STATE OF ILLINOIS

DEPARTMENT OF REGISTRATION AND EDUCATION

ST. LOUIS (MISSISSIPPIAN) OIL PRODUCTION IN JASPER COUNTY, ILLINOIS

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ILLINOIS PETROLEUM 82

ILLINOIS STATE GEOLOGICAL SURVEY

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ABSTRACT

A well in the St. Louis Limestone in Jasper County, Illinois, was completed in December 1965 for 538 barrels of oil a day, flowing from a dolomite zone at a depth of 2940 to 2961 feet. The well, Union Oil Company of California No. 1 Leo Menke "A", is located at the northern end of the Clay City Consolidated pool.

As a result of extensive drilling and testing of the St. Louis Limestone stimulated by this discovery, 16 producers have already been completed in the St. Louis that have initial production ranging from 140 to 1200 barrels of oil per day.

The probable presence of an active water drive suggests that St. Louis production along the 45-mile-long Clay City Anticline will be controlled in part by local structural conditions.

St. Louis production, much of it minor, from 26 other widely scattered pools indicates the St. Louis is a potential target in much of the Illinois Basin.

INTRODUCTION

On December 17, 1965, Union Oil Company of California completed its No. 1 Leo Menke "A" for 538 barrels of oil per day flowing from a dolomite zone in the St. Louis Limestone at a depth of 2940 to 2961 feet. The well is located in the E/2 NW NW, sec. 34, T. 7 N., R. 10 E., Jasper County, at the northern end of the Clay City Consolidated pool (figs. 1 and 2).

During the summer of 1965, many wells in the immediate vicinity of the Leo Menke lease had been deepened from their nearly depleted McClosky or shallower pays to dolomite zones 80 to 125 feet in the Ste. Genevieve Limestone. These dolomite zones, some 150 feet above the St. Louis producing zone in the No. 1 Leo Menke "A", initially produced

TABLE 1 — ST. LOUIS OIL PRODUCTION IN ILLINOIS*

No.	Pool	County	Township and Range	Number of wells	Depth (ft)
1	Barnhill	Wayne	3S, 8E	1	3520
2	Benton	Franklin	6S, 2E	1	2990
3	Casey	Clark	11N, 14W	unknown	450
4	Clay City C	Clay, Jasper, Richland, Wayne	1S-7N, 8-10E	41	3000
5	Clay City West C	Clay	3N, 5E	1	3175
6	Covington South	Wayne	2S, 6E	1	3360
7	Dale C	Hamilton	6S, 7E	1	3160
8	Divide C	Jefferson	1S, 3-4E	21	2840
9	Ellery North	Wayne	2S, 9E	1	3440
10	Exchange East	Marion	1N, 4E	1	2940
11	Frogtown North	Clinton	2-3N, 3-4W	5	1200
12	Goldengate C	Wayne	2S, 9E	3	3430
13	Ina	Jefferson	4S, 2E	7	3000
14	Inman East C	Gallatin	7S, 10E	1	2960
15	Iuka	Marion	2N, 4E	15	2775
16	Johnsonville C	Wayne	1S, 6E	6	3250
17	Kenner	Clay	3N, 5E	1	2975
18	Lawrence	Lawrence	2-4N, 11-12W	9	1660
19	Martinsville	Clark	10N, 13W	24	480
20	Mill Shoals	White	3S, 8E	1	3550
21	New Harmony C	White	4S, 14W	1	3150
22	Salem C	Marion	1-2N, 2E	15	2100
23	Sesser C	Franklin	6S, 1E	1	3000
24	Walpole	Hamilton	6S, 6E	1	3540
25	Waltonville	Jefferson	3S, 2E	1	2770
26	Westfield	Clark, Coles	11-12N, 11E, 14W	unknown	340
27	Whittington	Franklin	5S, 3E	1	3080

* Pool numbers are same as shown in figure 1; C = Consolidated.

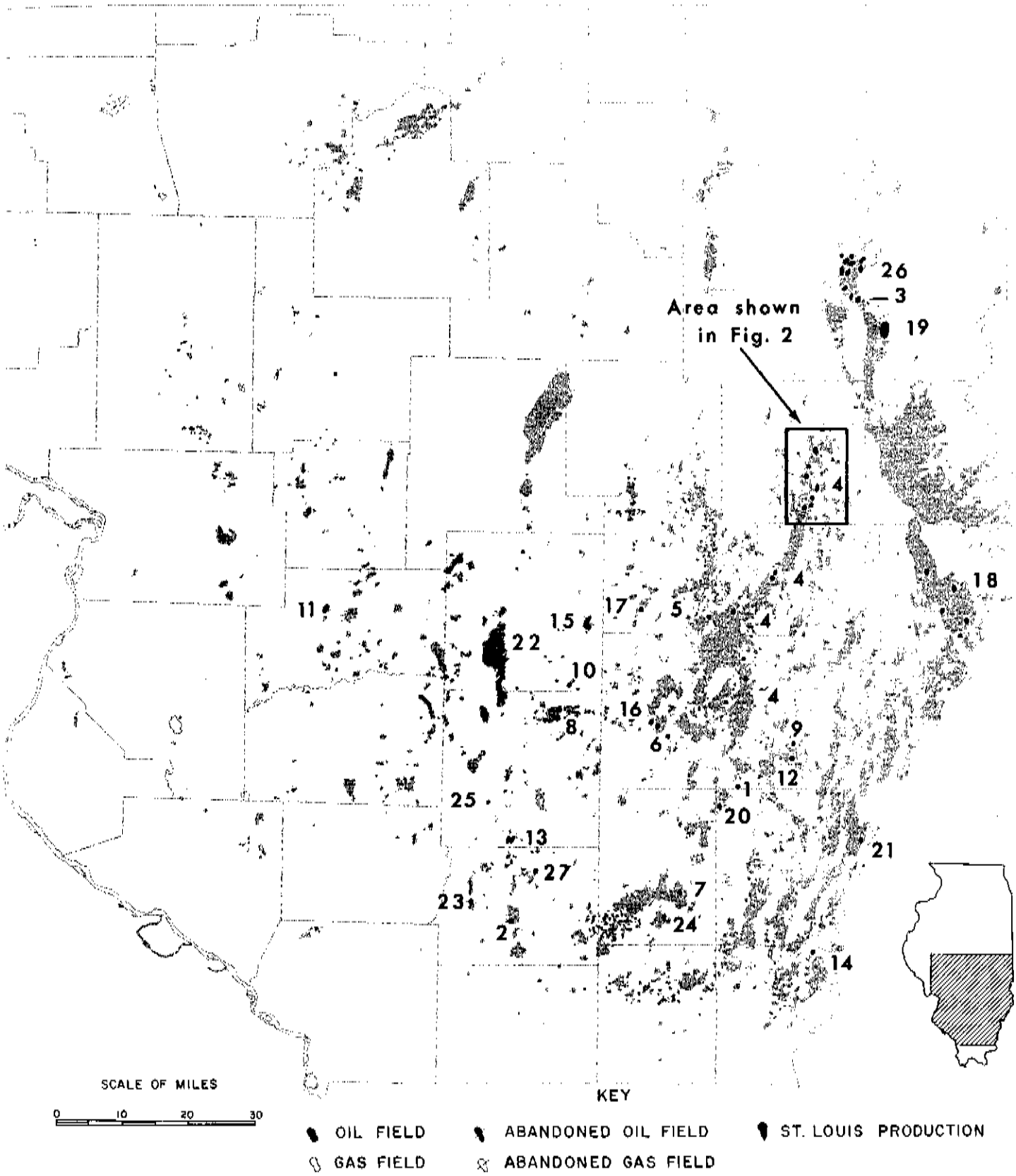

Fig. 1 — St. Louis oil production in Illinois (see table 1 for pool names)

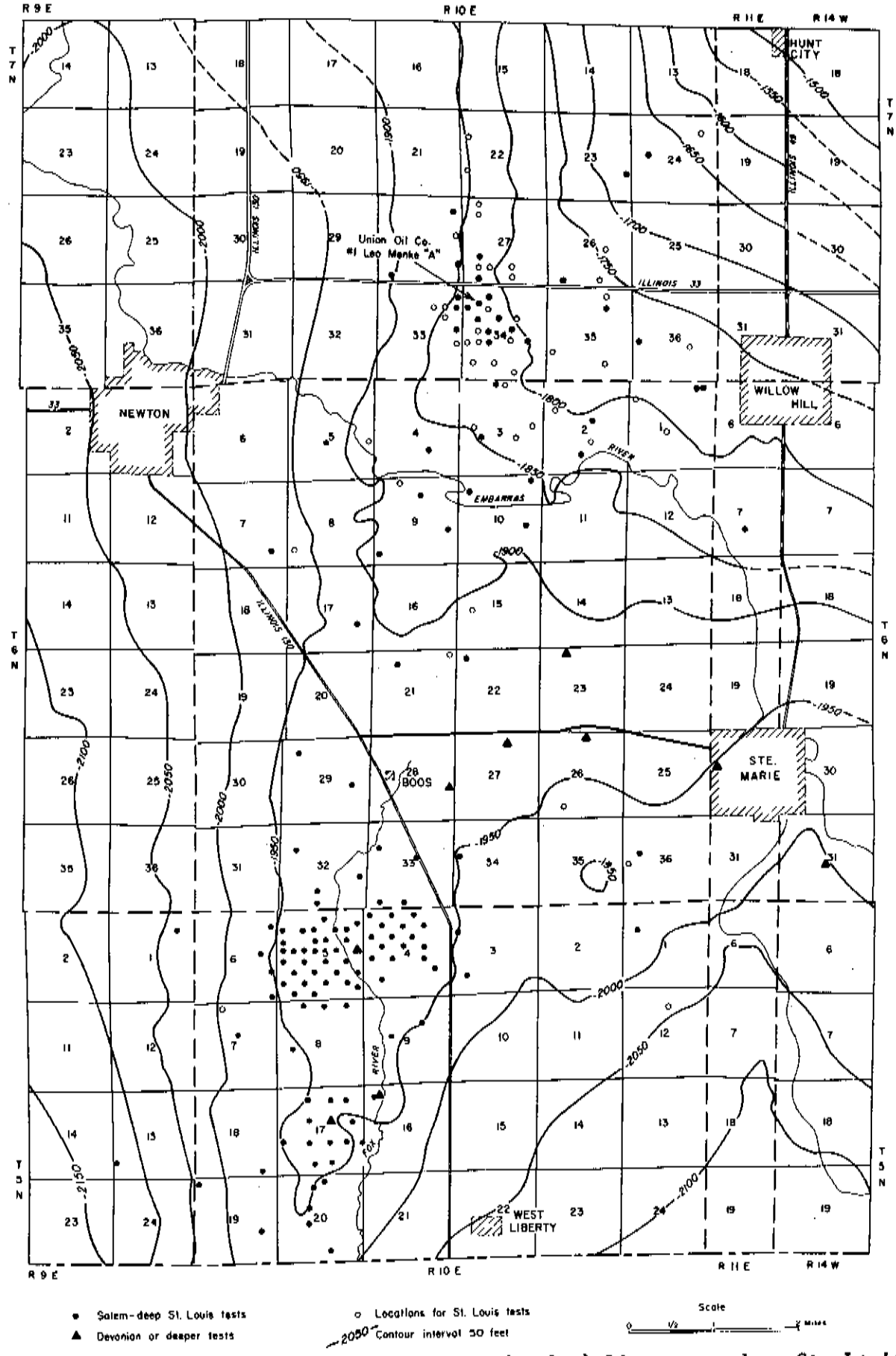

Fig. 2 — Structure on base of Beech Creek (Barlow) Limestone; deep St. Louis tests and locations are indicated (not all control points are shown).

25 to 100 barrels of oil per day, and their success set the stage for the St. Louis discovery in the No. 1 Leo Menke "A" that has stimulated extensive drilling and testing of the St. Louis section in Jasper County. A list of holes penetrating the new St. Louis pay zone appears in appendix 1, and recent locations appear in appendix 2.

This report briefly discusses the St. Louis production in Jasper County and indicates the widely scattered areas of previous St. Louis production in Illinois. It summarizes information that may be helpful in future exploration for St. Louis oil in the Illinois Basin.

ST. LOUIS OIL PRODUCTION

The first St. Louis oil production in Illinois was from the Westfield, Casey, and Martinsville pools (numbers 26, 3, 19, respectively, in fig. 1). These pools were discovered along the LaSalle Anticlinal Belt between 1900 and 1907. Subsequently, 24 additional pools produced oil from the St. Louis (table 1). Although no complete St. Louis production figures are available, several pools are known to have produced hundreds of thousands of barrels of St. Louis oil.

St. Louis Production in Jasper County

Stratigraphy

The geologic section in the Union Oil Company of California No. 1 Leo Menke "A" is shown in figure 3. The thicknesses given for the formations down through the St. Louis are based on a sample study by Elwood Atherton of the Illinois State Geological Survey. The part of his study that includes strata from Downeys Bluff Limestone to total depth appears as appendix 3 to this report. The electric log and drilling time log from the Yankeetown Sandstone to total depth are shown in figure 4.

The top of the St. Louis Limestone is marked by the appearance of anhydrite and dark brown limestone that forms a contrast to the grayish brown limestone of the overlying Ste. Genevieve.

The producing interval in the No. 1 Leo Menke "A" is a 21-foot, light brown to brown, extra-fine dolomite 194 feet below the top of the St. Louis and 340 feet below the top of the Ste. Genevieve. Several other dolomite breaks with shows of oil occur in the St. Louis above and below this producing zone, as indicated on the electric and drilling time logs (fig. 4).

The base of the St. Louis is difficult to pick from the electric log, but examination of the well cuttings from the No. 1 Leo Menke "A" shows it to be at 3096 feet, 13 feet above a porous Endothyra zone of the Salem that is generally recognizable on the electric log. The upper 13 feet of the Salem is light brownish gray, oolitic limestone in which the ooliths have dark centers.

SYSTEM	SERIES	FORMATION OR GROUP		DEPTH (ft)	THICKNESS (ft)
QUATERNARY				0	20
PENNSYLVANIAN				20	1988
MISSISSIPPIAN	Chesterian	Waltersburg Ss.		2008	27
		Tar Springs Ss.		2035	118
		Glen Dean Ls.		2153	9
		Hardinsburg Ss.		2162	63
		Haney Ls.	Golconda	2225	23
		Fraileys Sh.		2248	39
		Beech Creek ("Barlow") Ls.		2287	13
		Cypress Ss.		2300	155
		Ridenhower		2455	15
		Bethel Ss.		2470	20
		Downeys Bluff Ls.		2490	8
		Yankeetown ("Benoist") Ss.		2498	37
		Renault Ls.		2535	6
	Valmeyeran	Aux Vases Ss.		2541	59
		Ste. Genevieve Ls.		2600	144
		St. Louis Ls.		2744	353
		Salem Ls.		3097	163
		Total Depth		3171	
Depths and thicknesses below Salem top are projected from the Lomelino No. 1 Ochs, NW NE sec. 27, T. 6 N., R. 10 E., Jasper County					
		Harrodsburg Ls.		3260	165
		Fort Payne Cht.		3425	375
		Borden Sts.		3800	185
	Kinderhookian	Chouteau Ls.		3985	5
		New Albany Sh.		3990	160
DEVONIAN		Lingle Ls.		4150	

Fig. 3 — Geologic section in the Union Oil Company of California No. 1 Leo Menke "A".

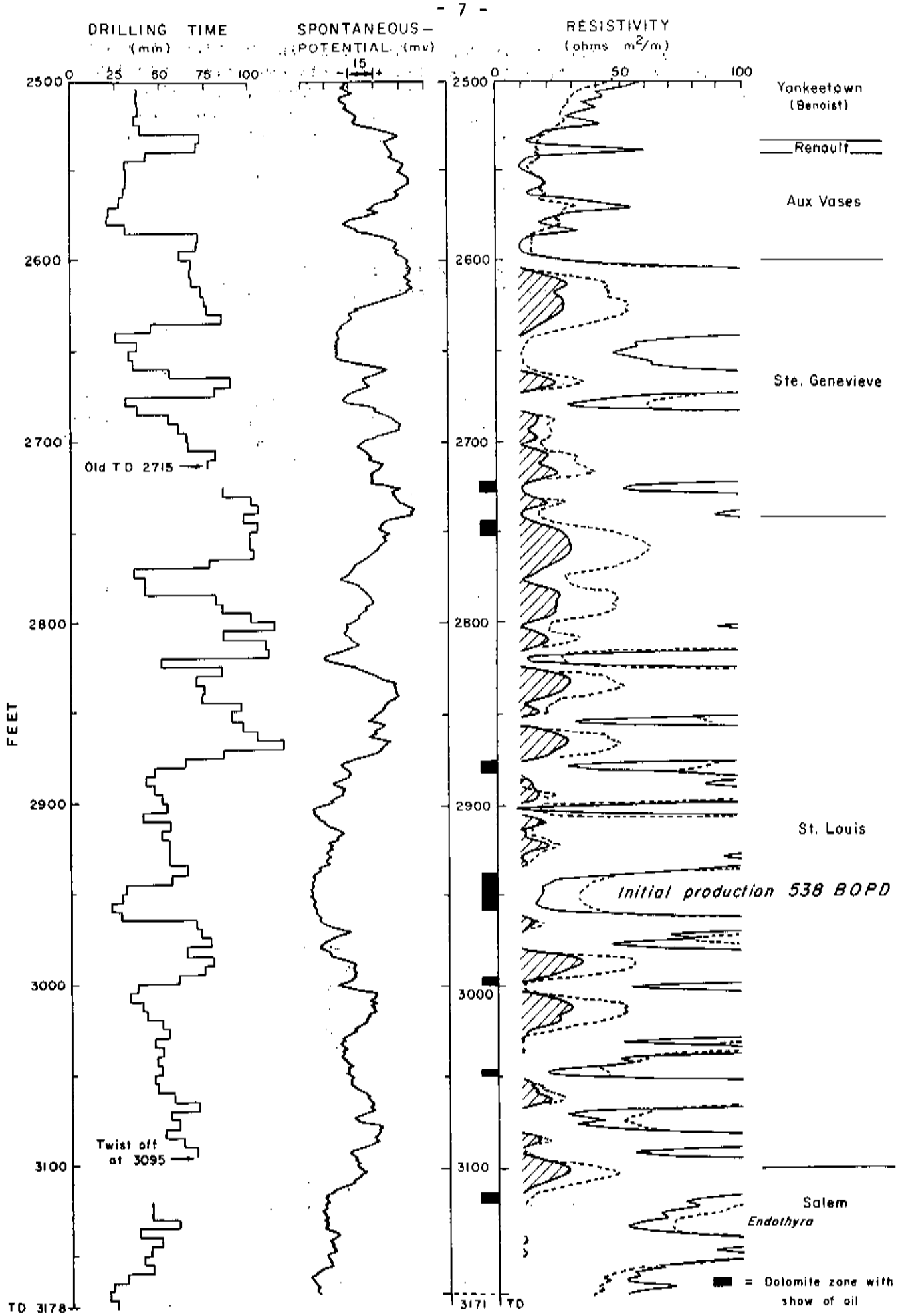

Fig. 4 — Drilling time log and electric log of Union Oil Company of California

Structure

St. Louis production in Jasper County is in the Clay City Consolidated pool (fig. 1). This is a series of pools extending from Hunt City at the north (fig. 2) to Fairfield in Wayne County, some 45 miles southwestward. The pools are located on a succession of southward-plunging anticlinal noses that compose the Clay City Anticline (often called the "Pure Trend").

Oil Production

The Pure Oil Company originally completed the No. 1 Leo Menke "A" in 1946 as dry and abandoned, 115 feet into the Ste. Genevieve (total depth 2715 feet). In 1957 it was deepened through the St. Louis and 74 feet into the Salem Limestone (total depth 3171 feet). Although the Salem was drill-stem tested, the St. Louis was not, and the well was again abandoned. In December 1965, Union Oil Company of California, which had absorbed the Pure Oil Company in 1965, re-entered the old hole, perforated the 2940- to 2953-foot interval of the St. Louis with 26 shots, and treated it with 8000 gallons of acid. The well came in for an initial production of 538 barrels of oil per day, flowing through a 10/64-inch choke. Six weeks later it had produced over 10,000 barrels of oil and was still flowing 175 barrels of oil and 3 barrels of salt water per day.

Since the completion of the Menke well 16 other St. Louis producers have been completed in the vicinity. Reported initial production figures range from 140 to 1200 barrels of oil per day. An oil sample from the No. 1 Leo Menke "A" that was analyzed by the Geological Survey's Analytical Chemistry Section had a gravity of 39.60° API at 60° F. Other reported gravities have ranged from 39.0° to 41.4°.

Wells structurally lower than the No. 1 Leo Menke "A" are producing much salt water. This suggests an active water drive. Many large flares indicate that solution gas also is helping to drive the oil.

Completion and Production Practices

General practice in completing and producing these wells has been to set pipe through the pay, perforate, and treat with 5000 to 10,000 gallons of acid. Some of the work-over wells (previously producing from McClosky or shallower pays) have been completed by drilling a slim hole below the original production string and then running 2½-inch pipe set on a packer, perforating, and then acidizing. The Pure Transportation Company (a division of Union Oil Company of California) and Ashland Oil Company are taking the oil from this area and are paying on a basis of $3.10 per barrel for 40° gravity oil with a 2-cent per barrel drop per degree of gravity from 39.9° to 38.0°, then a 3-cent per barrel drop per degree below 37.9°.

CONCLUSIONS

The recent discovery of prolific St. Louis producers in Jasper County, significant in itself, should lead to a re-examination of St. Louis

possibilities throughout the Illinois Basin. Although a majority of pools producing from the St. Louis have had only one St. Louis well, St. Louis production is widely scattered and therefore is a potential target over much of the basin. It would be especially attractive in old pools that have reached their economic limit producing from shallower pays.

Dolomite production from the St. Louis in the vicinity of the No. 1 Leo Menke "A" may have an active water drive. This suggests that oil production along the Clay City Anticline will be controlled in part by local structural conditions.

APPENDIX 1

Holes Penetrating New St. Louis Pay Zone

In Jasper County, Illinois

Sec.	T.	R.	Location	Well	Total depth (ft)
1	5N	9E	747 NL, 1090 EL, NE	Slape #2 J. Manning	3656
13	5N	9E	NW SW SW	Spickler & Kiser Oil Co. #1 Ben Bollman	3600
1	5N	10E	NE SW NW	J. W. Rudy #2 Milliam "A"	3462
3	5N	10E	NW SW NW	H. W. Brinkley #1 Ochs	3341
3	5N	10E	NW SW SW	Bayles #1 A. E. Redman	3325
4	5N	10E	NW NW NW	Pure #4 J. Rohr	3302
4	5N	10E	NW SE NW	Pure #1 Bolander Consol.	3304
4	5N	10E	NW SW NE	Pure #4 M. Bolander "A"	3305
4	5N	10E	SE SW NE	Pure #5 M. Bolander "A"	3312
4	5N	10E	SE NE NW	Pure #6 M. Bolander "A"	3309
4	5N	10E	NW NW NW	Pure #7 M. Bolander "A"	3310
4	5N	10E	NE SW SW	Brinkley #1 Hines-Ochs Comm.	3305
4	5N	10E	SE SW NW	Pure #2 W. Kermicle "C"	3303
4	5N	10E	SE NW NW	Pure #3 W. Kermicle "C"	3310
4	5N	10E	NE NW SE	Brinkley #1 L. Ochs Comm.	3304
4	5N	10E	SW NE SE	Brinkley #3 L. Ochs Comm.	3314
4	5N	10E	NW NE SW	Zanetis #1 Ochs Comm. "B"	3324
4	5N	10E	SE SE NW	Zanetis #1 Richards Consol.	3328
4	5N	10E	SE NW NE	Pure #3 Roberts Consol. "A"	3304
4	5N	10E	NW NW NE	Pure #4 Roberts Consol. "A"	3340
4	5N	10E	360 NL, 330 WL, SW NW	Pure #3 J. Rohr	3301
4	5N	10E	NW NW SW	Pure #1 Rohr Consol. "B"	3274
5	5N	10E	SE NE SW	Pure #3 Cunningham "A"	3301
5	5N	10E	SE NW SW	Pure #4 B. Cunningham "A"	3306
5	5N	10E	NW NE SW	Pure #5 B. Cunningham "A"	3313
5	5N	10E	NW NW SW	Pure #6 B. Cunningham "A"	3313
5	5N	10E	SE SE NW	Zanetis #1 G. Keller	3309
5	5N	10E	SE SW NW	Zanetis #2 G. Keller	3306
5	5N	10E	NE SE NW	Zanetis #3 G. Keller	3283
5	5N	10E	SW SE NW	Zanetis #6 G. Keller	3303
5	5N	10E	SW SW NW	Zanetis #7 G. Keller	3298
5	5N	10E	530 NL, 330 WL, SW NW	Zanetis #8 G. Keller	3314

APPENDIX 1 -- Continued

Sec.	T.	R.	Location	Well	Total depth (ft)
5	5N	10E	SW NE NE	Zanetis #1 Kermicle-Payne	3289
5	5N	10E	C E/2 NE NE	Zanetis #2 Kermicle-Payne	3308
5	5N	10E	NW NW SE	Pure #4 C. King "A"	3307
5	5N	10E	NW SW SE	Pure #5 C. King "A"	3302
5	5N	10E	SE NW SE	Pure #6 C. King "A"	3287
5	5N	10E	NW SE SE	Pure #7 C. King "A"	3283
5	5N	10E	NW SW NE	Pure #2 King Consol.	3290
5	5N	10E	SE SW NE	Pure #3 King Consol.	3305
5	5N	10E	NW NE SE	Pure #3 W. J. Maginn "A"	3282
5	5N	10E	SE NE SE	Pure #4 W. J. Maginn "A"	3275
5	5N	10E	SE NE NW	Calvert #1 Mattingly Comm.	3284
5	5N	10E	SW NE NW	Calvert #2 Mattingly Comm.	3286
5	5N	10E	NW NW NE	Pure #2 J. Mattingly	3291
5	5N	10E	SE NW NE	Pure #3 J. Mattingly	3310
5	5N	10E	SW NW NW	Zanetis #2 Mattingly	3336
5	5N	10E	NW SE SW	Athene #2 A. Roberts	3306
5	5N	10E	SE SE SW	Athene #3 A. Roberts	3308
5	5N	10E	NW SW SW	Athene #4 A. Roberts	3312
5	5N	10E	SE SW SW	Athene #5 A. Roberts	3309
5	5N	10E	SE SE NE	Pure #3 Rohr Consol.	4500
5	5N	10E	NW SE NE	Pure #4 Rohr Consol.	3276
5	5N	10E	C E/2 SE SE	Pure #1 H. Wartsbaugh "A"	3301
6	5N	10E	SE NE SE	Pure #7 Cunningham "A"	3318
6	5N	10E	SW SE NE	Zanetis #3 G. Keller "A"	3330
6	5N	10E	C E/2 NE NE	Zanetis #1 Payne Heirs	3405
6	5N	10E	SE SE SE	Pure #3 H. Wartsbaugh "B"	3318
6	5N	10E	SE SE NE	Zanetis #1 G. Keller "A"	3307
7	5N	10E	C W/2 SW NE	Pure #3 R. E. Hall	3400
8	5N	10E	NE NW SW	New Ill. Midcontinent #1 Byrnes	3458
8	5N	10E	NW NE NE	Murvin & Stever #1 Cunningham	3300
8	5N	10E	NW NW NE	Pure Oil #8 R. Shinn	3312
8	5N	10E	NW NE NW	Pure Oil #9 R. Shinn	3311
9	5N	10E	NE SW NE	Carter #1 L. K. Gustin	3336
9	5N	10E	SW SE NW	H. W. Brinkley #1 F. Zuber	3335
16	5N	10E	C NW NW	Pure #1 A. M. Dorn	3310
16	5N	10E	C E/2 NW NW	Pure Oil #1 M. P. Redman	4584
17	5N	10E	625 SL, 625 EL, NE NW	Pure #5 M. Aldridge	3348
17	5N	10E	645 NL, 660 WL, NW SE	Pure Oil #4 J. Canny	3340
17	5N	10E	2026 SL, 990 EL, SE	Pure Oil #1 L. E. Canny	3319
17	5N	10E	673 SL, 2318 WL	Pure Oil #1 Anise Davidson	3313

APPENDIX 1 — Continued

Sec.	T.	R.	Location	Well	Total depth (ft)
17	5N	10E	660 SL, 685 WL, SW SE	Pure Oil #7 Anise Davidson	3309
17	5N	10E	C SE NW	Pure Oil #6 J. W. Dickerson "A"	3367
17	5N	10E	C W/2 NW SW	Pure Oil #4 L. Hall	3371
17	5N	10E	C NE SW	Pure Oil #5 L. Hall	3360
17	5N	10E	C NW NE	Pure Oil #3 C. M. Honey "A"	3323
17	5N	10E	C W/2 NE NE	Pure Oil #4 J. W. Honey "A"	3321
17	5N	10E	C SW NE	Pure Oil #5 J. W. Honey "A"	4558
17	5N	10E	C SE NE	Pure Oil #6 J. W. Honey "A"	3350
18	5N	10E	SW SE SE	Pure #2 A. Sprsul	3347
19	5N	10E	W/2 NE SE	Pure #2 W. R. Cunningham	3407
19	5N	10E	330 NL, 1650 EL, NE frac. NW	Shulman #1 Worcester	3280
20	5N	10E	NW NW NE	Shulman Bros. #1 Adams	3347
20	5N	10E	C N/2 NE SW	Expl. & Dev. #1 Tedford	3330
20	5N	10E	674 NL, 330 EL, NE NW	Pure Oil #1 Dickerson Consol.	3333
20	5N	10E	C SE NW	Pure Oil #3 Robins Consol.	3328
20	5N	10E	C SW SE	P. Fulk #1 Tedford Consol.	3363
1	6N	10E	330 S, 420 E, NW/c NE NE	W. McKinney #1 R. Alexander	3115
1	6N	10E	330 NL, 420 WL, NE NE	Spickler #2 C. L. Ireland	3115
2	6N	10E	N/2 SW NW	Expl. & Dev. #3-A Dhom	3000
2	6N	10E	NE SE SW	Southern Ill. Oil Prod. #1 G. Dallmier	3011
2	6N	10E	SW SW NE	Francis Pierce #1 Dhom-Fear Comm.	3030
3	6N	10E	330 NL, 331 WL, NE SW	David F. Herley #1 T. J. Bergbower	3055
3	6N	10E	NE NE NW	Doran Oil Prop. #3 G. Bergbower	2997
3	6N	10E	2493 NL, 660 EL, NE	K. Freed #3 C. Mascher	3048
4	6N	10E	S/2 NW SE	Pure #1 J. Schiessl "A"	3206
5	6N	10E	NE NE SW	Brever & Robison #1 Acklin	3330
7	6N	10E	NW SE SE	Pass Oil #1 Reep	3414
9	6N	10E	SW NW NE	Fulk #1-A McIntire	3150
9	6N	10E	C NE SE	Pure #1 M. Bergbower "B"	3358
9	6N	10E	C W/2 SW SW	Pure Oil #1 Anton Eckl "A" (Howard #2 Keller)	3265
10	6N	10E	C S/2 NW NW	Southern Ill. Oil Prod. #1 G. Bergbower	3310
10	6N	10E	NW NE SE	Partlow #1 Hahn	3100
10	6N	10E	C N/2 NE NE	Baldridge #1 Kerner	3012
17	6N	10E	SW NE SE	Murvin & Steber #1 W. Murvin	3486
21	6N	10E	SW NE NW	Van Fossan #2 Houser-Sears	3330
22	6N	10E	C NW SE	Calvert #1 Huss et al.	3547

APPENDIX 1 — Continued

Sec.	T.	R.	Location	Well	Total depth (ft)
23	6N	10E	NW NE NW	Rudy #1 P. Ochs	4515
26	6N	10E	NW NW NE	Don Baines #1-A Keller	4527
27	6N	10E	C NW NE	Lomelino #1 X. Ochs	4515
28	6N	10E	E/2 NE SE	Brever & Robison #1 F. Albright	4540
29	6N	10E	NW NE SE	Calvert #2 G. Kistner	3401
29	6N	10E	SE NW NW	D. B. Bayles #1 Kocher et al.	3344
32	6N	10E	SE SE SW	Zanetis #1 J. Clapp	3317
32	6N	10E	E/2 NE SE	Pure Oil #2 E. Hemrick	3332
32	6N	10E	NE SE SW	Pure Oil #1 W. Kermicle "D"	3321
32	6N	10E	NE SW NW	D. Slape & McConnel #B-1 J. Raef	3558
33	6N	10E	N/2 SW NW	Zanetis #1 B. Bigard	3300
33	6N	10E	SW SW NE	J. M. Zanetis #1 Bigard Consol. "A"	3322
33	6N	10E	SE SE SW	Pure Oil #6 J. Frohning	3309
33	6N	10E	C S/2 SW SW	Pure Oil #7 J. Frohning	3390
34	6N	10E	SW SW NW	Fulk #1 Smithhenry	3314
36	6N	10E	SE SW NW	Rudy #1 H. Menke	3366
7	6N	11E	SW NW SE	A. J. Slagter #1 Reeves	3270
30	6N	11E	330 SL, 330 WL of frac. NW	Turnipseed & Formals #1 J. J. Hartrich	4500
31	6N	14W	NE NE SW	Don Baines Drlg. #1 Ferd Hartrich	4668
23	7N	10E	SE NE SE	Robinson & Puckett #2 L. Smith	3066
24	7N	10E	SE SW NW	Robinson & Puckett #3 Cummings	2919
26	7N	10E	SE SW SW	Runyon #1 L. H. Kerner	3300
27	7N	10E	SE SW SW	Ill. Oil Trust #2 J. Honey	2974
27	7N	10E	SE NW SW	Anson #1 Mattingly Comm.	3014
28	7N	10E	SE SW SW	Boxell #1 L. Kerner	3094
28	7N	10E	NE SE SE	Anson #5 C. A. Moschenrose	2993
28	7N	10E	C S/2 NE NE	Southern Ill. Prod. #1 N. Kerner	3092
33	7N	10E	NE NE NE	Union Oil of Cal. #1 J. Menke	3010
33	7N	10E	SE SE NE	Union Oil of Cal. #2 J. Menke	3082
34	7N	10E	NW NE SW	Tri-Apco #1-D Dhom Heirs	3176
34	7N	10E	405 N, 330 E, SW/c SE NW	Bangert Casing Pulling Co. #1 Dhom Heirs	3026
34	7N	10E	NW NE SE	Union Oil of Cal. #4 C. Miller	3030
34	7N	10E	SW NW NW	Union Oil of Cal. #A-2 L. Menke "A"	3010
34	7N	10E	E/2 NW NW	Union Oil of Cal. #1 L. Menke "A"	3172
34	7N	10E	NE SW NW	Bangert Casing Pulling #2 W. Menke Consol.	3010
34	7N	10E	NW NE NW	Ill. Oil Trust #1 Geo. Fear	3046

APPENDIX 1 -- Continued

Sec.	T.	R.	Location	Well	Total depth (ft)
34	7N	10E	330 SL, 430 WL, NE	Parrish Production Co. #3 R. A. Bergbower	3014
34	7N	10E	NE SE NW	M. L. Van Fossan #1 Gibbons	3016
35	7N	10E	SW NW SW	Union Oil of Cal. #2 C. Miller	3025
35	7N	10E	SE NW NE	Parrish-Ensminger #2 Hippler	3075
36	7N	10E	NW NW SW	Armantrout & Dannenberg #1 Burgund-York Comm.	3030

APPENDIX 2

Locations of Proposed St. Louis-Salem Tests

In Jasper County as of February 4, 1966

Sec.	T.	R.	Location	Well
1	6N	10E	NE NE SW	Amgo, Inc. #1 J. Brinson
1	6N	10E	SW NW NW	Exploration & Development #1 C. R. Short Comm.
3	6N	10E	2495 NL, 660 EL NE	K. Freed #3 C. Mascher
3	6N	10E	NE NW SE	Kinsell Oil Co. #1 Brinson
3	6N	10E	NW NW NE	Tri-Apco #C-2 Dhom Heirs
3	6N	10E	SE SW NW	H. F. Robinson #2 Kerner
5	6N	10E	NE NE SE	Edwards #E-4 A. Kerner
8	6N	10E	NW SW SW	Black & Black #1 R. Ridgeway
8	6N	10E	W/2 NE SE	Tatum-Marquand #2 Bergbower
9	6N	10E	NW NE NW	Tatum-Marquand #2 Long
16	6N	10E	NE NW SW	Black & Black #1 Geo. Dallmier
21	6N	10E	NE NE NE	Black & Black #1 E. Dallmier
26	6N	10E	C W/2 SE SW	Pointer Oil Co. #1 Rubsam
36	6N	10E	NW NW SW	Exploration & Development #1 C. Keller Comm.
22	7N	10E	330 N, 415 E, SW/c NW SW	C. B. & M. Oil Co. #1 Fitch-Cook
22	7N	10E	NW SW NW	Basin Oil Dev. #1 E. Townsend
24	7N	10E	SW NE NE	Ego Oil Co. #1 Madden Est.
26	7N	10E	NE NW SE	M. V. Ring #1 R. Hall
26	7N	10E	S/2 SW SE	Parrish Production Co. #1 Gilbert Selby
27	7N	10E	SW SW SE	S & M Oil Co. #3 R. Bond
27	7N	10E	NW SW SE	S & M Oil Co. #4 R. Bond
27	7N	10E	NW SE SW	Anson #1-A T. Bergbower
27	7N	10E	SE SW SW	Anson #2 J. Honey
27	7N	10E	NE SW SW	Illinois Oil Co. #1 Honey
27	7N	10E	SE NW NW	Southern Ill. Oil Prod. #1 A. Reisner
27	7N	10E	NE NW NW	Southern Ill. Oil Prod. #2 A. Reisner
28	7N	10E	SE SE NE	Fulk #1 T. Bergbower
33	7N	10E	SE NW NE	Parrish & Ensminger #2 I. Hippler
33	7N	10E	SE NE NE	Union Oil of Cal. #3 J. Menke
33	7N	10E	NW SE NE	Union Oil of Cal. #4 J. Menke

APPENDIX 2 — Continued

Sec.	T.	R.	Location	Well
33	7N	10E	C E/2 NE SE	Union Oil of Cal. #1 E. J. Schackmann "A"
34	7N	10E	C N/2 SW SW	Parrish Production Co. #3 Dhom Heirs
34	7N	10E	NW NE SW	Tri-Apco Inc. #D-1 H. Dhom Heirs
34	7N	10E	SE SW NW	Bangert Casing Pulling Co. #1-A Menke Consol.
34	7N	10E	NW NW SE	Tri-Apco Inc. #B-2 Dhom Heirs
34	7N	10E	NW NW SW	Tri-Apco Inc. #C-2 Dhom Heirs
34	7N	10E	NE NW SW	Tri-Apco Inc. #C-1 Dhom Heirs
34	7N	10E	C N/2 SW NE	Union Oil of Cal. #2 F. Wemmer
34	7N	10E	C S/2 SW SE	Tri-Apco #A-2 Dhom Heirs
34	7N	10E	C N/2 SE SW	Tri-Apco #A-2 H. Dhom Heirs
35	7N	10E	NE NW NE	Runyon #1 Miller-Brinson-Turnipseed Consol.
36	7N	10E	C E/2 NW SE	Spickler #1 L. Ferguson

APPENDIX 3

Summary Sample of Downeys Bluff to Salem Section of the Union Oil Company of California No. 1 Leo Menke "A"

by Elwood Atherton

(Depths adjusted to 1957 electric log)

Strata	Thickness (ft)	Bottom depth (ft)
Mississippian System		
Chesterian Series		
Downeys Bluff Limestone		
Limestone, light olive gray, fine to coarse; trace of chert	8	2498
Yankeetown ("Benoist") Sandstone		
Sandstone, slightly hematitic to very hematitic, light gray to red, very fine, angular, friable	7	2505
Sandstone, hematitic, reddish gray to red, very fine, angular, friable	22	2527
Shale, dark gray, red	8	2535
Renault Limestone		
Limestone, oolitic, medium light brownish gray, medium to coarse	6	2541
Valmeyeran Series		
Aux Vases Sandstone		
Shale, dark gray, red	23	2564
Sandstone, calcareous in part, light olive gray, light gray, very fine to fine, few medium grains, angular, compact, in part with fine to coarse brownish gray limestone grains, in part with oil show	8	2572
Sandstone, calcareous, light gray, very fine, angular, friable; sandstone, as above	8	2580
Sandstone, very dolomitic, brownish gray, very fine, compact; grading to dolomite, gray, extra-fine	6	2586
Shale, dark gray, red	14	2600
Ste. Genevieve Limestone		
Limestone, medium dark brownish gray, extra-fine, dense, in part with fine to medium light fossil grains; trace of chert	6	2606
Limestone, brownish gray, light gray, white, fine to coarse, fossiliferous; trace of chert	4	2610
Limestone, medium dark brownish gray, dense, with few dark grains; slightly cherty	5	2615

APPENDIX 3 - Continued

Strata	Thickness (ft)	Bottom depth (ft)
Limestone, as above; grading to sandstone, very calcareous, dark brownish gray, very fine, compact	8	2623
Limestone, oolitic, light olive gray, light gray, fine to medium, in part porous, oil show ("McClosky")	5	2628
Limestone, oolitic, light olive gray, fine to medium, in part very finely sandy	15	2643
Limestone, very sandy, light olive gray, very fine; grading to limestone, oolitic, as above	14	2657
Limestone, slightly cherty, medium light brownish gray, sublithographic	8	2665
Limestone, medium light brownish gray, fine to coarse, dense; trace limestone, very dolomitic, extra-fine	5	2670
Limestone, medium light brownish gray, sublithographic	6	2676
Dolomite, calcareous, light brownish gray, extra-fine	4	2680
Limestone, oolitic, medium light brownish gray, medium; limestone, medium light brownish gray, sublithographic	10	2690
Limestone, medium light brownish gray, dense to sublithographic, in part obscurely oolitic, fine; little limestone, very finely sandy	5	2695
Limestone, brownish gray, dense to sublithographic	4	2699
Dolomite, calcareous, light gray to brownish gray, extra-fine	2	2701
Limestone, oolitic, grayish brown, fine to coarse	4	2705
Limestone, medium light brownish gray, obscurely granular, in part extra-finely dolomitic	10	2715
Limestone, grayish brown, dense to sublithographic, in part very finely sandy	7	2722
Dolomite, grayish brown, gray, extra-fine; oil show in part; trace of chert	4	2726
Limestone, sandy, obscurely oolitic, grayish brown, fine to medium with very fine to medium sand grains	4	2730
Limestone, very finely sandy, grayish brown, fine	5	2735
Limestone, sandy, in part obscurely oolitic, grayish brown, brownish gray, fine to medium; little dolomite, light brown, extra-fine; oil show	9	2744
St. Louis Limestone		
Limestone, dark brown, fine to medium; contains anhydrite, dark brown; trace of oil	6	2750
Limestone, as above; limestone, very dolomitic, brownish gray, extra-fine	5	2755

APPENDIX 3 — Continued

Strata	Thickness (ft)	Bottom depth (ft)
Limestone, dolomitic in part, medium to light brownish gray, mostly fine	10	2765
Limestone, slightly dolomitic, light brownish gray, fine to coarse; trace of chert; little limestone, dark brown, fine to medium; anhydrite	5	2770
Limestone, slightly cherty, medium to light brownish gray, mostly fine, in part slightly dolomitic	5	2775
Limestone, cherty, slightly dolomitic, light brownish gray, mostly fine; dolomite, cherty, brownish gray, extra-fine	10	2785
Limestone, light to medium light brownish gray, dense to sublithographic	5	2790
Dolomite, medium light brownish gray, very fine	10	2800
Limestone, medium light brownish gray; dolomite, as above; dolomite, grayish brown, extra-fine	10	2810
Limestone, light brownish gray, sublithographic; trace of chert; dolomite, brown, extra-fine	16	2826
Dolomite, brown, extra-fine	5	2831
Limestone, cherty, grayish brown, dense	14	2845
Limestone, grayish brown, dense to sublithographic; limestone, cherty, light brownish gray, fine to coarse	7	2852
Dolomite, light brownish gray, extra-fine	2	2854
Limestone, cherty, grayish brown, dense; trace of oil	8	2862
Limestone, grayish brown, fine to medium, with little very fine sand and coarse silt	5	2867
Limestone, grayish brown, very fine to medium, rather dense; little very fine sand, in part obscurely oolitic; trace of oil	9	2876
Dolomite, light brown, extra-fine; oil show	4	2880
Limestone, grayish brown, very fine to medium, rather dense	6	2886
Dolomite, brown, extra-fine	2	2888
Limestone, grayish brown, sublithographic; anhydrite, white	4	2892
Limestone, grayish brown, mostly fine, dense; trace of oil; anhydrite, white	4	2896
Limestone, obscurely oolitic in part, grayish brown, fine to medium, rather dense; trace of oil	4	2900
Dolomite, brown, grayish brown, very fine to extra-fine	4	2904
Limestone, medium light brownish gray, sublithographic; dolomite, brown; trace of oil	7	2911

APPENDIX 3 — Continued

Strata	Thickness (ft)	Bottom depth (ft)
Limestone, light brownish gray, fine to medium, dense; dolomite, brown to gray, light brownish gray, very fine to extra-fine	7	2918
Limestone, brown, sublithographic; contains dark brown anhydrite; anhydrite, white	20	2938
Dolomite, light brown, brown, extra-fine; oil show	21	2959
Limestone, brown, sublithographic	10	2969
Limestone, dolomitic, oolitic in part, dark brown, fine to coarse	5	2974
Limestone, dolomitic in part, brown, with dark brown anhydrite	5	2979
Limestone, dark to light brown, dense to sublithographic	10	2989
Limestone, dark brown, dense to sublithographic	5	2994
Limestone, brown to dark brown, sublithographic	4	2998
Dolomite, brown, very fine to extra-fine; oil show	2	3000
Limestone, dark brown, sublithographic; trace of limestone, obscurely oolitic, medium to coarse	5	3005
Limestone, silty, dark brown, dense, fossiliferous in part; trace of limestone, oolitic, brownish gray, dark brown, medium to coarse	5	3010
Limestone, dark brown, sublithographic, with dark brown anhydrite	10	3020
Limestone, silty, dark brown, dense	5	3025
Limestone, silty in part, dark brown, dense to sublithographic	5	3030
Limestone, silty in part, dark brown, rather dense, with dark brown anhydrite; limestone, grayish brown, in part obscurely oolitic	14	3044
Dolomite, light brown, very fine to extra-fine; oil show	4	3048
Limestone, silty, dark brown, brownish gray, dense to sublithographic	4	3052
Limestone, silty, medium to dark brownish gray, little dark gray, dense	10	3062
Limestone, silty, dark grayish brown to medium dark brownish gray, dense, with dark brown anhydrite	4	3066
Dolomite, calcareous, light brownish gray, extra-fine, with little anhydrite, white; limestone as above	12	3078
Limestone, medium dark brownish gray, dense to sublithographic, with dark brown anhydrite	10	3088
Dolomite, calcareous, gray, extra-fine; little anhydrite, white	5	3093

APPENDIX 3 — Continued

Strata	Thickness (ft)	Bottom depth (ft)
Limestone, silty, medium dark brownish gray, extra-fine	4	3097
Salem Limestone		
Limestone, oolitic, medium dark brownish gray, light gray; contains dark coliths, fine to coarse, mostly medium	13	3110
Limestone, oolitic, light brownish gray with brown and dark gray oolith centers, fine to coarse, fossiliferous, with Endothyra (dark gray); trace of oil	32	3142
Limestone, as above, grading to dolomite, medium light brownish gray, extra-fine	16	3158
Limestone, very dolomitic in part, brownish gray, little light gray, dark gray, fine to coarse, very fossiliferous, Endothyra	14	3172
Limestone, oolitic, dolomitic in part, light brownish gray with brown- and dark gray-centered coliths, fine to coarse, fossiliferous	4	3176

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