The American Association of Petroleum Geologists Bulletin
V. 60, No. 8 (August 1976), P. 1196-1203, 5 Figs., 5 Tables

Developments in West Coast Area in 1975[1]

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Abstract West Coast exploration continued without change of pace in 1975. Three unsuccessful wells were drilled in Washington, and 4 in Oregon. The number of California exploratory wells drilled to find oil decreased somewhat with most of the reduction in new-field wildcats. Development of steam at the Geysers continued; generating capacity now exceeds 500,000 kw.

Introduction

West Coast exploration and development activity for 1975 is summarized in this report. It covers the states of Washington, Oregon, and California. Exploratory and development drilling data were provided by the West Coast CSD Committee and were compiled by the American Petroleum Institute Division of Statistics and Economics. Oil and condensate production information was provided by the Committee of California Oil Producers. Dry gas production was furnished by the State of California Division of Oil and Gas. Data on geophysical activity were obtained from the Society of Exploration Geophysicists.

Tabulation of the 1975 geophysical report has not been completed, but the totals are not expected to change more than 5% from the final figures which will be published in the Geophysical Activity report of the SEG. Oil and gas reserve estimates were provided by API and the American Gas Association.

Washington

Three exploratory wells were drilled in the state during 1975 (Fig. 1). El Paso Products Co. drilled 2 wells; 1 in Grays Harbor County and 1 in Jefferson County. Both of these wells were exploring for gas. The Jefferson County well tested gas at a subcommercial rate before it was plugged and abandoned. No shows were reported in the Grays Harbor well. The third well was drilled in Grays Harbor County by Northwest Exploration Co.; it too was unsuccessful.

Shell Oil Co. was reported to have leased a large block of acreage near Vantage in eastern Washington (Fig. 1). One month of seismic work was conducted in this area. Columbia River basalts cover much of the area. Little is known about the sediments which underlie the basalts.

Oregon

Reichhold Energy Corp. drilled 4 exploratory wells in western Oregon searching for gas (Fig. 1). No information has been released on these wells, although all of them were plugged and abandoned. It was reported that several followup wells may be drilled in 1976. One month of marine seismic work was reported for the state.

California

Fewer exploratory wells were drilled in 1975. A total of 205 wells of all classes was completed as compared to 231 in 1974. The number of new-field wildcats again declined, 64 versus 83, as did the number of extensions, 54 versus 65. Exploratory drilling statistics are listed in Table 1.

Discoveries

A total of 51 successful exploratory wells is listed by CSD. Of this total, only 3, 1 gas and 2 oil discoveries, can be considered significant. These wells are listed in Tables 2 and 3 and indicated by number on the California maps (Figs. 2, 3).

Onshore the Tenneco-Standard Tenneco 22X (No. 1) made a deep Miocene oil discovery at the Rio Viejo field. Two followup wells were drilling at year end. Occidental Morrissey 2-1 (No. 2) discovered gas in 2 Cretaceous sandstones at the Stoney Creek field.

Offshore Standard drilled a successful extension well OCS P-0217-1 in the Santa Clara unit (No. 3). A second well was drilling on OCS lease P-0217 at year end. Additional delineation wells will be required before an operating plan for the Santa Clara unit can be filed.

Exploratory Methods

Onshore seismic activity declined slightly, from 121.6 crew-months in 1975 to 119 crew-months. Most of this activity was concentrated in the Sacramento and northern San Joaquin Valleys. Offshore 45 crew-months of seismic work were reported. This work was concentrated in the Outer Basins area south of the Channel Islands (Fig. 2).

An industry-sponsored core hole was drilled to TD of 10,920 ft in the Outer Basins area (No. 4) prior to OCS lease sale 35 which was held December 11, 1975.

[1]Manuscript received and accepted, April 15, 1976.

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American Petrofina drilled a 21,164-ft core hole near Watts in the Los Angeles basin (No. 5). This is the deepest test drilled in the basin to date. The well flared gas on tests, but details of the testing program have not been released.

A new California depth record was set by the Tenneco Superior Sandhills 64 X (No. 6) which reached 22,711 ft. Deep tests at West Coyote (No. 7) by Standard and at Montebello (No. 8) by Argo Petroleum Co. were unsuccessful.

Phillips Petroleum Co. abandoned an 18,438-ft deeper pool test on federal lease OCS P-0166 in the Santa Barbara Channel (No. 9).

It appears that the deep drilling campaign undertaken by industry in the past 2 years so far has been unsuccessful. Although some deep tests have had shows of oil and gas, no commercial completions have been reported.

Developments

Development drilling increased again in 1975; there were 1,854 successful completions as compared to 1,715 in 1974 (Table 4). Most of these wells were shallow and were drilled as a result of steam projects in the San Joaquin, Salinas, and Santa Maria Valleys.

The Exxon deep-water platform is under construction and will be installed at the Hondo discovery at the Santa Ynez unit this year. Exxon was successful in obtaining all of the required permits to bring Hondo production onshore for treatment and transshipment. However, the State Coastal Zone Commission overruled the local Coastal Zone Commission and offered only a 5-year permit to bring oil and gas ashore. Within the 5-year period Exxon would have to sponsor construction of a pipeline to move Hondo and other production developed in the Santa Barbara Channel area to the Los Angeles basin or face suspension of operations. Unless Exxon is successful in having the State Commission's temporary permit overruled, an offshore treating and loading facility will have to be constructed at Hondo.

Additions to Reserves

Estimated reserves of 412.5 million bbl were added in California during the year. Of this total, extensions and revisions comprised 410 million bbl, as a result mainly of increased recovery from steam projects. New-field and new-pool additions to reserves totaled 2.6 million bbl, the smallest increase since 1971. California production is listed in Table 5. Annual production and additions to crude oil reserves for the period 1960-1975 are shown in Figure 4.

Natural gas reserves, dry gas, and residual gas, at year end 1975 were estimated to be 5,484 Bcf, an increase of 289 Bcf over 1975. This increase was due primarily to new discoveries and extensions in the Sacramento Valley. Natural gas liquids reserves were 107.5 million bbl, an increase of 3.9 million bbl from the previous year.

Trends

Exploratory activity continued at about the same pace in the Sacramento Valley. The total number of gas discoveries increased slightly from 12 in 1974 to 15 in 1975.

The total number of exploratory wells drilled for oil dropped from 144 to 116. Most of the reduction was in new-field wildcats (Table 1). Exploration in onshore California has reached a mature state; there are fewer opportunities for new-field wildcats. General tightening of money supply and uncertainty of government tax rulings affecting the oil industry are also in part the reason for a decrease in exploratory drilling.

Industry acquired 70 tracts of 231 offered for sale at Los Angeles December 11, 1975. Most of these tracts were in the Tanner Cortez Banks area off southern California. Several of the high bidders already have filed for exploratory drilling permits on the leases. Drilling is expected to begin in the third quarter 1976.

Geothermal

Exploratory drilling in the Imperial Valley at Brawley and Heber (GP-2, Fig. 1) by Union and Chevron Oil attempted to find commercial hot water or steam deposits. No information from these wells has been released.

At the Geysers (GP-1, Fig. 1) successful extensions were drilled by Burmah, Pacific Energy, Shell, and Union. Generating capacity at the Geysers now exceeds 500,000 kw. At year end permits to construct another 110,000-kw unit finally were issued.

Table 1. Summary of Exploratory Well Completions by All Operators in California in 1975* Reported by CSD

	Number of Wells Completed			Exploratory Footage			Avg. Exploratory Footage	
	All Wells	Success. Wells	% Success	Total for All Wells	Success. Footage	% Success	All Wells	Success. Ft./ Success. Well
New-Field Wildcats								
Drilled primarily to find oil	33	1	3.0	224,725	16,520	7.4	6,810	16,520
Drilled primarily to find gas	31	1	3.2	205,385	5,713	2.8	6,625	5,713
Total	64	2	3.1	430,110	22,233	5.2	6,720	11,116
New-Pool Wildcats								
Drilled primarily to find oil	38	15	39.5	167,811	82,873	49.4	4,416	5,525
Drilled primarily to find gas	36	6	16.7	206,705	32,623	15.8	5,742	5,437
Total	74	21	28.4	374,516	115,496	30.8	5,061	5,500
Deeper-Pool Tests								
Drilled primarily to find oil	6	0	0	63,600	0	0	10,600	0
Drilled primarily to find gas	2	1	50.0	14,642	9,834	67.2	7,321	9,834
Total	8	1	12.5	78,242	9,834	12.6	9,780	9,834
Shallower Pool Tests								
Drilled primarily to find oil	2	2	100.0	5,300	5,300	100.0	2,650	2,650
Drilled primarily to find gas	3	3	100.0	10,050	10,050	100.0	3,330	3,330
Total	5	5	100.0	15,350	15,350	100.0	3,070	3,070
Outposts								
Drilled primarily to find oil	37	18	48.7	149,538	71,688	47.9	4,042	3,983
Drilled primarily to find gas	17	4	23.5	103,774	25,833	24.9	6,014	6,458
Total	54	22	40.7	253,312	97,521	38.5	4,691	4,433
All Exploratory Wells								
Drilled primarily to find oil	116	36	31.0	610,974	176,381	28.9	5,267	4,899
Drilled primarily to find gas	89	15	16.9	540,556	84,053	15.6	6,074	5,604
Total	205	51	24.9	1,151,530	260,434	22.6	5,617	5,107

* Redrills counted as separate wells.

Table 2. Significant California Oil Discoveries for 1975 (Reported by CSD)

Map No.	Operator Well Name	County Location	Comp. Date	Total Depth (Feet)	Prod. Depth (Feet)	B/D	API G°	Res. Est. AAPG Class.	Age Prod. Fm.	Name of Field or Pool	AAPG Class.
1	Tenneco-Standard Tenneco 22X	Kern Sec. 34, T12N, R21W	10-27-75	16,520	14,100	550	30	D	Miocene	Rio Viejo	NFW
3	Standard OCS-P0217-1	Offshore Ventura	4-5-75	9,990	-	1,329	32	-	Miocene	Unnamed	Ext.

Table 3. Significant California Gas Discoveries for 1975 (Reported by CSD)

Map No.	Operator Well Name	County Location	Comp. Date	Total Depth (Feet)	Prod. Depth (Feet)	MCFGD	Res. Est. AAPG Class.	Age Prod. Fm.	Name of Field or Pool	AAPG Class.
2	Occidental Morrissey 1-12	Glenn Sec. 12, T22N, R3W	5-3-75	5,713	U-3,108 L-3,232	4,825 4,335	E	Cretaceous	Stoney Creek	NFW

Table 4. Completion Summary in California, 1975

	Oil	Gas	Dry	Total	% Success
Exploratory Wells	36	17	152	205	25.9
Development Wells*	1,818	29	152	1,999	92.4
Total	1,854	46	304	2,204	86.2

* Excludes 395 Service Wells.

Table 5. Production in California 1974-1975

	1974	1975	Cum. to 12/31/75
Oil (bbl)	322,500,000	322,000,000	17,075,179,900
Condensate (bbl)	300,300	274,600	41,895,800
Total liquids (bbl)	322,800,300	322,274,600	17,117,075,700
Gas (MCF)*	374,000,000	358,000,000	7,689,000,000

* Includes state tidelands.

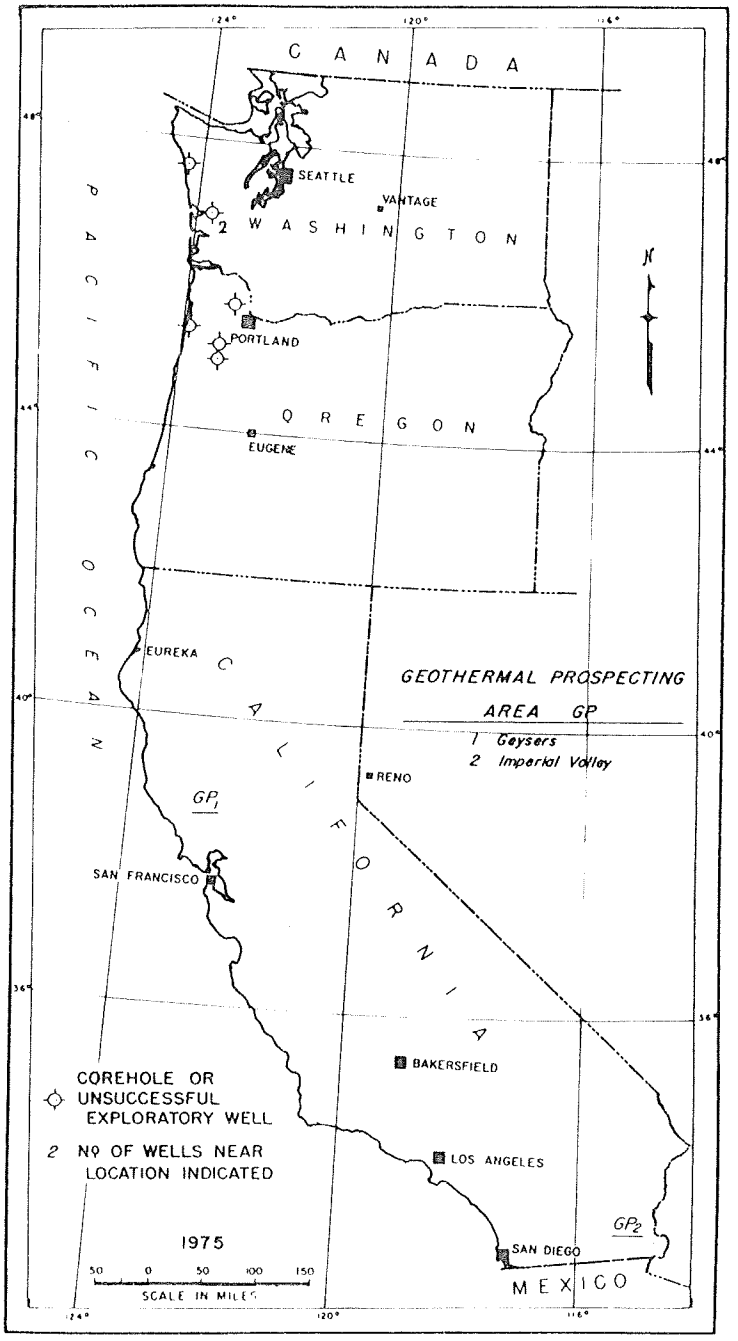

CANADA
SEATTLE
VANTAGE
2
WASHINGTON
PORTLAND
OREGON
EUGENE
EUREKA
PACIFIC OCEAN
CALIFORNIA
GEOTHERMAL PROSPECTING
AREA GP
1 Geysers
2 Imperial Valley
RENO
GP1
SAN FRANCISCO
BAKERSFIELD
LOS ANGELES
GP2
SAN DIEGO
MEXICO
COREHOLE OR
UNSUCCESSFUL
EXPLORATORY WELL
2 NO OF WELLS NEAR
LOCATION INDICATED
1975
50 0 50 100 150
SCALE IN MILES
124°
120°
116°
48°
44°
40°
36°

FIG. 1.

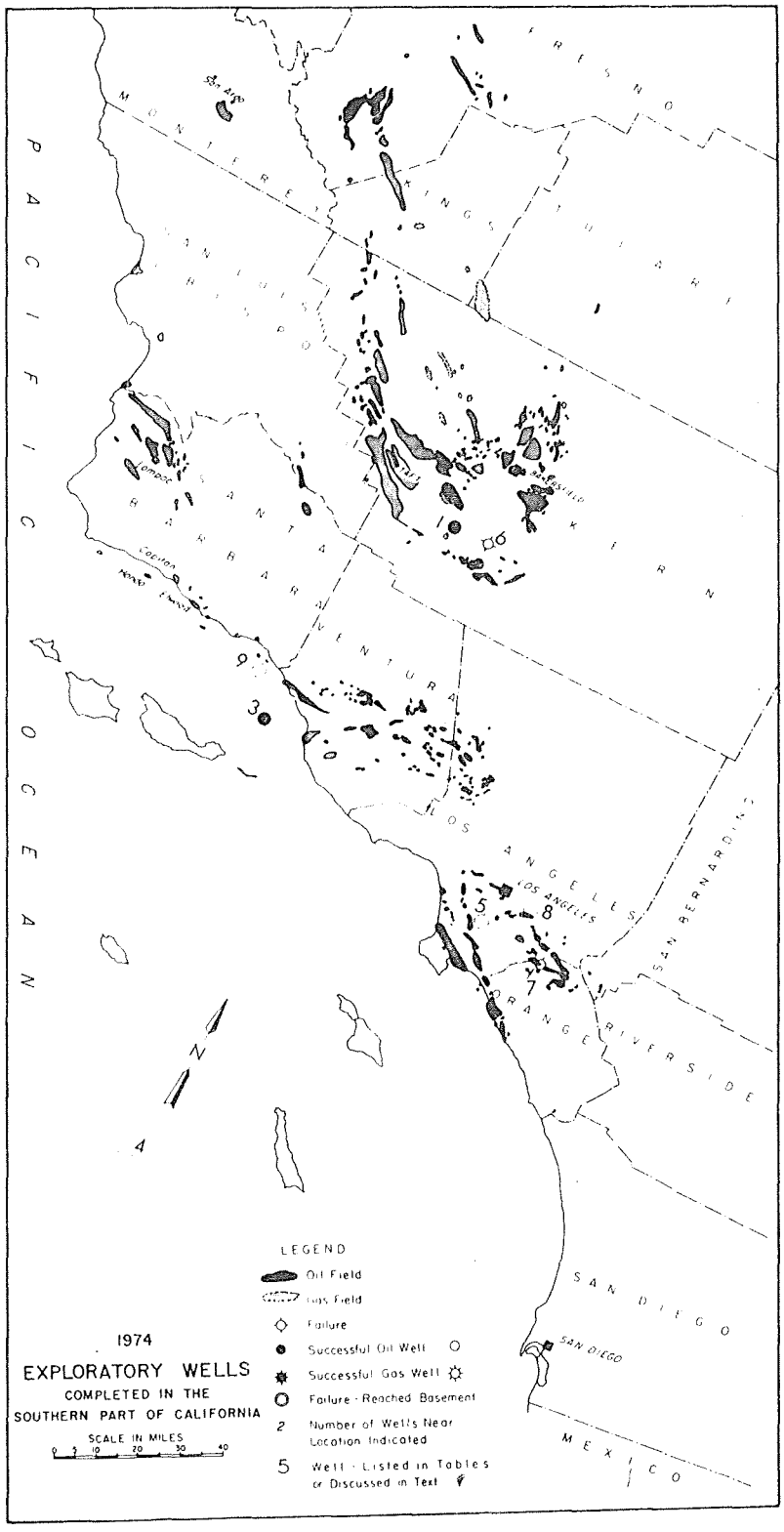

PACIFIC OCEAN
MONTEREY
FRESNO
KINGS
TULARE
SAN LUIS OBISPO
SANTA BARBARA
KERN
VENTURA
LOS ANGELES
SAN BERNARDINO
ORANGE
RIVERSIDE
SAN DIEGO
MEXICO
Santa Ana
Lompoc
Casmalia
Point Conception
Santa Cruz Island
Santa Rosa Island
San Clemente Island
Catalina Island
Los Angeles
San Diego
1974
EXPLORATORY WELLS
COMPLETED IN THE
SOUTHERN PART OF CALIFORNIA
SCALE IN MILES
0 5 10 20 30 40
LEGEND
Oil Field
Gas Field
Failure
Successful Oil Well
Successful Gas Well
Failure - Reached Basement
2 Number of Wells Near Location Indicated
5 Well - Listed in Tables or Discussed in Text

FIG. 2

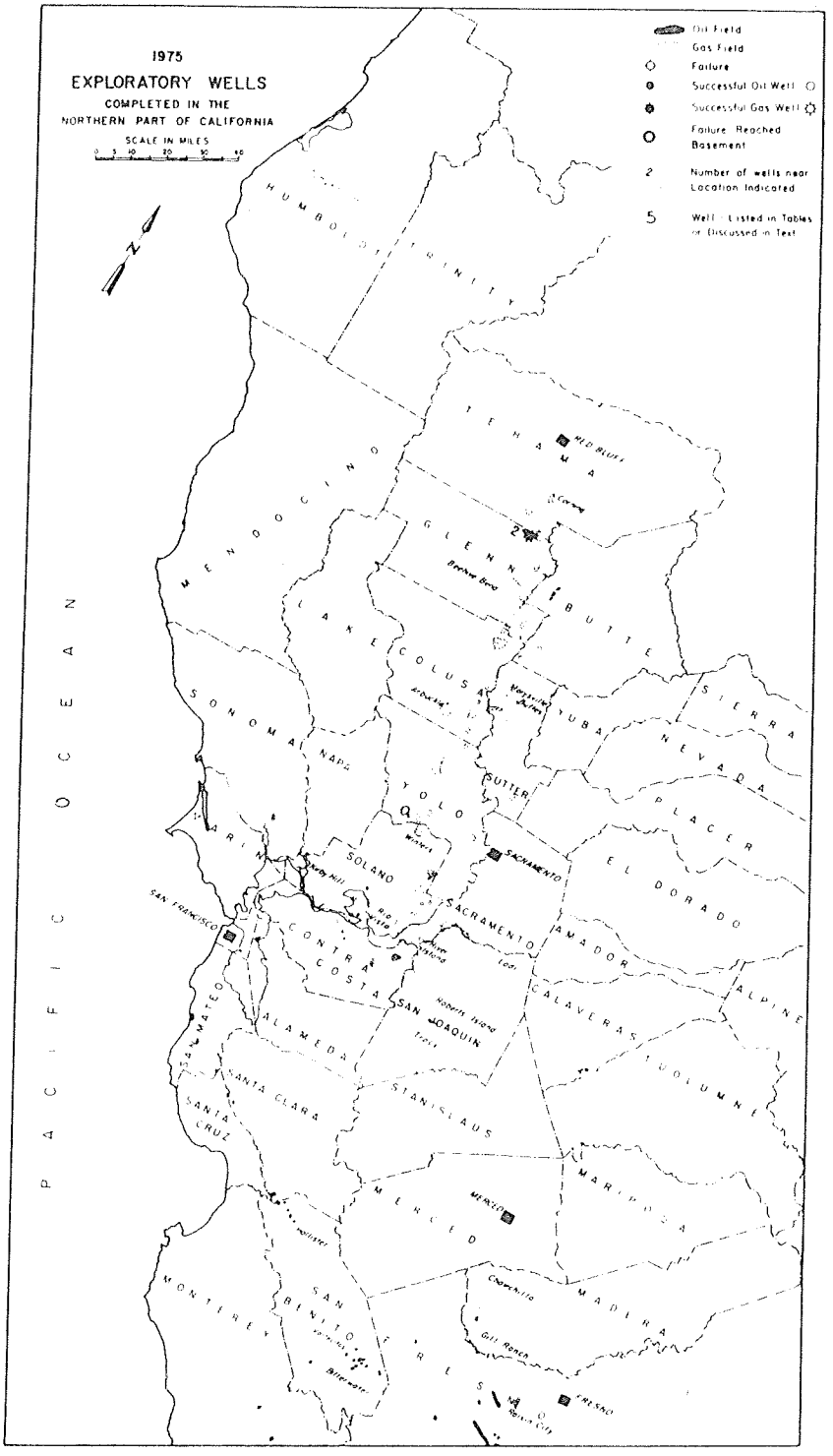

1975
EXPLORATORY WELLS
COMPLETED IN THE
NORTHERN PART OF CALIFORNIA
SCALE IN MILES
Oil Field
Gas Field
Failure
Successful Oil Well
Successful Gas Well
Failure Reached Basement
2 Number of wells near Location Indicated
5 Well Listed in Tables or Discussed in Text
PACIFIC OCEAN
HUMBOLDT
TRINITY
TEHAMA
RED BLUFF
MENDOCINO
GLENN
BUTTE
LAKE
COLUSA
SONOMA
NAPA
YUBA
SIERRA
NEVADA
YOLO
SUTTER
PLACER
SOLANO
SACRAMENTO
EL DORADO
SAN FRANCISCO
CONTRA COSTA
AMADOR
ALPINE
SAN MATEO
ALAMEDA
SAN JOAQUIN
CALAVERAS
SANTA CLARA
STANISLAUS
TUOLUMNE
SANTA CRUZ
MERCED
MARIPOSA
MONTEREY
SAN BENITO
MADERA
FRESNO

FIG. 3

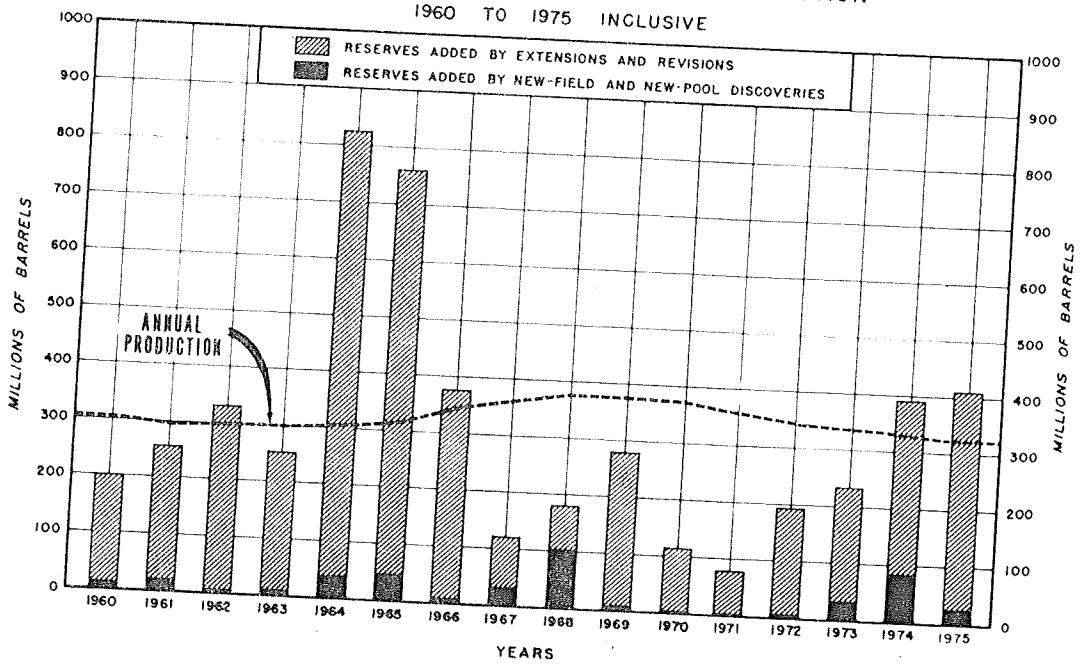
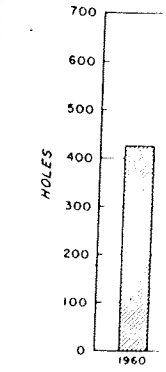
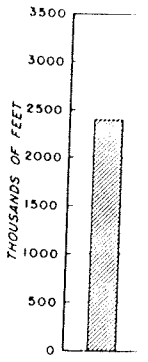
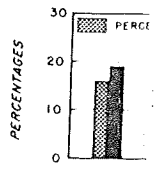
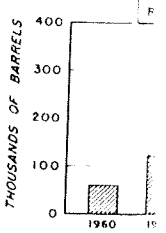

CALIFORNIA
ADDITIONS TO OIL RESERVES VS. PRODUCTION
1960 TO 1975 INCLUSIVE
RESERVES ADDED BY EXTENSIONS AND REVISIONS
RESERVES ADDED BY NEW-FIELD AND NEW-POOL DISCOVERIES
ANNUAL PRODUCTION
MILLIONS OF BARRELS
MILLIONS OF BARRELS
YEARS
1960 1961 1962 1963 1964 1965 1966 1967 1968 1969 1970 1971 1972 1973 1974 1975
0 100 200 300 400 500 600 700 800 900 1000

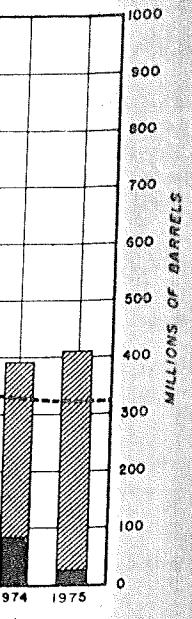
FIG. 4


HOLES
0 100 200 300 400 500 600 700
1960


THOUSANDS OF FEET
0 500 1000 1500 2000 2500 3000 3500


PERCENTAGES
0 10 20 30


THOUSANDS OF BARRELS
0 100 200 300 400
1960


1000
900
800
700
600
500
400
300
200
100
0
MILLIONS OF BARRELS
974
1975

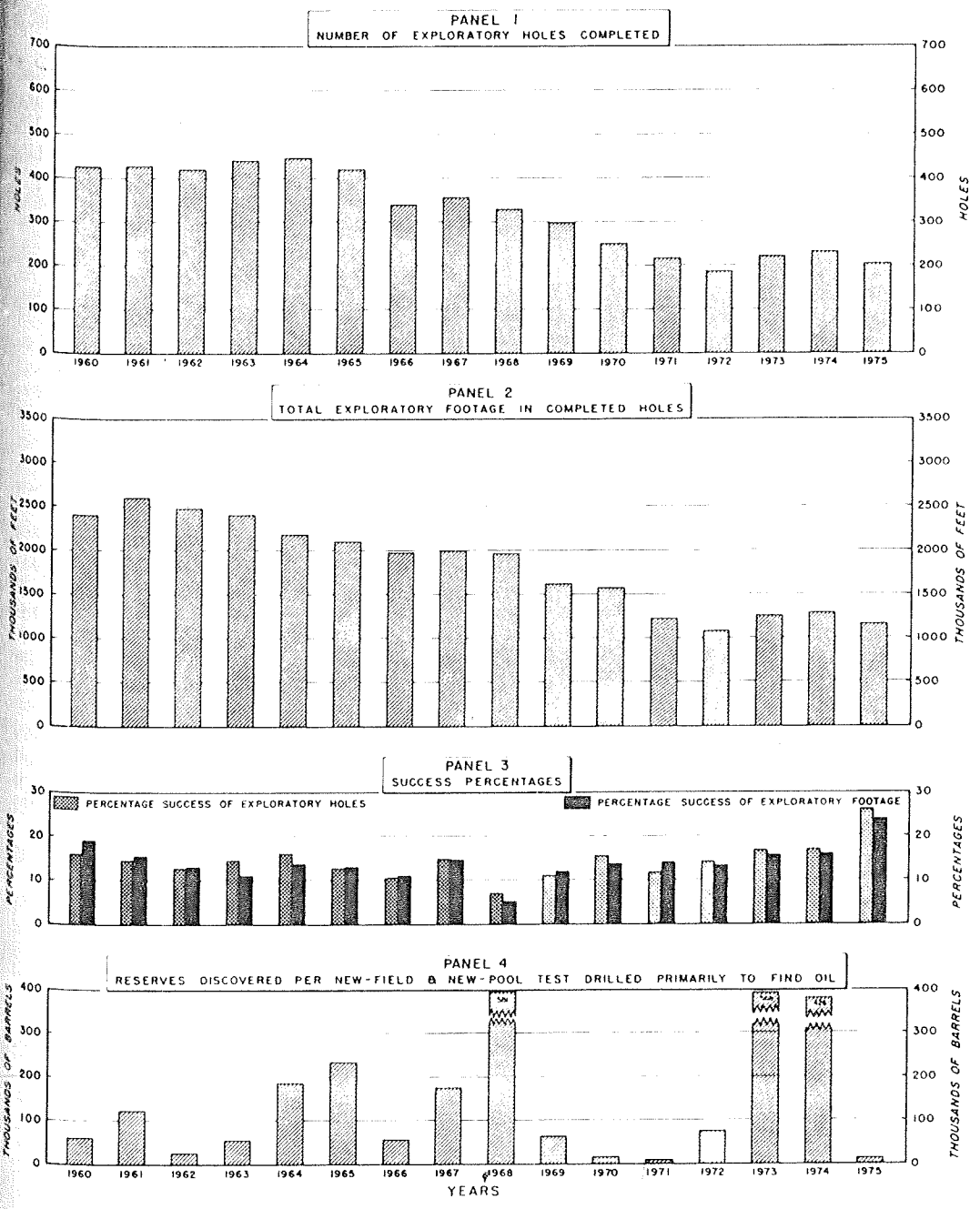

CALIFORNIA
TRENDS IN EXPLORATORY DRILLING & ADDITIONS TO OIL RESERVES
1960 TO 1975 INCLUSIVE
PANEL 1
NUMBER OF EXPLORATORY HOLES COMPLETED
HOLES
PANEL 2
TOTAL EXPLORATORY FOOTAGE IN COMPLETED HOLES
THOUSANDS OF FEET
PANEL 3
SUCCESS PERCENTAGES
PERCENTAGE SUCCESS OF EXPLORATORY HOLES
PERCENTAGE SUCCESS OF EXPLORATORY FOOTAGE
PERCENTAGES
PANEL 4
RESERVES DISCOVERED PER NEW-FIELD & NEW-POOL TEST DRILLED PRIMARILY TO FIND OIL
THOUSANDS OF BARRELS
1960 1961 1962 1963 1964 1965 1966 1967 1968 1969 1970 1971 1972 1973 1974 1975
YEARS

FIG. 5