock Drilling Company's well shows that by the middle of August gas was breaking out of the oil in the vicinity of this well to such an extent that the decline was accentuated, even though the intensive drilling did not start for another month. This was due to the unrestricted production of this and the surrounding wells. The curve of this well also shows a rather rapid decline during November and December when it was put on the pump after deepening. Projection of this curve shows that by far the greater part of the well's potential ultimate yield was produced by the end of September.

The dots showing dates of completion and initial production rates indicate that good wells could be obtained, with initials up to 1000 barrels per day, until the end of October though the better wells were mostly those on the margins of the highly developed area. After October few completions reached 500 barrels per day and the average dropped rapidly until by the end of December initials of more than 200 barrels per day were exceptional, even though most wells were taking in the full 400 feet of productive section.



1949

The following table gives the best available figures for the production of the Placerita field since the drilling of the Kraft' No 1 well. The accuracy of these figures is subject to some question, due to the way in which the field was produced and the oil marketed. It may be noted that in the higher gravity pool, the average rate reached the extraordinary figure of 522 barrels per day per well in August in spite of the fact that between one-third and one half of the wells were restricted for lack of an outlet. The rapid decline of this area can be seen by the drop from this figure to an average of 155 barrels per day per well estimated for December, with all wells producing to capacity.

Placerita Oil Field Production

South of Center Line - Lower Gravity Oil

	Number of wells	Monthly total barrels	Barrels per day	Barrels per day per well
1948				
April	1	400	40	40
May	1	1400	45	45
June	3	3300	110	37
July	6	4600	149	25
Aug	8	5400	174	22
Sept	13	7700	257	20
Oct	17	9700	313	18
Nov	21	12,700	423	20
Dec	22	16,800	542	25
1949				
Jan	28	25,000	807	29
Feb	35	<u>28,000</u>	1000	29
		115,000	Field total to this date	
March	41	40,300	1300	32
April	47	46,100	1537	33
May	53	54,500	1755	33
June	60	44,900	1497	25
July	63	59,700	1923	31
Aug	70	77,500	2500	36
Sept	72	69,500	2317	32
Oct	72	61,500	1984	28
Nov	75	65,800	2193	29
Dec		62,000	2000	
Jan 3, '50		<u>estimated</u>	2000	
Total		696,800		

North of Center Line - Higher Gravity Oil

Field Total						
	Number of wells	Monthly total barrels	Barrels per day	Barrels per day per well*	Monthly total	Barrels per day
1949					(115,000 forward)	
March	1	8100	261	270	48,400	1561
April	3	26,600	887	436	72,700	2424
May	10	60,700	1960	361	115,200	2116
June	20	195,700	6523	447	240,600	8020
July	32	519,900	16,750	432	579,600	18,673
Aug	43	556,700	17,950	410	634,200	20,450
Sept	61	868,400	28,950	522	937,900	31,267
Oct	91	773,500	24,900	311	835,000	26,884
Nov	145	766,800	25,560	188	832,600	27,753
Dec	169	797,000	25,700	155	859,000	27,700
Jan 3, 1950	172	<u>estimated</u>	24,840	145	<u> </u>	26,840
Total		4,573,400			5,270,200	

*Adjusted for completion dates

Technology

Wells in the Placerita field vary in depth from 600 to 2300 feet. As a consequence of the shallow depth all have been drilled with light portable rigs. Most of them have been completed with combination strings of 7 or 8-5/8 casing, using 80 to 100 mesh perforations in the higher gravity area and 120 to 200 mesh in the heavy oil area. Considerable difficulty has been encountered in the latter with plugging of perforations in the smaller mesh and sand trouble in the larger mesh, and also with gas locking of pumps due to the high viscosity of the oil which generates a foam around the pump barrel. Light but long stroke hydraulic pumping units are becoming increasingly popular. Various practices have been used to overcome plugging and sand trouble, including gas and string shots and blowing of the wells with compressed air.

There has been comparatively little sand trouble in the higher gravity area except on wells where the production interval has been unduly disturbed, but once started it is difficult to overcome.

The field is now served by one pipeline, that of the General Petroleum Company. A large proportion of the oil has been and still is moved by tank truck.

No commercial outlet has been obtained for the gas in the field. The volume was insignificant during the early stages but increased during the latter part of the flowing life of the higher gravity area. It is believed to be declining rather rapidly at present, but no reliable figures are available to the writer.

Geology

Structure The Placerita field is a fault trap on a monocline. The beds throughout the field dip rather uniformly about west-northwest at an average rate of from 20° to 25°. The field is bounded on the north by the great San Gabriel fault, one of the major rifts of Southern California, which brings Mint Canyon beds of middle Miocene age on the northeast against the productive Pliocene and Pleistocene series on the southwest. The easterly closure of the field is made by a small fault, designated the Swall-Ferrier fault. This has a throw of about 150 feet at its southerly end. The throw dies out to the north. The outcrop of the fault plane, exposed in road cuts around the Doc wells, shows from two to six inches of blue gouge or clay which has apparently been adequate to form an effective seal and trap millions of barrels of oil.

The southern boundary of production has not been defined. It is almost certainly formed by faulting, but its location and its direction have not been determined.

In addition to the closing faults there are at least two minor faults which divide the field into pools from which oils of different gravity are produced. The so-called Orwig fault separates the higher gravity pool from a narrow strip which yields 13° to 16° gravity oil. This in turn is separated by the Placerita fault from the area to the west which produces 12° gravity oil. Other minor faults are known to be present in the vicinity of the Doc' wells but the details thereof have not been worked out. The Orwig fault was located on the outcrop after its presence was suspected due to gravity differences, but no recognizable displacement can be found either in the well logs or the structure contours along it. The Placerita fault is not exposed, but it can be recognized in three wells, each showing a throw of about 40 feet.

Stratigraphy Surface beds in the Placerita oil field are of Saugus (Pleistocene) age. They consist of coarse sand and conglomerate of continental origin with some interbedded siltstone and shale.

The oil producing formations, known as the Kraft and upper Kraft zones, underlie the Saugus and have the same characteristics, though the percentage of actual coarse conglomerate is somewhat less. These zones have a total thickness of about 900 feet though not all of this is productive in all parts of the field. The age of the Kraft zone is not known but it is thought to be Pico (upper Pliocene) because the interbedded silts are similar to those below which carry an identifiable fauna.

Under the Kraft zone is a series of siltstones of Pico age varying in thickness from 200 to several hundred feet. Below this the following wells have reached the formations indicated. No standard section can be established for these older formations and their structural relationships are not known. None indicate the presence of deeper productive zones.

Terminal-McBurney, Terminal Drilling Co., Thompson
No 1 No Pico, all conglomerate to Eocene shale
at 3760'

Hardesty et al, Reno No 1 Eocene shale between
2220' and 2740'

Nelson-Phillips Oil Co., Kraft No 1 No Pico silt,
Eocene shale at 815', strongly faulted

King Oil and Gas Co., Peggy Moore No 7 Hard con-
glomerate at 1550'

Rae Oil Co., Doc No 1 Hard conglomerate

San Gabriel Oil Co , 'San Gabriel No 2 Granite

William Y Lee, Heil" No 1 Granite

Bevo Drilling Co , 'Carter-Earl' No 4 Granite

Productive Zones The accompanying chart of electric logs of typical wells shows the thickness of productive sands and the parts of the section which produce in each locality in the field. The Kraft zone on the lease of that name consists of about 150 feet of nearly solid sand just under a 20-foot shale with a few stringers of saturated sand above it. Northward the upper stringers become barren, while the saturated interval below the Kraft shale thickens to 400 feet. To the southwest, however, stringers above the Kraft shale thicken and merge, and commercial saturation extends progressively higher in the section until it reaches the base of the upper Kraft shale. Streaks of siltstone appear in the lower part of the productive section. Careful correlation in the extreme southwest area indicates that the supposed lower zone in the Guiberson Oil Co well No Shepard 1 is stratigraphically equivalent to the lower part of the original Kraft interval.

A characteristic of the southern part of the field is the presence above the productive section of considerable thicknesses of oil saturated sand which yield only fresh water. These have almost the same appearance in cores as the productive sands and often show considerable resistivity on the electric log but they apparently have been flooded either by exposure to the outcrop or through the old wells in the Elsmere and Whitney Canyon areas.

Reserves

The Placerita field includes a total of approximately 560 acres. The effective thickness of productive sand ranges from 150 to 320 feet.

Saturation of the oil sand is extremely high. This is indicated by the exceptional resistivity shown on electric logs which varies from 80 to 800 ohms. Logs are run on a 400 ohm scale to differentiate these sands and show the full resistance.

Original pressures throughout the field apparently approximated closely the normal hydrostatic head. In the two more northeasterly blocks, however, it has been fairly well determined that there is no effective water drive. Such a drive may exist throughout the low gravity area, as high head waters have been encountered at its western margin but depletion of this area has not advanced far enough to determine the nature of the drive.

Taking the foregoing factors into consideration, it is estimated that the field had an original reserve of approximately 45,000,000 barrels of recoverable oil, of which some 5,000,000 barrels have been produced, leaving an effective reserve of 40,000,000 barrels. The north pool will probably yield another 5,000,000 barrels in 1950, but the balance of the reserve, mostly heavy oil, will probably be recovered gradually over a period of 20 to 30 years.

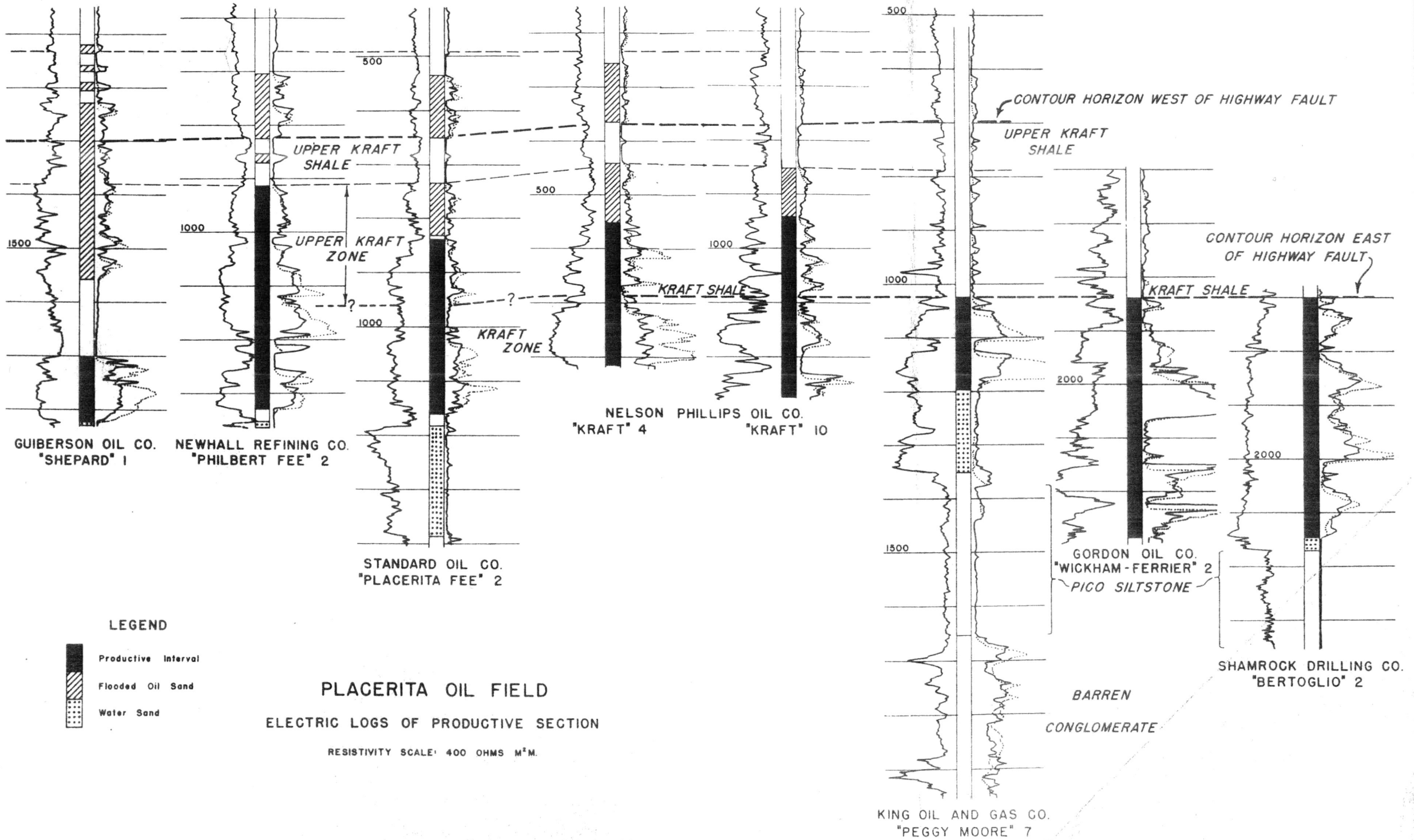
EXTREME S.W.

SOUTHWEST




KRAFT

KING

HIGHER-GRAVITY POOL



LEGEND

-  Productive Interval
-  Flooded Oil Sand
-  Water Sand

PLACERITA OIL FIELD

ELECTRIC LOGS OF PRODUCTIVE SECTION

RESISTIVITY SCALE: 400 OHMS M²M.

(PLACERITA)

INDEPENDENT EXPLORATION
(NEWHALL ROYAL COMM.)

GORDON OIL COMPANY

(WICKHAM-FERRIER)

GORDON OIL COMPANY
(PEGGY MOORE)

MAP OF
NORTH TOWNLOT AREA
OF THE
PLACERITA OIL FIELD

N 1/2 NE 1/4 SEC. 31-4N.-15W.

SCALE: 1"=200'

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