

# **Hydrocarbon Possibilities in the Yuma Area, Arizona**

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# Hydrocarbon Possibilities in the Yuma Area, Arizona

## Revised Abstract\*

Fault-block mountains and broad valleys characterize the Yuma area of southwestern Arizona. Fewer than 20 oil test holes have been drilled in an area of more than 450 mi<sup>2</sup> (page 2). Recently released seismic-reflection data, integrated with earlier work and with data from oil and gas test holes and water wells, reveal a complex geologic history (page 4 and Plates 1 through 5).

Gravity mapping (Plate 6) suggests the presence of basins with up to 15,000 feet of sediments. Seismic-reflection data and dipmeter logs confirm the existence of a highly angular unconformity deep in the section. A Miocene-Pliocene transgression deposited older marine, marine Bouse Formation, and transition-zone sediments. Sand facies in each of these deposits represent potential reservoirs. A conglomerate at the unconformity and sands in a volcaniclastic section beneath the unconformity may also be reservoirs. Stratigraphic and fault traps may be present.

The opening of the Gulf of California and contemporaneous volcanism was followed by deposition of coarse clastic and volcanic rocks. Block faulting was succeeded by a transgression. Sediments may include submarine fans or turbidites. Colorado River progradation has shaped the modern updip limit of marine deposits.

Several wells had shows of oil or gas reported on sample logs, mud logs, or drillers' reports. Sediments have vitrinite reflectance indicative of maturity in the oil window (page 5). In the Mexican portion of the basin, Pemex has discovered gas in the Gulf of California, abandoned a noncommercially producing well, and reported strong shows of oil and gas in other wells (page 3 and Plate 7). The Yuma area has oil and gas potential and may yet join producing provinces in the United States.

Note: The material in this open-file report was originally presented by D.J. Brennan in a poster session at the 1989 annual convention of the American Association of Petroleum Geologists held in San Antonio, Texas. The material includes 8 plates:

Plate 1	Seismo-Geologic Structure Section A-A'
Plate 2	Seismo-Geologic Structure Section B-B'
Plate 3	Seismic Time-Depth Map...Near Conglomerate, Yuma Area, Arizona
Plate 4	Seismic Time-Depth Map...Near Top Bouse Fm., Yuma Area, Arizona
Plate 5	Simplified Version of Geologic History of Yuma Area, Arizona
Plate 6	Bouguer Gravity Map of Yuma Area, Arizona
Plate 7	Map of Exploration Activity in Sonora and Baja California Norte, Mexico
Plate 8	Stratigraphic Chart of Yuma Area, Arizona.

\*Brennan, D.J., 1989, Hydrocarbon possibilities in Yuma area, Arizona [abs.]: American Association of Petroleum Geologists Bulletin, v. 73, no. 3, p. 337.

## Well Locations in the Yuma Area, Arizona

(See Plate 6)

<u>Location of well to the nearest qtr-qtr section</u>	<u>Operator</u>	<u>Well</u>	<u>Completion Date</u>	<u>Total Depth (feet)</u>
T8S, R22W, sec 15, ne se	Gila Valley Oil & Gas	#1 Kamrath	1958	2,140
T8S, R22W, sec 15, se se	Gila Valley Oil & Gas	#2 Kamrath	1958	380
T8S, R22W, sec 35, ne sw	U.S. Geological Survey	#29 LCRP	8/65	2,001
T8S, R23W, sec 32, ne sw	Sinclair Oil	#1 Kryger	4/25	1,400
T9S, R19W, sec 23, ne sw	V.R. Smith	#1 State	12/71	3,986
T9S, R21W, sec 14, ne nw	B. Palon	Water Well	1965	1,085
T9S, R22W, sec 28, nw sw	U.S. Geological Survey	#25 LCRP	11/64	2,319
T9S, R23W, sec 19, sw nw	Colorado Basin Associates	#1 Newcomer (Elliott)	11/54	3,277
T9S, R23W, sec 32, se se	Central Oil Company	#1 MCP Blank	7/84	2,540
T9S, R23W, sec 32, se se	Yuma Basin Oil Company	#1 Sinclair	1/25	1,815
T9S, R24W, sec 08, ne nw	U.S. Geological Survey	#28 LCRP	7/65	2,470
T9S, R25W, sec 35, nw sw	U.S. Geological Survey	#9 LCRP	8/62	1,201
T10S, R23W, sec 05, se nw	Central Oil Company	#1 Aman		2,850
T10S, R23W, sec 23, se se	An-Son	#1-23 State	10/80	2,883
T10S, R23W, sec 31, ne ne	M.P. Stewart	#1 Federal	6/54	3,660
T10S, R23W, sec 31, nw nw	U.S. Geological Survey	#1 LCRP	?	1,000
T10S, R23W, sec 34, nw nw	Dowling Petroleum	#1 State	3/83	2,925
T10S, R23W, sec 34, nw nw	Dowling Petroleum	#1A State	6/85	5,006
T10S, R24W, sec 24, nw sw	Colorado Basin Associates	#1 Federal	1/55	6,015
T10S, R24W, sec 35, nw nw	J.M. Hickey	#1 Federal	12/52	940
T10S, R25W, sec 35, nw nw	U.S. Geological Survey	#17 LCRP	2/64	2,946
T11S, R23W, sec 26, se ne	Petroleum Technical Svcs.	#26-1 Federal	10/87	9,135
T11S, R23W, sec 34, nw nw	U.S. Geological Survey	#30 LCRP	1965	627
T11S, R24W, sec 04, c	Petroleum Technical Svcs.	#4-1 Federal	9/87	7,000
T11S, R24W, sec 08, sw ne	Exxon	#1 Yuma-Federal	2/73	11,444
T11S, R25W, sec 11, nw ne	Yuma Valley Gas & Oil	#1 Musgrove	6/40	4,870

The 26 wells listed above are the most significant and deepest holes recorded for the Yuma area. Many additional, shallower irrigation wells have also been drilled in the area. Three significant wells drilled in California are not listed above, but are shown on Plate 6.

The seven U.S. Geological Survey (USGS) wells were drilled in connection with a study of the hydrogeology of the area. Most of these wells were logged, and sample descriptions were published.

The stratigraphic chart (Plate 8) from the Exxon #1 Yuma-Federal well is based on the following work: Eberly, L.D., and Stanley, T.B., 1978, Cenozoic stratigraphy and geologic history of southwestern Arizona: Geological Society of America Bulletin, v. 89, p. 921-940. It is believed to be representative of the stratigraphy in the area.

## Pemex Activity in Sonora and Baja California Norte

(See Plate 7)

**Extremeno #1.** Total depth at 16,400 feet. Drilled by the drill ship *Reforma* in 120 feet of water approximately 14 miles offshore. Flowed 5.7 million cubic feet of gas per day plus condensate on a 1/4" choke from the interval 13,510 to 13,543 feet. An article published in the Mexican newspaper *21 Mexicano* in 1981 said that the discovery was estimated to hold 50 billion cubic feet of natural gas reserves. One confirmation test well was drilled and completed as a gas-condensate well. Two additional development wells were drilled, and one additional location was spotted.

**Tutuli #1.** Total depth at 16,400 feet (1985) in salt of undetermined age, but some Miocene sediments were drilled. A gas zone was encountered at approximately 7,800 feet in Miocene or Pliocene sands. The well flowed gas with water during a production test and was announced as a discovery. The uncontrolled increase in water production resulted in its abandonment. The well had a good sand-shale sequence.

**Jikawi #1.** Projected total depth at 16,400 feet in Miocene(?) or Pliocene(?) sediments. The well was reported to have excellent shows at 8,500 feet in a 40-foot sand sequence. A drill-stem test flowed oil and gas. The operator had to shut the blowout preventer rams on the drill pipe to control a "kick" when the drill pipe was almost out of the hole. Valves were installed on the drill pipe.

**Altar #1.** Total depth at 9,571 feet in the very top portion of Miocene sediments. Hydrocarbon stain and residue were evident in some well samples. No completion was attempted, and the well was abandoned in November 1983. The well is 8 miles south of the Arizona-Mexico border.

**Cucapah #1.** Total depth at 12,605 feet in Pliocene sediments. Hydrocarbon stain and residue were evident in some well samples. No completion was attempted, and the well was abandoned.

**Tebari #1.** Total depth at 16,898 feet in Pliocene sediments. This well confirmed a very deep basin. No information was available, and the well was abandoned. Reports indicate that two new locations are planned (not prepared as of this writing) about 8 miles north of the well.

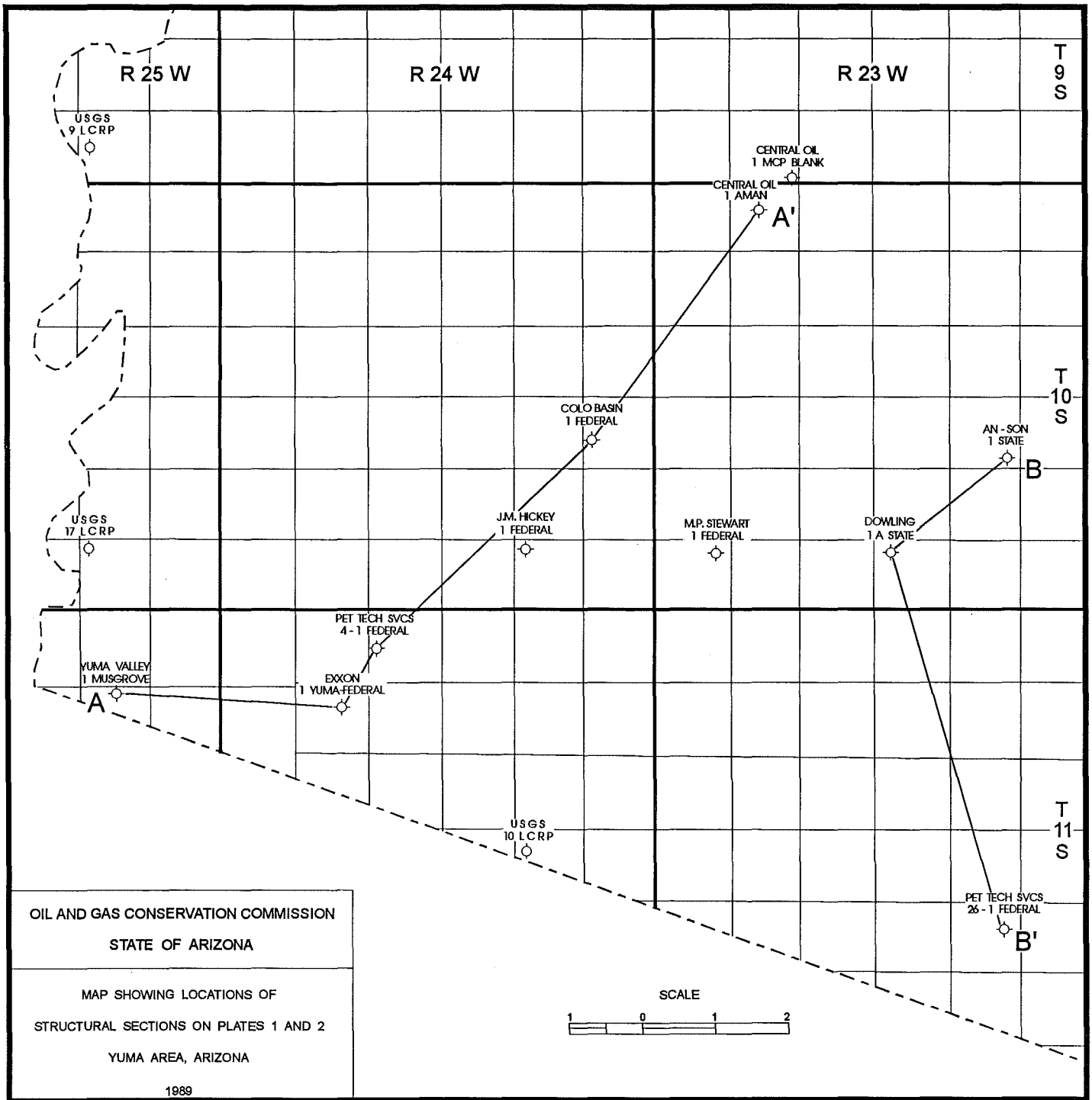
**Rio Colorado #1.** Total depth at 14,858 feet in Pliocene sediments. No information was obtained on this well, and it was abandoned. One location is planned about 3 miles south of the well.

New locations: Well site prepared, but no drilling to date.

**Tascari #1.** The location is barely onshore about 14 miles south of the *Tutuli #1*.

**Huibira #1.** The location is about 11 miles east of *Altar #1*.

**Eulene #1.** The location is about 9 miles south of the Arizona-Mexico border.



# VITRINITE REFLECTANCE DATA

EXXON YUMA FEDERAL NO. 1

T. 11 S., R. 24 W., sec. 8  
YUMA COUNTY, ARIZONA

