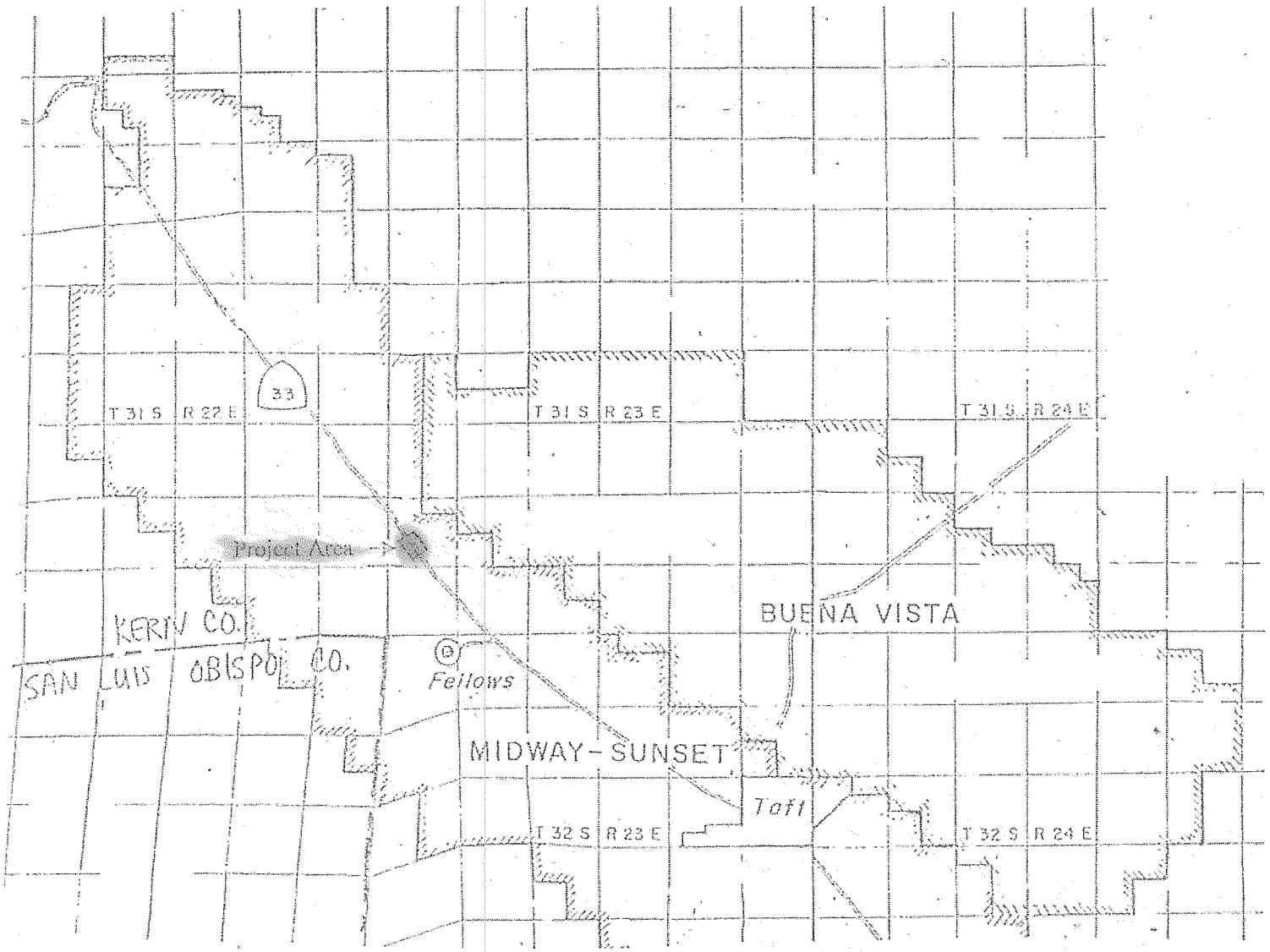
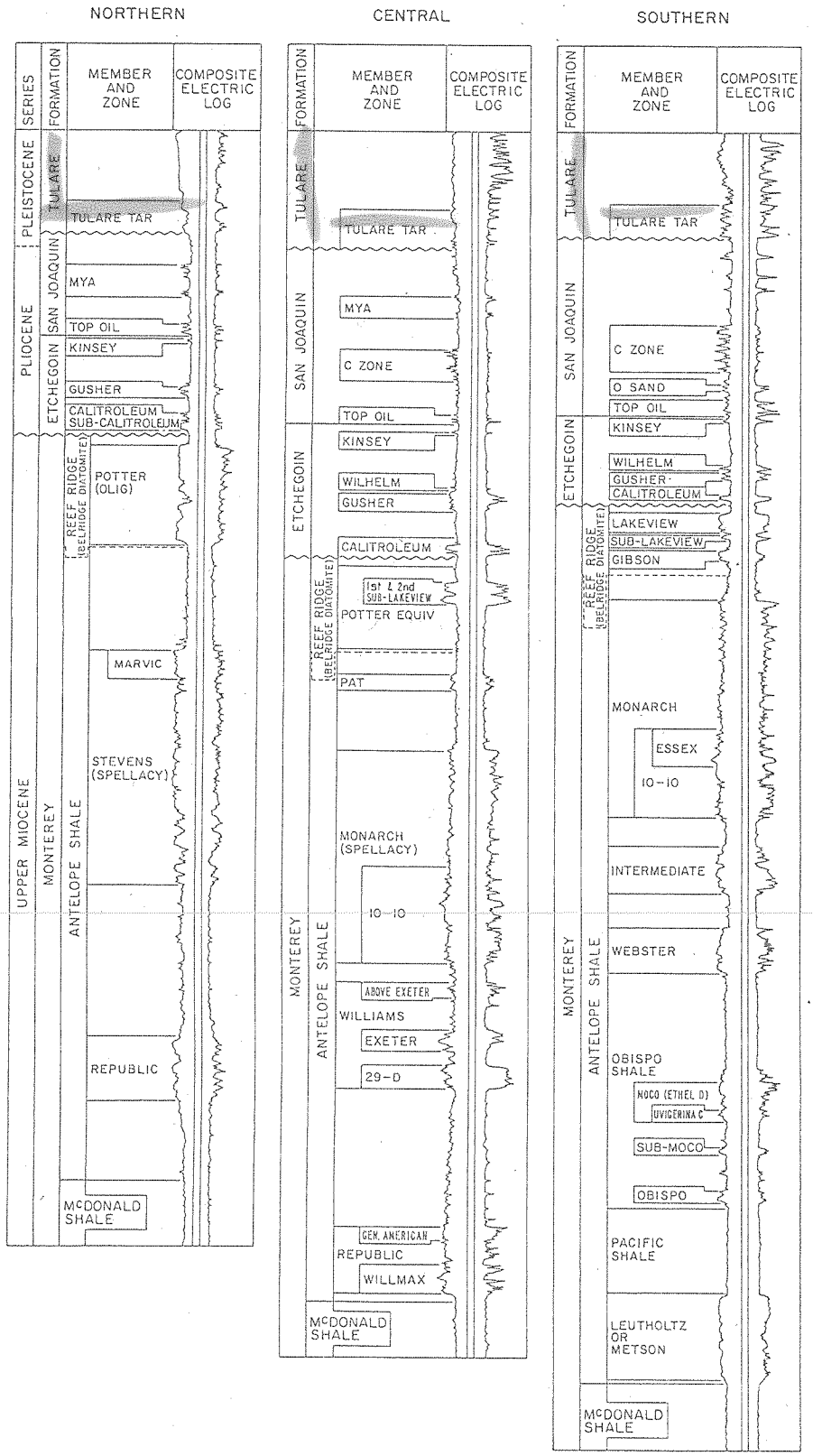


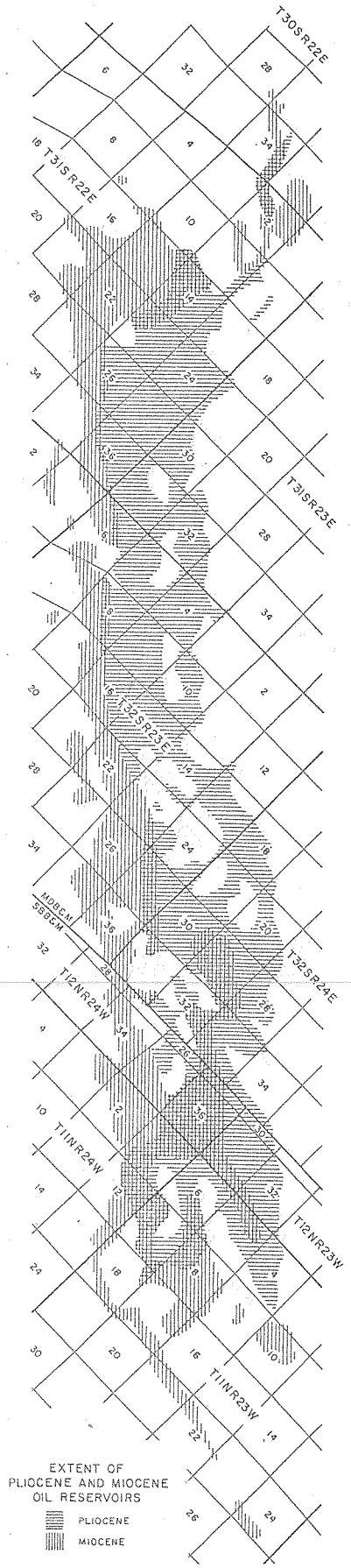
Source: DOG, 1981

FIGURE S-1
Map of Extent of Exempted Aquifer
Sunrise Power Company
Underground Injection Control (UIC) Application
February 2012

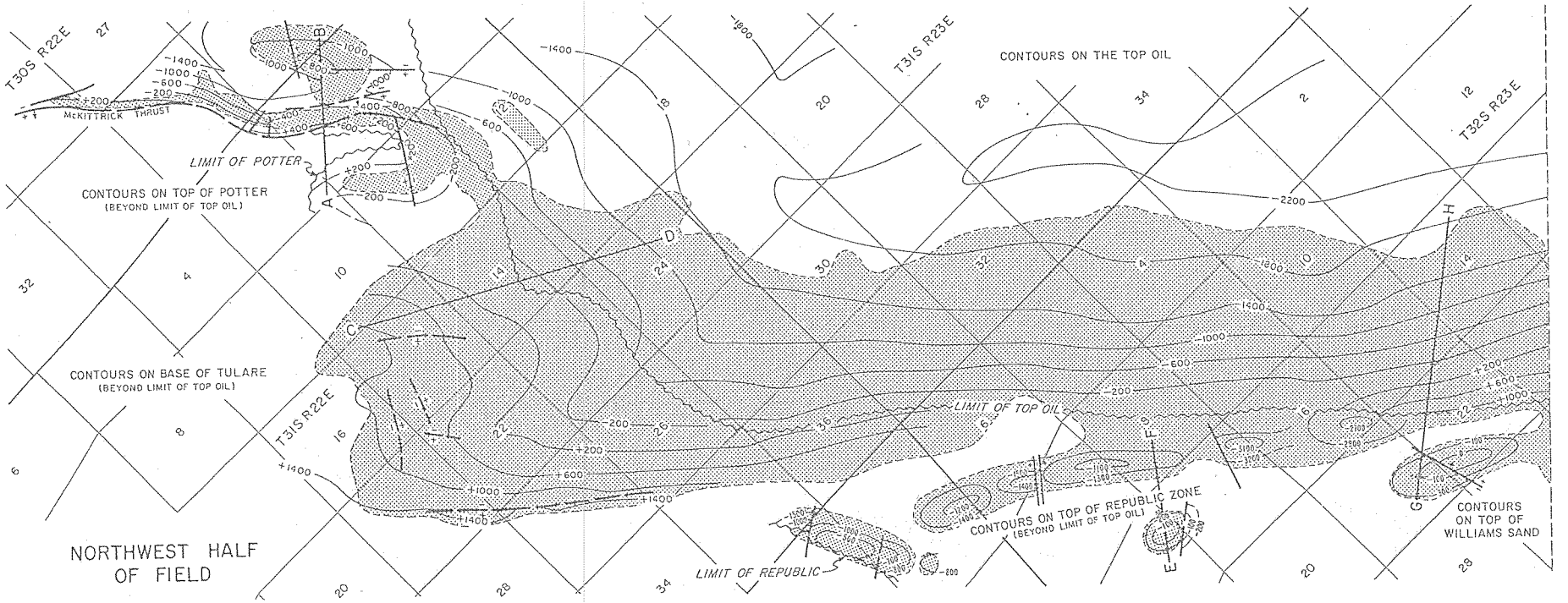
CH2MHILL

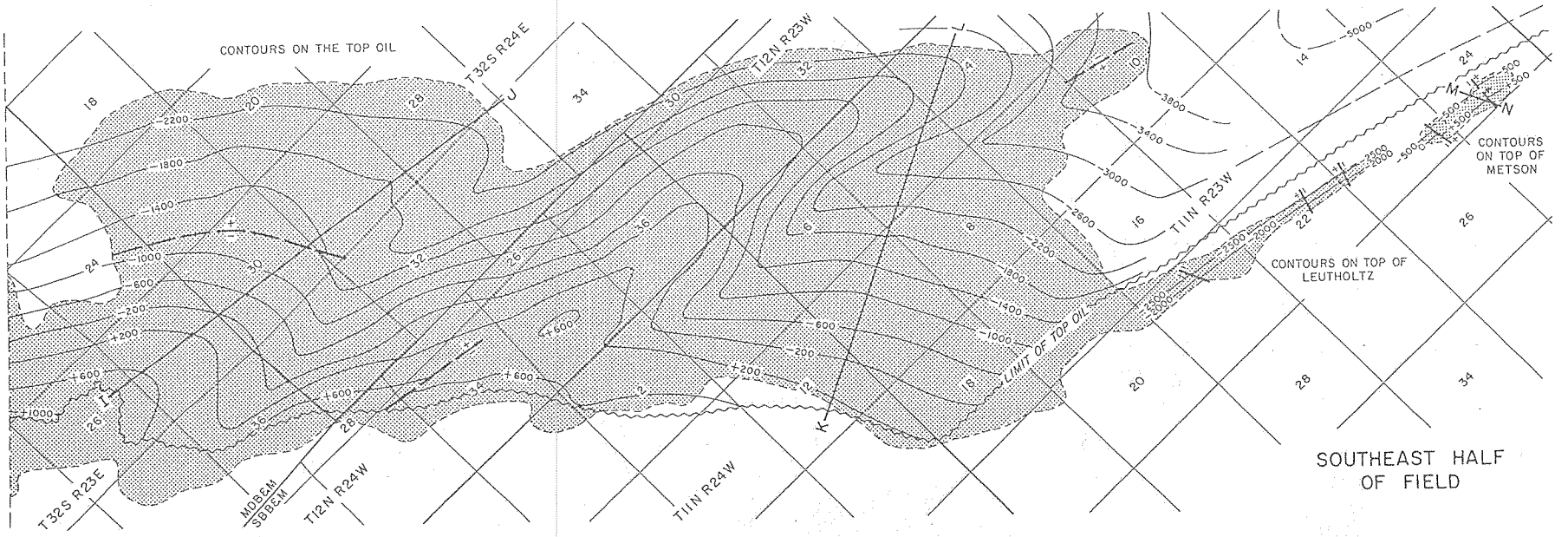
MIDWAY-SUNSET OIL FIELD





ED_001000_00015763-00002

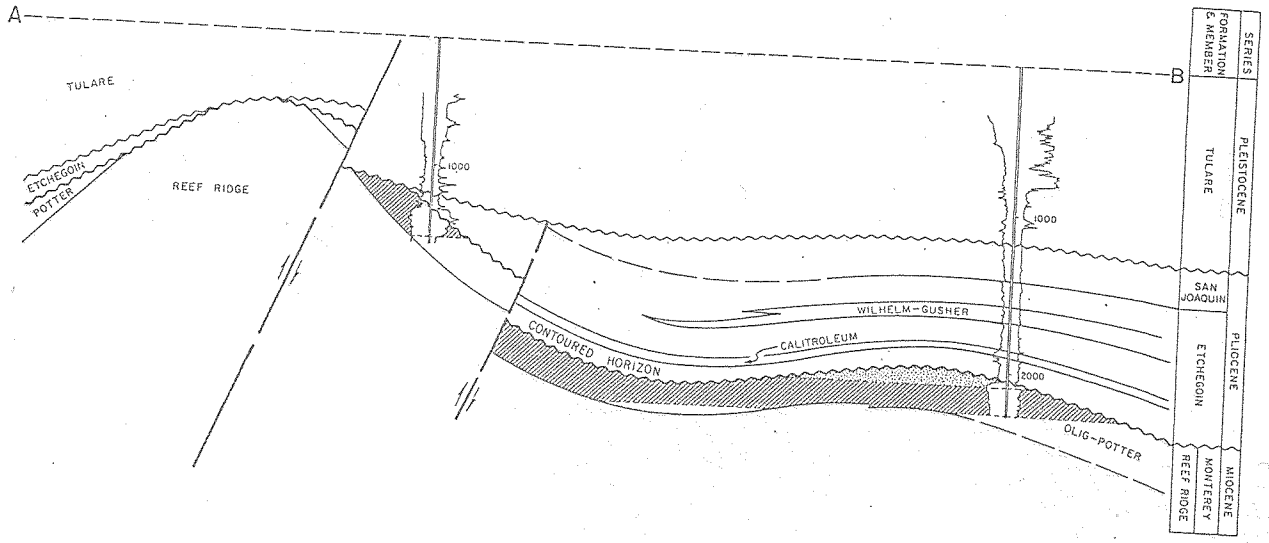


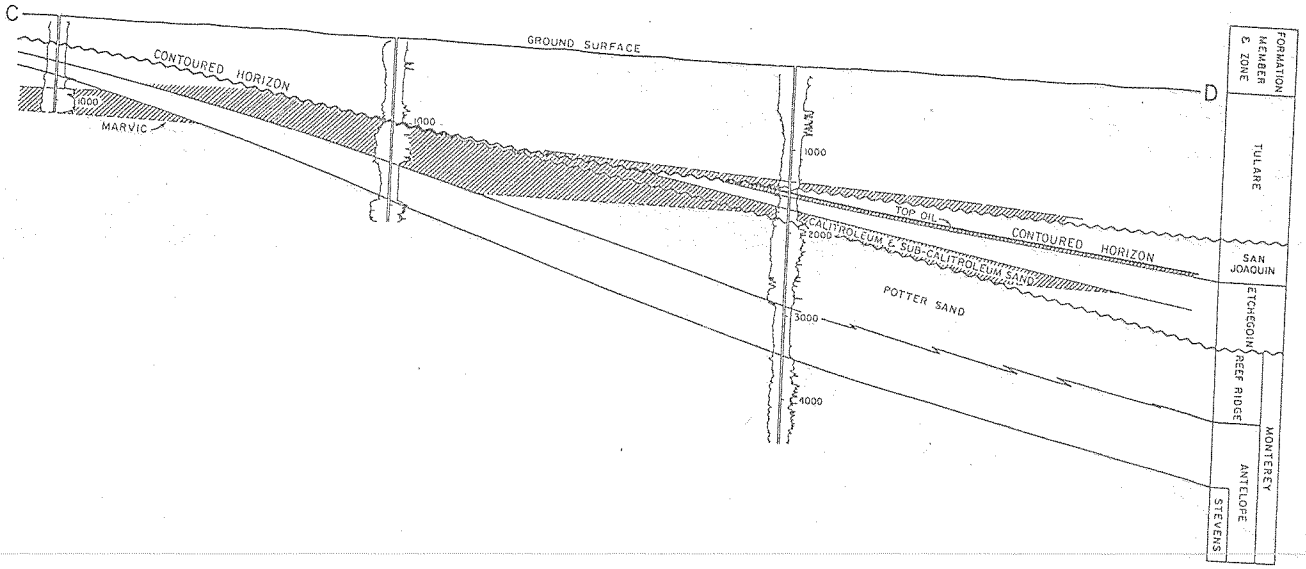


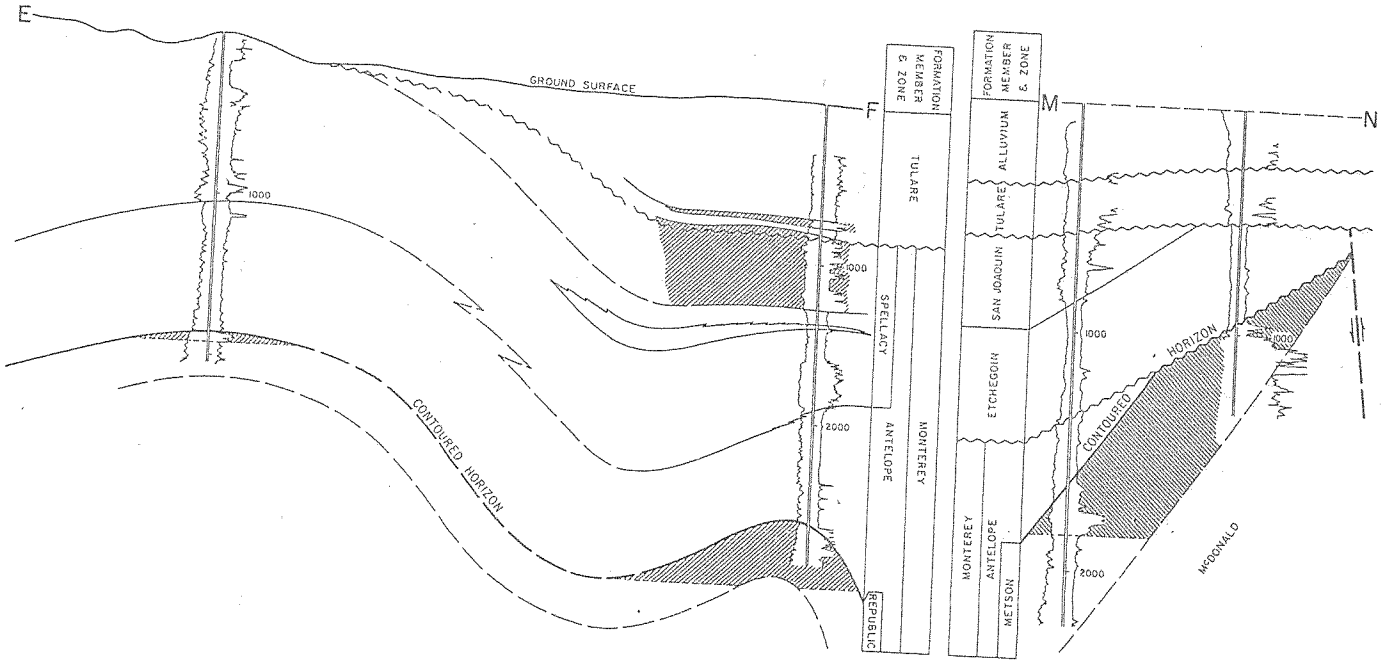
MIDWAY-SUNSET OIL FIELD

ED_001000_00015763-00003

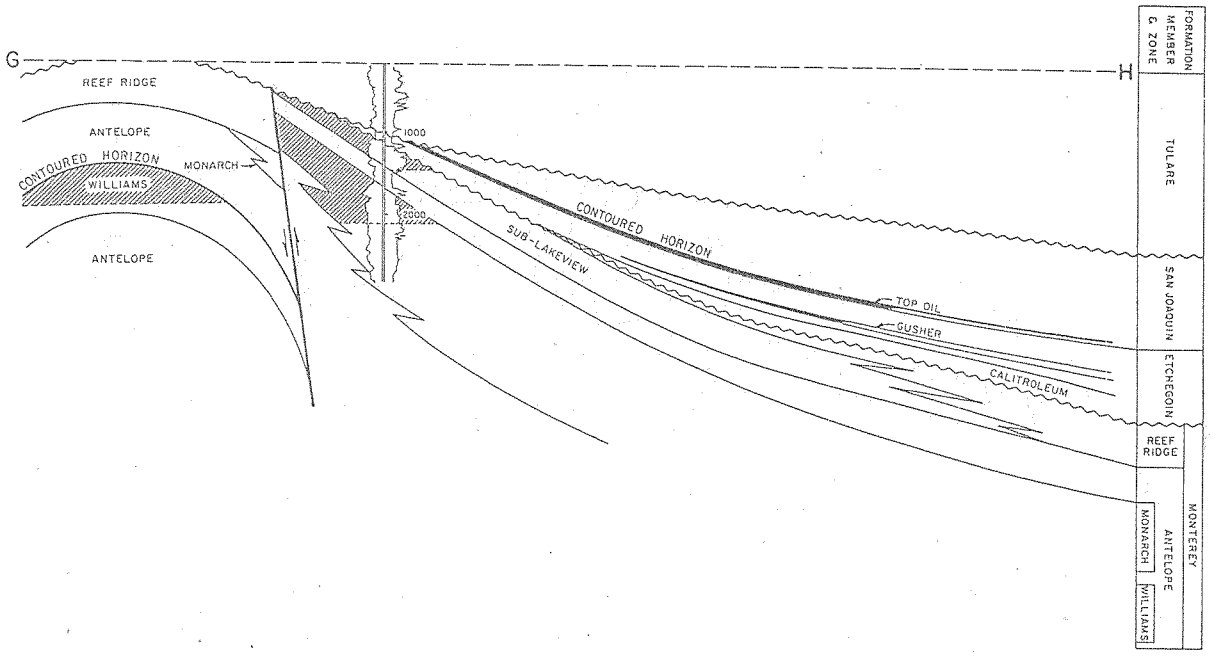
MIDWAY-SUNSET OIL FIELD

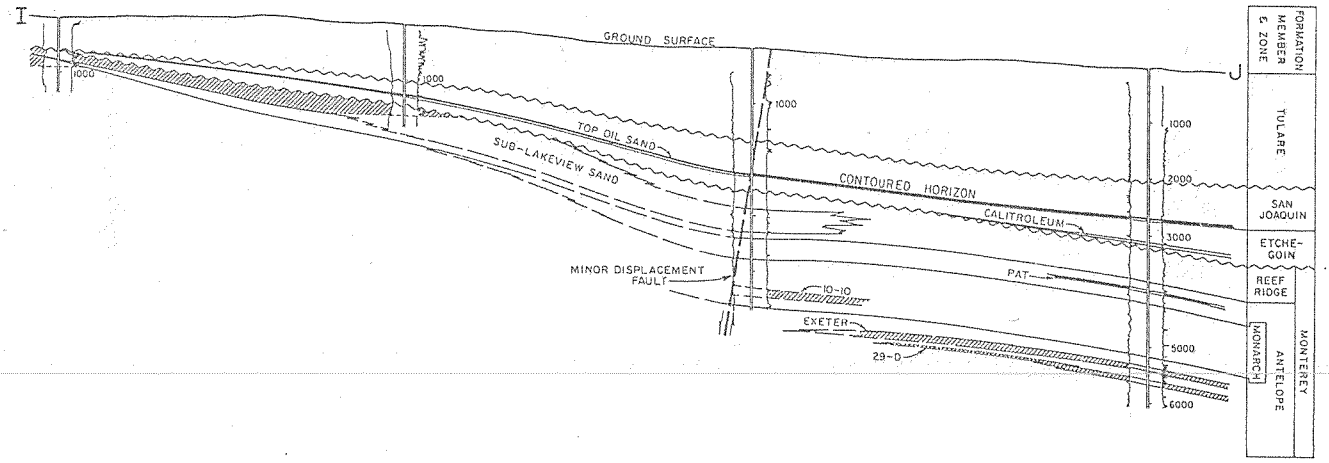


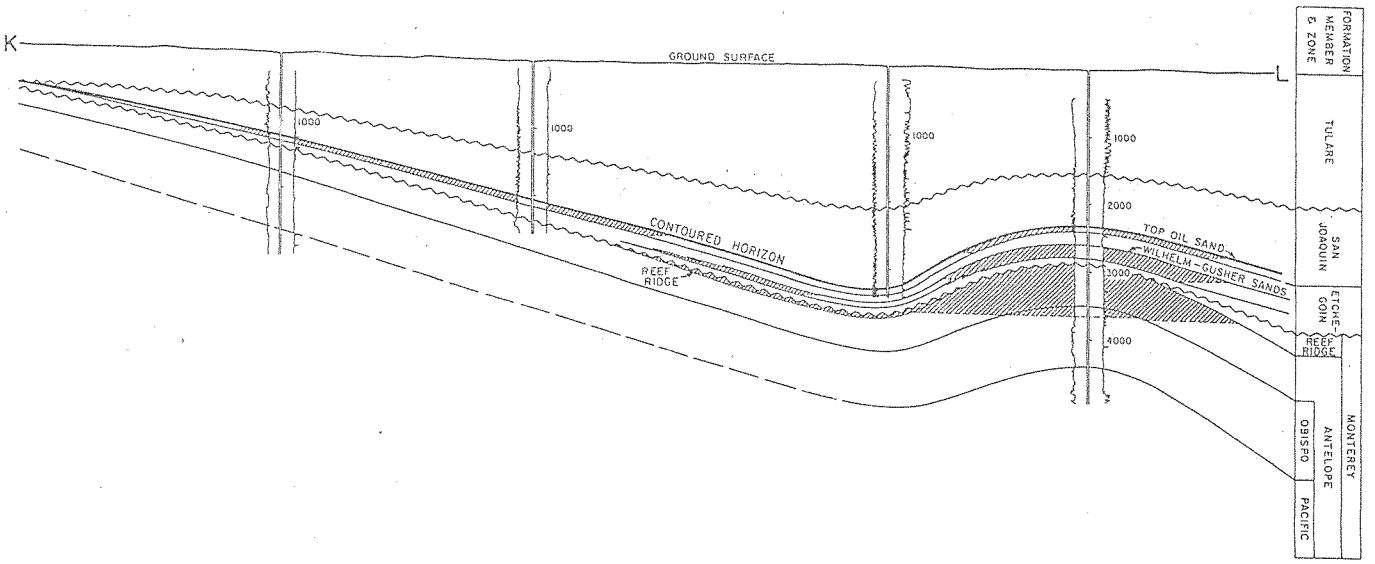




MIDWAY-SUNSET OIL FIELD







ED_001000_00015763-00005

CALIFORNIA DIVISION OF OIL AND GAS

MIDWAY-SUNSET OIL FIELD

LOCATION: Vicinity of Taft, about 28 miles southwest of Bakersfield

Kern and San Luis Obispo Counties

TYPE OF TRAP: Regional homocline modified by: anticlines; anticlinal noses; lithofacies variations; angular unconformities; lenticular sands; fractured shales

ELEVATION: 600 - 1,750

DISCOVERY DATA

Zone	Present operator and well name	Original operator and well name	Sec. T. & R.	B & M	Initial daily production Oil (bbl)	Initial daily production Gas (Mcf)	Date of completion
Tulare	Operator name and well number unknown	Same as present	N.A.	MD	N.A.	N.A.	prior to 1894
Mya Tar	Getty Oil Co. No. 101	Associated Oil Co. No. 101	2 31S 22E	MD	10	N.A.	Jan 1920
Top Oil	Operator name and well number unknown	Operator name and well number unknown	N.A.	MD	N.A.	N.A.	N.A.
Kinsey	Same as above	Same as above	N.A.	MD	N.A.	N.A.	N.A.
Wilhelm	Same as above	Same as above	N.A.	MD	N.A.	N.A.	N.A.
Gusher	Chanslor-Western Oil & Dev. Co. No. 2	Chanslor-Canfield Midway Oil Co. No. 2 A	6 32S 23E	MD	3,000	N.A.	Nov 1909
Calitroleum	Operator name and well number unknown	Same as present	N.A.	MD	N.A.	N.A.	N.A.
Lakeview and Sub-Lakeview	Mobil Oil Corp. "Lakeview" 1	Lake View Oil Co. B No. 1	25 12N 24W	SB	68,000	N.A.	Mar 1910
Potter	Exeter Oil Co. Ltd. "Exeter-BAOC" 101-15	Dominion Oil Co. No. 1	15 31S 22E	MD	100	N.A.	Jan 1910
Marvic	Mobil Oil Corp. "Marvic" 1	Marvic Associates Ltd. No. 1	16 31S 22E	MD	72	N.A.	May 1941
Monarch	Standard Oil Co. of Calif. "Monarch" 28	Sunset-Monarch Oil Co. No. 1	2 11N 24W	SB	N.A.	N.A.	about 1902
Webster	Directors Oil Co. No. 7	Ruby Oil Co. No. 7	2 11N 24W	SB	35	N.A.	Dec 1913
Moco	Mobil Oil Corp. "Moco 35" WT 504	General Petroleum Corp. "Moco 35" 204	35 12N 24W	SB	188	20	Jul 1957
Obispo	Union Oil Co. of Calif. "Obispo" 6	Obispo Oil Co. No. 6	32 12N 23W	SB	6,000	N.A.	Sep 1925
Pacific	Mobil Oil Corp. "Pacific" 4	General Petroleum Corp. "Pacific" 4	32 12N 23W	SB	1,078	N.A.	Jun 1947
Metson	Tenneco Oil Co. "Metson" 47-24	Bankline Oil Co. "Metson" 47-24	24 11N 23W	SB	27	0	Mar 1953
Leutholtz	Gulf Oil Corp. No. 2 - "I.M. Woodward USL"	Western Gulf Oil Co. No. 2 - "I.M. Woodward USL"	21 11N 23W	SB	1,021	120	Aug 1945
Republic	Shell Oil Co. "Sec. 8" 25	Republic Petroleum Co. No. 25	8 32S 23E	MD	1,114	350	Mar 1928

Remarks: A First of over 100 gushers in field and is the first significant production from the Gusher zone.
B "America's Most Spectacular Gusher" blew out and flowed uncontrolled for 18 months after which the flow stopped probably because the bottom of the hole caved in. It was estimated that the early flow rate was about 68,000 b/d and that production amounted to 8-1/4 million barrels oil of which 3-1/2 million barrels was lost by evaporation and seepage.

DEEPEST WELL DATA

Present operator and well name	Original operator and well name	Date started	Sec. T. & R.	B & M	Depth (feet)	At total depth Strata	At total depth Age
The Superior Oil Co. "C.W.O.D." 58-21	Same	Nov 1957	21 32S 23E	MD	14,504	lower Santos	early Mio

PRODUCING ZONES

Zone	Average depth (feet)	Average net thickness (feet)	Geologic Age	Geologic Formation	Oil gravity (°API) or Gas (btu)	Salinity of zone water gr/gal	Class BOPE required
Tulare	200 - 1,400	50 - 200	Pleistocene	Tulare	13	200 - 1,000	None
Mya Tar	1,100	150	Pliocene	San Joaquin	12	260	None
Top Oil	500 - 2,500	20 - 50	Pliocene	San Joaquin	15 - 23	1,490 - 2,160	None
Kinsey	2,000 - 3,600	15 - 175	Pliocene	Etchegoin	14 - 26	1,500 - 1,860	None
Wilhelm	2,000 - 3,000	100	Pliocene	Etchegoin	14 - 26	1,700 - 2,100	None
Gusher	2,000 - 3,000	75	Pliocene	Etchegoin	14 - 26	1,440 - 1,580	None
Calitroleum	1,500 - 4,500	80	Pliocene	Etchegoin	14 - 26	1,620 - 2,040	None
Lakeview	2,600 - 3,300	20 - 200	late Miocene	Monterey	21	1,670	None
Sub-Lakeview	400 - 3,100	10 - 300	late Miocene	Monterey	22	440	III
Potter	200 - 2,500	60 - 500	late Miocene	Monterey	14	5 - 400	None
Marvic	1,000	200	late Miocene	Monterey	13	40	None
Monarch	600 - 2,000	50 - 400	late Miocene	Monterey	13 - 17	50 - 1,300	None
Webster	1,500 - 1,800	50 - 250	late Miocene	Monterey	14	N.A.	None
Moco	2,150	70 - 450	late Miocene	Monterey	15	980	III
Obispo	3,600	50 - 1,500	late Miocene	Monterey	14 - 27	970	III
Pacific	3,700	50 - 300	late Miocene	Monterey	16	600	III
Metson	1,250	400	late Miocene	Monterey	8 - 12	790	None
Leutholtz	3,200	40 - 400	late Miocene	Monterey	15 - 24	550	III
Republic	1,300 - 4,900	150	late Miocene	Monterey	12 - 24	70	III

PRODUCTION DATA (Jan. 1, 1973)

1972 Production Oil (bbl)	1972 Production Net gas (Mcf)	1972 Production Water (bbl)	1972 Proved acreage	1972 Average number producing wells	Cumulative production Oil (bbl)	Cumulative production Gas (Mcf)	Peak oil production Barrels	Peak oil production Year	Total number of wells Drilled	Total number of wells Completed	Maximum proved acreage
34,579,424	5,810,674	66,810,031	24,370	5,549	1,157,831,025	500,583,802	34,579,424	1972	10,318	9,486	28,090

STIMULATION DATA (Jan. 1, 1973)

Type of project	Date started	Cumulative injection - Water, bbl, Gas, Mcf; Steam, bbl (water equivalent)	Maximum number of wells used for injection
Water flood	1954	20,838,718	15
Steam flood	1963	15,398,177	47
Cyclic-steam	1963	195,087,515	4,870
Air injection for a fire flood	1960	N.A.	24
Gas injection for pressure maintenance	1944	43,302,959	7

SPACING ACT: Does not apply except at extreme southeast end of field.

BASE OF FRESH WATER: None

CURRENT CASING PROGRAM: Various; depending on zone and location.

METHOD OF WASTE DISPOSAL: Percolation and evaporation sumps; during 1972, 6,222,115 bbl. of waste water was injected into 7 disposal wells.

REMARKS: In a report by W.L. Watts titled "Sunset Oil Claims" in the Calif. State Mining Bureau Bull. No. 3 (1894) mention is made of steam injection into a well in Sec. 21, T. 11N., R. 23W., S.B.B. & M to reduce the viscosity of the heavy oil so it can be pumped to the surface. Later application and refinement of this method of reservoir stimulation was a significant contributing factor toward attaining the peak oil production in 1972.

REFERENCES: Anderson, D.N., Monarch 10-10 Pool of Midway-Sunset Oil Field: Calif. Div. of Oil and Gas, Summary of Operations--Calif. Oil Fields, Vol. 50, No. 1 (1964).
Arnold, Ralph and H.R. Johnson, McKittrick-Sunset Oil Region, Kern and San Luis Obispo Counties, Calif.: U.S. Geol. Survey Bull. 406 (1910).
Borkovich, G.J., Northernmost Portion of Midway-Sunset Oil Field: Calif. Div. of Oil and Gas, Summary of Operations--Calif. Oil Fields, Vol. 47, No. 1 (1961).
Ingram, W.L., Olig Pool of Midway-Sunset Oil Field: Calif. Div. of Oil and Gas, Summary of Operations--Calif. Oil Fields, Vol. 50, No. 1 (1964).
Land, P.E. and D.N. Anderson, Midway-Sunset Oil Field: Calif. Div. of Oil and Gas, Summary of Operations--Calif. Oil Fields, Vol. 51, No. 2 (1965).
Pack, R.W., The Sunset-Midway Oil Field, Part 1, Geology and Oil Resources: U.S. Geol. Survey Prof. Paper 116, p. 64 (1920).
Zulberti, J.L., Exeter and 29-D Pools of Midway-Sunset Oil Field: Calif. Div. of Oil and Gas, Summary of Operations--Calif. Oil Fields, Vol. 46, No. 1 (1960).
Zulberti, J.L., Lakeview Pool of Midway-Sunset Oil Field: Calif. Div. of Oil and Gas, Summary of Operations--Calif. Oil Fields, Vol. 47, No. 1 (1961).
Zulberti, J.L., Republic Sands of Midway-Sunset Oil Field: Calif. Div. of Oil and Gas, Summary of Operations--Calif. Oil Fields, Vol. 43, No. 2 (1957).
Zulberti, J.L., Santiago Area of Midway-Sunset Oil Field: Calif. Div. of Oil and Gas, Summary of Operations--Calif. Oil Fields, Vol. 44, No. 1 (1958).
Zulberti, J.L., Thirty-five Anticline of Midway-Sunset Oil Field: Calif. Div. of Oil and Gas, Summary of Operations--Calif. Oil Fields, Vol. 45, No. 1 (1959).

District 4

NON-HYDROCARBON PRODUCING ZONES BEING USED FOR WASTE WATER DISPOSAL

TABLE 1

Field	Formation & Zone	Lateral Limits	Depth to Top (feet subsea)	Thickness (feet)	Remarks
ern Front	Santa Margarita (Miocene)	Extends throughout the field	2,548	650	
ern River	Chanac (Miocene to Pleistocene)	Extends throughout the field	1,100	568	
	Santa Margarita (Miocene)	Extends throughout the field	1,698±	325-515	
	Vedder (Miocene)	Extends throughout the field	4,850	136-375	
akeside	San Joaquin (Pliocene)	Extends throughout the field	3,360	30	
os Loblos	Tulare (proposed) (Pleistocene)	Extends throughout the field	1,950±	1,550±	
idway-Sunet	Alluvium (Holocene)	Extends throughout the field	399	125-252	
ount Poso	Walker (Eocene-Oligocene)	Covers northeast half of field	1,939 (top of Vedder)	656-661	Injected only in combination with the laterally interfingered Vedder, which extends throughout the field.
untain View	Kern River (Pliocene)	Extends throughout the field	2,680	1,320±	
eito	Chanac (Pleistocene)	Extends throughout the field	2,756	634	
	Kern River (Pliocene)	Extends throughout the field	3,272	384	

ED_001000_00015763-00008