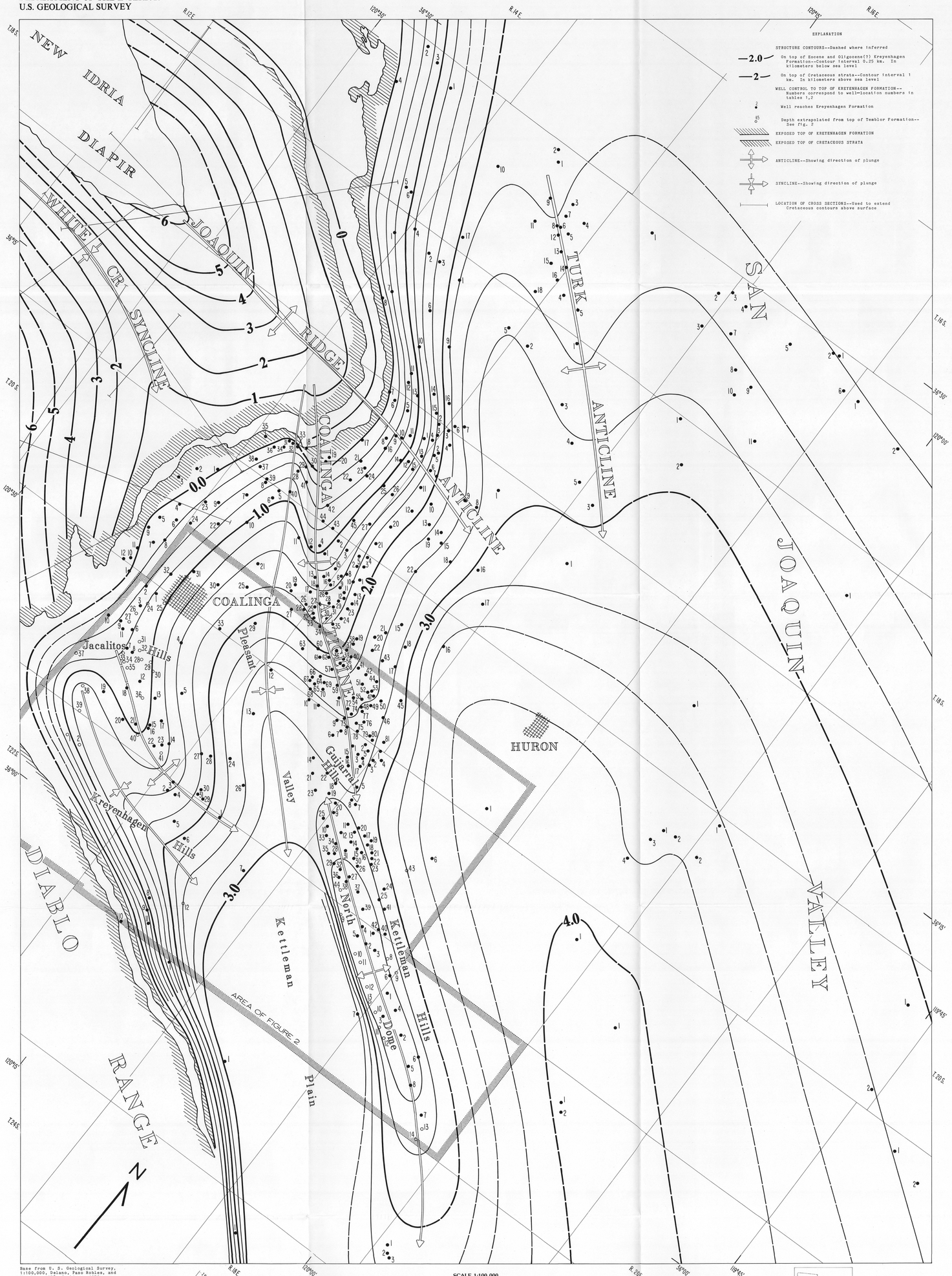

STRUCTURE CONTOUR MAP OF THE TOPS OF THE KREYENHAGEN FORMATION AND CRETACEOUS STRATA IN THE COALINGA AREA, FRESNO AND KING COUNTIES, CALIFORNIA

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This structure contour map, originally compiled during a study of the 1983 Coalinga earthquakes, shows the general structural configuration of the upper several kilometers of section in the Coalinga area. It was compiled by using electric well-log data available through April 1982 (Ammann Map Services, 1978; Petroleum Information Corporation, 1982; California Division of Oil and Gas, 1982) and surface geology (Dibblee, 1971; Mansfield, 1979).

The structure contours represent two separate horizons: (1) the top of the Kreyenhagen Formation and (2) the top of Cretaceous strata. Inclusion of the top of Cretaceous strata in the area northwest of the surface outcrop of the Kreyenhagen Formation extends the map into large folds in the exposed Great Valley sequence.

Structure contour maps of the Kreyenhagen Formation in the map area were compiled previously for oil-field studies. Kaplow (1946) prepared a detailed map of the Coalinga and East Coalinga Extension Oil Fields. The California Division of Oil and Gas (1973) compiled a less detailed structure contour map of the Coalinga Oil Field.

The top of the Eocene and Oligocene(?) Kreyenhagen Formation is contoured in the subsurface east and south of its surface outcrop. It is the deepest unit penetrated by the majority of wells in the area, thus providing the deepest structural horizon available for this type of study. The Kreyenhagen Formation is continuous throughout the Coalinga area and shows characteristic spontaneous potential and resistivity curves on electric well logs (fig. 1A).

The Kreyenhagen Formation was hand contoured by interpolating between control points (table 1) and, then, smoothing curves while maintaining consistency of form in structures. Faults through the Kreyenhagen Formation in the map area have insufficient throw to effect structure contours at this scale.

Depths to the tops of the Kreyenhagen and Temblor Formations were picked directly from electric well logs. In areas of dense drilling, depths from only four to six of the wells available in each section were selected. Outside the oil fields, particularly in the synclinal areas, little or no depth information is available.

Structure contours in the Joaquin Ridge anticline area depict the Cretaceous-Tertiary boundary. The boundary is projected upslip from the exposed contact on cross sections (see map for locations) to obtain contour altitudes. Using strikes of surface geology (Mansfield, 1971) as guides to structural form, the contours are interpolated between the cross sections.

Stratigraphic relations at the top of the Kreyenhagen Formation vary throughout the Coalinga area (fig. 1). The Kreyenhagen Formation is unconformably overlain by the Oligocene and Miocene Temblor Formation. Generally, sandstone of the Temblor Formation directly overlies the shale of the Kreyenhagen Formation (fig. 1A), but in the Kettleman Hills North Dome and Kreyenhagen Hills areas the basal part of the Temblor Formation is shale (fig. 1B). In the Turk anticline area, the shale of the Tumey Formation of Atwill (1935) is stratigraphically above but indistinguishable from the Kreyenhagen Formation; therefore, the Tumey Formation is considered the top of the Kreyenhagen Formation in this report (fig. 1C). The Leda sand of local usage (American Association of Petroleum Geologists, 1959), a lens of lower Miocene sandstone, separates the Temblor Formation from the Kreyenhagen Formation in the Guijarral Hills area (fig. 1D,E). The structure contours thus depict a lithostratigraphic boundary that probably varies in age somewhat from place to place.

Wells that reach the Kreyenhagen Formation are sparse on Jacalitos Hills and Kettleman Hills North Dome. Well-log data in these areas are supplemented with inferred depths to the Kreyenhagen Formation. These inferred depths were derived by adding the thickness of the Temblor Formation, determined from the Temblor isopach map (fig. 2), to the depth to the Temblor Formation in shallower wells (tables 1,2).

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Table 1.--Data for wells reaching top of Kreyenhagen Formation and wells used to make isopach map

T.[1]	R.	Sec.	Well location no.[2]	Operator	Well name and No.	Surface elev. (ft)	Yr well drilled	Total well depth (ft)	Kreyenhagen[4] (ft)	Altitude[3] Kreyenhagen (km)	Altitude[3] Temblor[5] (ft)	Altitude[3] Temblor[5] (km)	Temblor thickness (km)
17 S.	14 E.	3	1	Chevron	88	434	1944	6934	-06671	-1.42			
		4	2	Gulf	Lillis 22-4	760	1949	4656	-01965	-0.60			
		9	3	Texaco	Lillis 34-4	656	1950	5150	-02000	-0.61			
		10	4	Texaco	Lillis 41-9	656	1949	5119	-02054	-0.601			
		15	5	Gulf	Lillis 82	620	1950	5500	-02740	-0.84			
		36	6	San Roque Oil	Lillis 1	570	1965	5324	-03120	-0.94			
17 S.	15 E.	3	1	Gulf	S. F. Land Co. 3	362	1937	8115	-07133	-2.17			
		4	2	Arco	Turk 1	362	1939	8000	-07050	-2.15			
		11	3	Arco	SOPAC A-1	340	1952	9750	-07520	-2.29			
		13	4	Quintana Petro.	SP 1	322	1970	9600	-07773	-2.37			
		13	5	Texaco	SP 32	345	1941	9673	-07537	-2.30			
		14	6	Arco	Jones 27 Meyers 1	348	1951	9500	-07543	-2.30			
		14	7	Arco	Deltringer 1	348	1952	9470	-07435	-2.27			
		14	8	Chevron	Giffen Inc. and others 67	349	1969	14471	-07413	-2.26			
		15	9	Gulf	SP 1	365	1948	8060	-07277	-2.22			
		17	10	Russell Giffen	SP 53	421	1950	9935	-07209	-2.20			
		21	11	Texaco	Lillis Lands 72	355	1940	10000	-07455	-2.27			
		23	12	Texaco	SP 1	355	1940	10116	-07465	-2.28			
		24	13	Texaco	Everding 1	349	1940	10307	-07563	-2.31			
		25	14	Macrate Miller	Mer 1	327	1955	10500	-07608	-2.32			
		25	15	Conoco	SP 1	348	1949	10347	-07612	-2.32			
		31	16	Texaco	Lillis 1	365	1940	10500	-07664	-2.34			
		32	17	Mele SUMPF	INSANT 84	476	1953	10504	-06774	-2.06			
		36	18	Superior Oil	Cantua Land 54	365	1943	10729	-07960	-2.43			
17 S.	16 E.	5	1	Hancock Oil	Hancock Union Bristow 77	274	1955	10031	-07984	-2.44			
		10	2	Superior Oil	Jacalitos 1	226	1946	10500	-08033	-2.44			
		11	3	Superior Oil	HCDS-1	226	1946	10510	-08033	-2.44			
		30	4	Shell	Port Costa 48	330	1939	10711	-07620	-2.32			
		32	5	Patrick A. Doheny	Crosby Farrell 31	270	1955	9350	-07805	-2.38			
17 S.	17 E.	2	1	Coast Gibson Oil	Five Points 1	199	1952	8052	-07426	-2.26			
		3	2	Amerada Petro. Corp.	Sunnyhope 53	201	1952	8202	-07434	-2.26			
		6	3	Kern	M & E 1	221	1956	9000	-07939	-2.42			
		7	4	Phillips American	Hopper 58	218	1953	8000	-07900	-2.41			
		8	5	Mobil	SOPAC B-1	218	1943	8835	-07853	-2.39			
		12	6	Superior Oil Co.	First Western 73	197	1962	8450	-07548	-2.30			
		18	7	Geochemical Surveys	Mahoney 72	230	1967	8450	-07549	-2.30			
		20	8	Western Continental	Everts 72	115	1963	10503	-08415	-2.56			
		21	9	Arco	Lillis 1	275	1949	10500	-08419	-2.57			
		28	10	Western Continental	G. Rossi Pat Largo 1	275	1949	9389	-08419	-2.57			
		35	11	Stanford & Musolf	Tracebure No. 1	235	1955	9665	-08560	-2.61			
17 S.	18 E.	7	1	Mobil	Kathcrow 53	201	1944	8288	-07415	-2.26			
		8	2	Mobil	Noble 88	196	1942	8508	-07464	-2.27			
18 S.	14 E.	1	1	Santa Fe Drilling	1908 68	672	1968	6400	-02500	-0.76			
18 S.	15 E.	4	1	Shell	Lillis Christie 78X	486	1959	10320	-07164	-2.18			
		5	2	Getty	SP 27	544	1964	7471	-05086	-1.55			
		6	3	Shell	SP 77X	503	1960	8861	-05897	-1.80			
		7	4	Texaco	Lillis 33	525	1941	7500	-05900	-1.80			
		12	5	F. F. Greene	Dumenigne 53	362	1962	9402	-06998	-2.24			
		16	6	Conoco	Dumenigne 1	588	1971	8332	-06484	-1.73			
		18	7	Sharples Oil Corp.	Lillis 88	595	1951	7900	-06475	-1.64			
		19	8	Pray & Walker Jr.	SP 36	396	1951	9403	-06275	-0.86			
		19	9	Texaco	Lillis 1	396	1941	10500	-07200	-2.04			
		21	10	Exxon	A. M. Dumenigne 1	362	1952	9124	-06332	-1.32			
		34	11	Sharples	Sharples Jordon 52	718	1948	9217	-02476	-0.75			
		35	12	Chevron	Dumenigne 64	718	1949	9000	-02350	-0.72			
		36	13	Chevron	Imperial Oil Fee 36	694	1948	8400	-03255	-1.00			
		36	14	Superior Oil	Dumenigne Dumenigne 73	636	1948	8600	-05455	-1.66			
		36	15	Superior Oil	Anderson 37	636	1949	8447	-05589	-1.70			
		36	16	Sunray Mid Continent	Paulson 42	600	1955	9965	-07140	-2.18			
18 S.	16 E.	1	1	Exxon	C. A. Puchhaber and others 1	293	1957	11000	-08039	-2.45			
		2	2	Bell Petro.	Bell Universal SP 54	350	1959	9412	-08910	-2.71			
		15	3	Superior Oil	SPL 1	305	1939	11442	-08760	-2.67			
		23	4	Les Cat & J. W. Wood	SP 23-1	311	1956	9616	-09141	-2.79			
		25	5	Exxon	Southern Pacific RR Co. 1	350	1959	9500	-09200	-2.80			
		26	6	Universal Consol.	Seaboard SP-27	309	1959	9400	-09753	-2.95			
		26	7	Universal Consol.	Seaboard SP 45	479	1952	11549	-08455	-2.58			
18 S.	17 E.	9	1	Shell	O'Neill 1	250	1960	11222	-09385	-2.86			
		30	2	Shell Oil Co.	SPL Oil Bank 1	350	1963	12000	-09175	-2.80			
		31	3	Pure Oil	SPL Co. 1	350	1963	12236	-09175	-2.96			
18 S.	18 E.	11	1	Texaco	SP (MCT-11)	225	1956	10200	-08795	-2.68			
19 S.	15 E.	1	1	Getty	Flatshacker 1	638	1938	7378	-04767	-1.33			
		1	2	Fernle Enterprises	Paseos 41	566	1958	8776	-06044	-1.85			
		3	3	Sharples	Flatshacker 84	564	1948	8400	-05681	-1.79			
		4	4	Sharples	Flatshacker 85	566	1949	8433	-05499	-1.65			
		2	5	Chevron	Prospect Hole 8	786	1952	2843	-00021	-0.62			
		5	6	Chevron	1	786	1951	3000	-00200	-0.67			
		5	7	Chevron	Core Hole A	1020	1944	217	0,04	-0.04			
		11	8	Chevron	77	1020	1944	2215	-00978	-0.30			
		11	9	Chevron	102	840	1945	2570	-01670	-0.51			
		11	10	Chevron	116	786	1955	3058	-02253	-0.69			
		11	11	Chevron Oil	Fairlaine 1	786	1956	3500	-02600	-0.79			
		12	12	Chevron	Mitchum 58	749	1967	4719	-03978	-1.18			
		13	13	Norris	Dehmt 84	660	1970	7353	-04568	-1.39			
		13	14	L. C. Brown	Standard Fee 31	745	1962	6673	-05050	-1.48			
		13	15	Chevron	81	693	1956	7203	-04317	-1.32			
		14	16	Shell	86	693	1957	7000	-04500	-1.38			
		14	17	Shell	363X	1265	1952	10414	300	0.09			
		18	18	Fresno Exploration	Phelps Gov't 2	575	1947	4582	1180	0.36			
		21	19	Shell	8	1387	1955	2000	250	0.10			
		21	20	Shell	988	1040	1949	2500	-00915	-0.28			
		22	21	Chevron	1	1040	1949	2581	-00915	-0.28			
		22	22	Chevron	28	1111	1943	2556	-01540	-0.47			
		23	23	Chevron	32	950	1953	2610	-01360	-0.41			
		23	24	Chevron	63	800	1943	3000	-01600	-0.49			
		24	25	R. S. Doheny	83	800	1943	4344	-02423	-0.74			
		26	26	Shell	Shell Standard USL 83	762	1961	5343	-04462	-1.36			
		27	27	Chevron	110	744	1961	5340	-04724	-1.44			
		28	28	Chevron	110	1207	1944	3135	-01927	-0.59			
		28	29	Chevron	153	1207	1945	3000	-01800	-0.55			
		28	30	Chevron	153	1517	1947	2997	83	0.05			
		29	31	Shell	222A	1337	1970	1510	295	0.09			
		32	32	Shell	732A	1337	1970	1543	-00268	-0.09			
		33	33	Shell	752A	1340	1970	1950	-00615	-0.16			
		33	34	Shell	772A	1340	1970	1950	-00615	-0.16			
		30	35	Shell	6-11	1432	1960	970	912	0.28			
		30	36	Shell	777A	1293	1981	1500	-00137	-0.04			
		31	37	Standard	1-25	1153	1962	2210	-01037	-0.32			
		31	38	Westates Petro.	M-49	1237	1973	1745	-00448	-0.14			
		32	39	Chevron	54	1017	1943	4000	-02983	-0.91			
		33	40	Chevron	56	1017	1943	4045	-03003	-0.92			
		33	41	Chevron	71	1237	1944	2900	-01621	-0.50			
		35	42	Chevron	4	944	1940	2940	-01596	-0.50			
		35	43	Shell	19	879	1943	3642	-02731	-0.83			
		36	44	Chevron	76	1017	1943	4000	-02983	-0.91			
		36	45	Chevron	Tuentsag 11	765	1943	4360	-03049	-1.09			
19 S.	16 E.	3	1	Amtonil	SP 27	365	1961	10074	-09665	-2.95			
		6	2	Sharples	Hyde 1	599	1947	8900	-06657	-1.82			
		6	3	Shell	Standard Investment 1	599	1950	9000	-06657	-1.82			
		7	4	Chevron	Hyde 54	496	1966	9654	-07319	-2.23			
		7	5	Chevron	22	636	1948	8251	-05840	-1.78			
		7	6	Chevron	45	622	1947	8262	-05932	-1.80			
		7	7	Chevron	47	590	1950	8300	-06490	-1.90			
		9	8	Amerada Petro.	SP 1	350	1970	9000	-07450	-2.27			
		9	9	Amerada Petro.	Prospect 38	437	1950	8758	-08118	-2.47			
		17	10	Amerada Petro.	SPL 37	526	1940	9511	-06683	-2.04			
		19	11	Chevron	Cole 55	474	1949	9000	-07500	-2.29			
		20	12	Shell	1	500	1940	8245	-06984	-1.72			
		21	13	F. C. Davonst	SP 35	441	1960	9006	-07250	-2.15			
		21	15	Texaco	SP 58	448	1944	10558	-07932	-2.42			
		28	16	Superior Oil	Spell 1	400	1947	11000	-11250	-3.42			
		28	17	Superior Oil	Spelling Oil	400	1947	11044	-11250	-3.42			
		28	18	Superior Oil	SPL 33-27	423	1949	11274	-08619	-2.63			
		28	19	Kennsall Oil	JA & K 1	482	1949	9793	-07419	-2.26			
		30	20	Bandini Petro.	558	446	1941	8228	-06234	-1.90			
		32	21	Chevron	1	446	1941	8000	-06000	-1.83			
		33	22	Reserve Oil	Reserve Union 44	439	1956	10443	-08297	-2.50			
19 S.	17 E.	6	1	Tidewater Oil Co.	Indian Westates 25	343	1955	12330	-10271	-3.13			
		24	2	Texaco	Rhein 1	325	1956	13437	-10990	-3.35			
19 S.	18 E.	21	1	Morton Central Oil	Boston Ranch Co. 1	290	1979	12715	-12110	-3.42			
20 S.	14 E.	1	1	Chevron	67	990	1955	1123	140	0.04			
		11	2	Kaltings Drilling	5	944	1936	1298	594	0.18			
		11	3	Shell	6	944	1936	1300	594	0.18			
		14	4	Chevron	78	840	1944	1070	-00130	-0.04			
		23	5	Chevron	Ziar 18	897	1945	1500	-00458	-0.14			
		24	6	Getty	Claremont 3-A	784	1947	1446	-00621	-0.19			
		25	7	Chevron	85	874	1942	1451	-00543	-0.16			
		25	8	Chevron	87	874	1942	1500	-00490	-0.15			
		26	9	Chevron	Victoria Fee 73	875	1960	1961	-00490	-0.15			
		35	10	Texaco	1	1346	1934	1392	546	0.17			
		35	11	Texaco	1	1148	1935	1885	758	0.08			
		35	12	Shell	Section One 1	1443	1938	1363	796	0.24			
20 S.	15 E.	1	1	Shell	12	852	1943	4230	-03373	-1.03			
		2	2	Shell	71	781	1944	4255	-03469	-1.06			
		3	3	Shell	101	883	1944	4000	-03117	-0.95			
		4	4	Shell	116	883	1960	7006	-03267	-1.93			
		4	5	Royalty Service	Mack 14-44	995	1943	3963	-02681	-0.80			
		5	6	Chevron	Z-11	914	1953	3100	-02178	-0.66			
		5	7	Chevron	102	914	1953	3000	-02078	-0.63			
		7	8	Superior Oil of Calif.	California Coalinga 77	838	1943	4604	-03352	-1.02			
		10	9	Mobil	Medford 1	919	1938	4000	-02581	-0.79			
		11	10	Shell	51	908	1948	4075	-03082	-0.94			
		12	11	Shell	1	908	1948	4000	-03082	-0.94			
		12	12	Tidewater Oil	Meridian 66	973	1938	7500	-04317	-1.31			
		12	15	Getty Development	88	790	1939	6686	-04419	-1.35			
		12	16	Union	66	815	1940	6997	-04680	-1.39			
		15	17	Shell	65	815	1945	7543	-05020	-1.53			
		17	18	Chevron	1	719	1951	7500	-05400	-1.65			
		19	19	R. S. Rheem	Zweng 1	719	1953	7875	-05413	-1.65			
		20	20	R. S. Rheem	Zweng 2	680	1954	8110	-05660	-1.73			
		21	21	R. S. Rheem	Rheem Standard 28	680	1960	7911	-05188	-1.58			
		28	22	Otis Inc. of Calif.	Fearon 2	780	1938	4833	-02347	-0.72			
		29	23	Shell	1	780	1938	4000	-02500	-0.76			
		29	24	Chevron	5302	776	1955	4305	-02494	-0.38			
		22	25	Superior Oil	Pleasant Valley Farms 1	683	1939	9418	-05467	-1.67			
		24	26	Union	Stanley 1	722	1939	9000	-05474	-1.67			
		24	27	Parkford & Assoc.	Coalinga 1	649	1949	8260	-06143	-1.87			
		26	28	Chevron Oil	Fee 1	633	1955	9000	-06367	-1.94	-6067	-1.85	0.23
		26	29	Sun Drilling	PGF 55-26	633	1955	9472	-06822	-2.08			
		28	30	Trico Oil	454	671	1968	5470	-04659	-1.42			
		31	31	Chevron	4-6	644	1963	4080	-03316	-1.01			
		32	32	Chevron	109	715	1942	3190	-02480	-0.75	-2058	-0.63	0.12
		34	33	Union	58	667	1942	3027	-02333	-0.86	-5173	-1.58	0.28
20 S.	16 E.	6	1	Texaco	Exter 5	669	1940	8150	-06178	-1.88			
		6	2	Union	Cagle 8-2	662	1940	8000	-06041	-1.85			
		6	3	Superior Oil	Cagle 8-3	644	1940	8164	-06200	-1.85			
		6	4	Superior Oil	Cagle 8-4	644	1940	8000	-06000	-1.83			
		6	5	Superior Oil	Cagle 8-9	762	1941	8000	-05238	-1.60			
		7	6	Union	1	799	1941	6882	-04663	-1.42			
		7	7	Union	2	865	1941	7000	-04635	-1.41			
		7	8	Union	13	765	1939	7368	-04897	-1.49			
		7	9	Union	21	765	1939	7000	-04529	-1.38			
		7	10	Union	42	763	1940	8020	-05569	-1.70			
		7	11	Los Nietos	66	800	1940	8015	-05402	-1.65			
		8	12	Union	1	837	1940	8000	-05578	-1.70			
		8	13	Superior Oil	Hight 2	690	1939	8300	-06167	-1.88			
		8	14	Superior Oil	Hight 3	690	1939	8000	-05867	-1.79			
		12	15	F. M. Taylor	34	451	1954	9144	-08549	-2.60			
		12	16	Westates Petro.	PGF 118	430	1967	12518	-11515	-3.51			
		14	17	Union	6-14	501	1955	9000	-08499	-2.64			
		16	18	C. F. Braun & Co.	Mesters 81	602	1947	9757	-08158	-2.49			
		16	19	F. M. Taylor	1	602	1949	9351	-06958	-2.12			
		16	20	F. M. Taylor	63	522	1954	9914	-07718	-2.35			
		16	21	R. Giffen	81F	480	1953	10189	-07960	-2.43			
		17	22	M. I. Lehow	88	501	1955	9000	-07499	-2.28			
		18	23	Union	22	716	1939	8235	-06214	-1.84			
		18	24	Union	22	722	1942	8022	-05958	-1.82			
		18	25	Union	8	793	1941	7800	-05282	-1.61			
		18	26	R. S. Lytle	22	817	1939	7422	-04943	-1.51			
		18	27	Union	44	803	1941	7800	-05000	-1.52			
		18	28	Union	46	803	1941	7803	-05310	-1.59			
		18	29	Union	62	844	1941	7992	-05406	-1.65			
		30	30	Los Nietos	60	749	1940	8051	-05523	-1.68			
		18	31	Union	74	801	1944	8146	-05549	-1.70			
		19	32	Union	32	729	1940	7800	-05471	-1.67			
		19	33	Chevron	33	729	1940	7800	-05641	-1.72			
		19	34	Chevron	64	680	1944	7780	-05775	-1.76			
		20	35	Union	1	696	1940	8150	-05867	-1.79			
		20	36	Union	PGF 77	544	1945	8937	-06671	-2.00			
		21	37	Chevron	PF 5	554	1955	9000	-06500	-1.98			
		21	38	Chevron	9	554	1955	9015	-06500	-2.01			
		21	39	Chevron	PGF 28F	540	1943	9255	-06930	-2.11			
20 S.	17 E.	5	1	Shell	12	852	1943	4230	-03373	-1.03			
		2	2	Shell	71	781	1944	4255	-03469	-1.06			
		3	3	Shell	101	883	1944	4000	-03117	-0.95			
		4	4	Shell	116	883	1960	7006	-03267	-1.93			
		4	5	Royalty Service	Mack 14-44	995	1943	3963	-02681	-0.80			
		5	6	Chevron	Z-11	914	1953	3100	-02178	-0.66			
		5	7	Chevron	102	914	1953	3000	-02078	-0.63			
		7	8	Superior Oil of Calif.	California Coalinga 77	838	1943	4604	-03352	-1.02			
		10	9	Mobil	Medford 1	919	1938	4000	-02581	-0.79			
		11	10	Shell	51	908	1948	4075	-03082	-0.94			
		12	11	Shell	1	908	1948	4000	-03082	-0