State of Illinois
William G. Stratton, Governor
DEPARTMENT OF REGISTRATION AND EDUCATION
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Division of the

STATE GEOLOGICAL SURVEY

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Urbana

CIRCULAR NO. 185

SUMMARY OF WATER FLOOD OPERATIONS IN ILLINOIS OIL POOLS DURING 1952

By

Paul A. Witherspoon and Members of the
Illinois Secondary Recovery and Pressure Maintenance Study Committee

Reprint of the Report Published
by the Interstate Oil Compact Commission
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PREFACE

The Interstate Oil Compact Commission, through its Secondary Recovery Division with Albert E. Sweeney, Jr., Director, and Paul D. Torrey, Chairman of the Secondary Recovery and Pressure Maintenance Advisory Committee, takes great pleasure in presenting this "Summary of Water Flood Operations in Illinois Oil Pools During 1952."

We have heretofore cooperated with the State of Illinois in preparing and publishing the following reports:

"Summary, Water Flooding Operations in Illinois, 1950," covering the 1949 operations.

"Summary, Water Flooding Operations in Illinois To 1951," covering the operations in 1950.

"Summary of Water Flooding Operations in Illinois Oil Pools During 1951," in which the Compact Commission did not officially participate but did render all assistance possible to the state.

We are honored to cooperate fully in the publication of this pamphlet which has been prepared with the cooperation of the Illinois State Geological Survey, and we feel sure that this report, together with the others above mentioned, will be of great interest and most helpful not only to the State of Illinois and the Compact, but also to the other states and the oil and gas industries generally.

The Interstate Oil Compact Commission wishes to express its appreciation, especially to Paul A. Witherspoon, Chairman, and members of the State Secondary Recovery and Pressure Maintenance Study Committee of the State of Illinois, and to all companies, organizations, and individuals who have assisted in gathering the data on this project. It is published in order that the states, the public in general, and the oil and gas industries in particular may have factual information regarding secondary recovery and pressure maintenance operations in the State of Illinois.

Earl Foster
Executive Secretary

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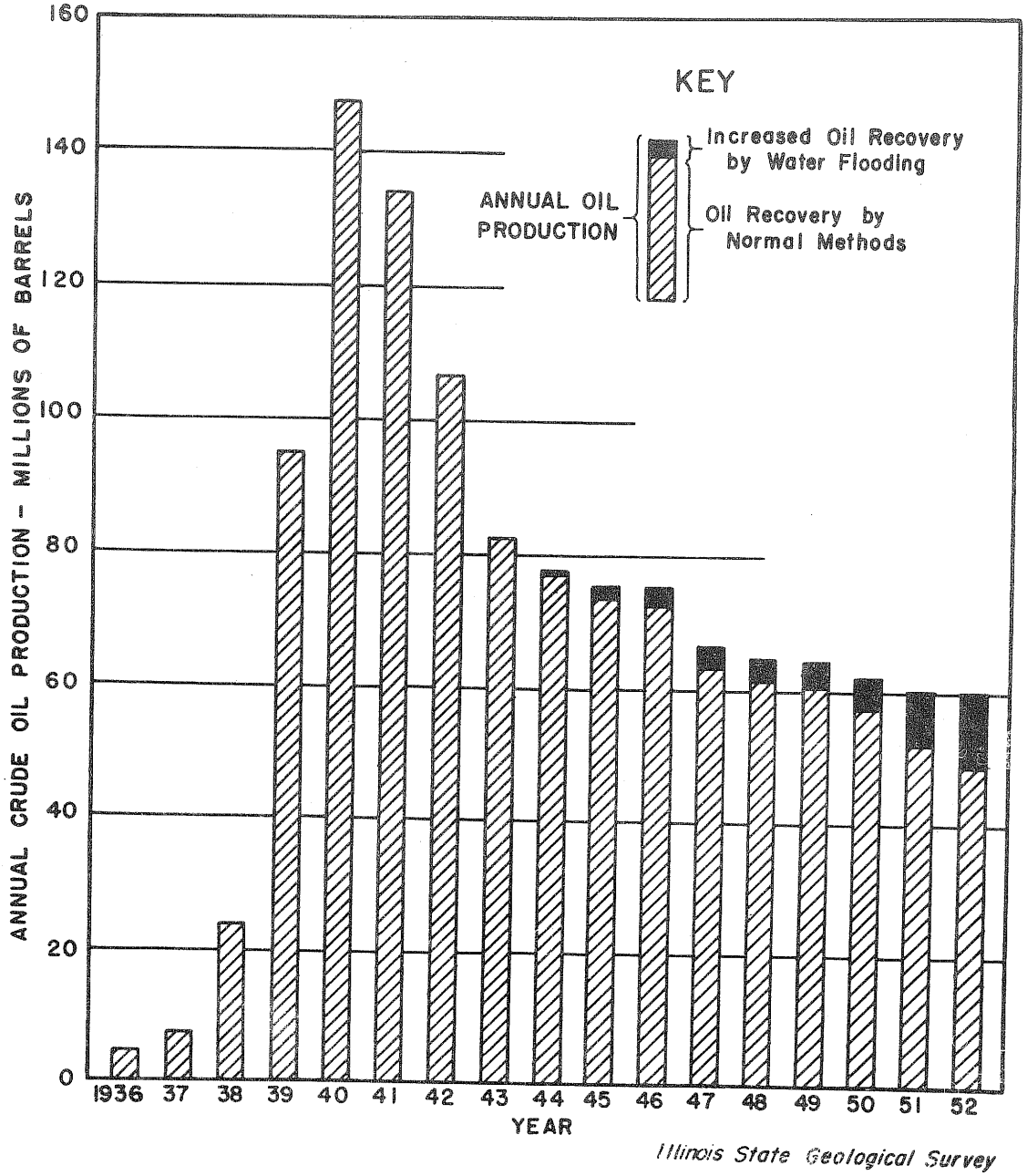

Illinois State Geological Survey

SUMMARY OF WATER FLOOD OPERATIONS IN ILLINOIS OIL POOLS DURING 1952

INTRODUCTION

This report is the result of a joint effort by the Illinois State Geological Survey and the Illinois Secondary Recovery and Pressure Maintenance Study Committee of the Interstate Oil Compact Commission. The following persons were appointed to the Study Committee in 1953 by Governor William G. Stratton to assist in the compilation of data on the water flood and pressure maintenance projects that were in operation in Illinois oil pools during 1952.

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Evansville, Indiana

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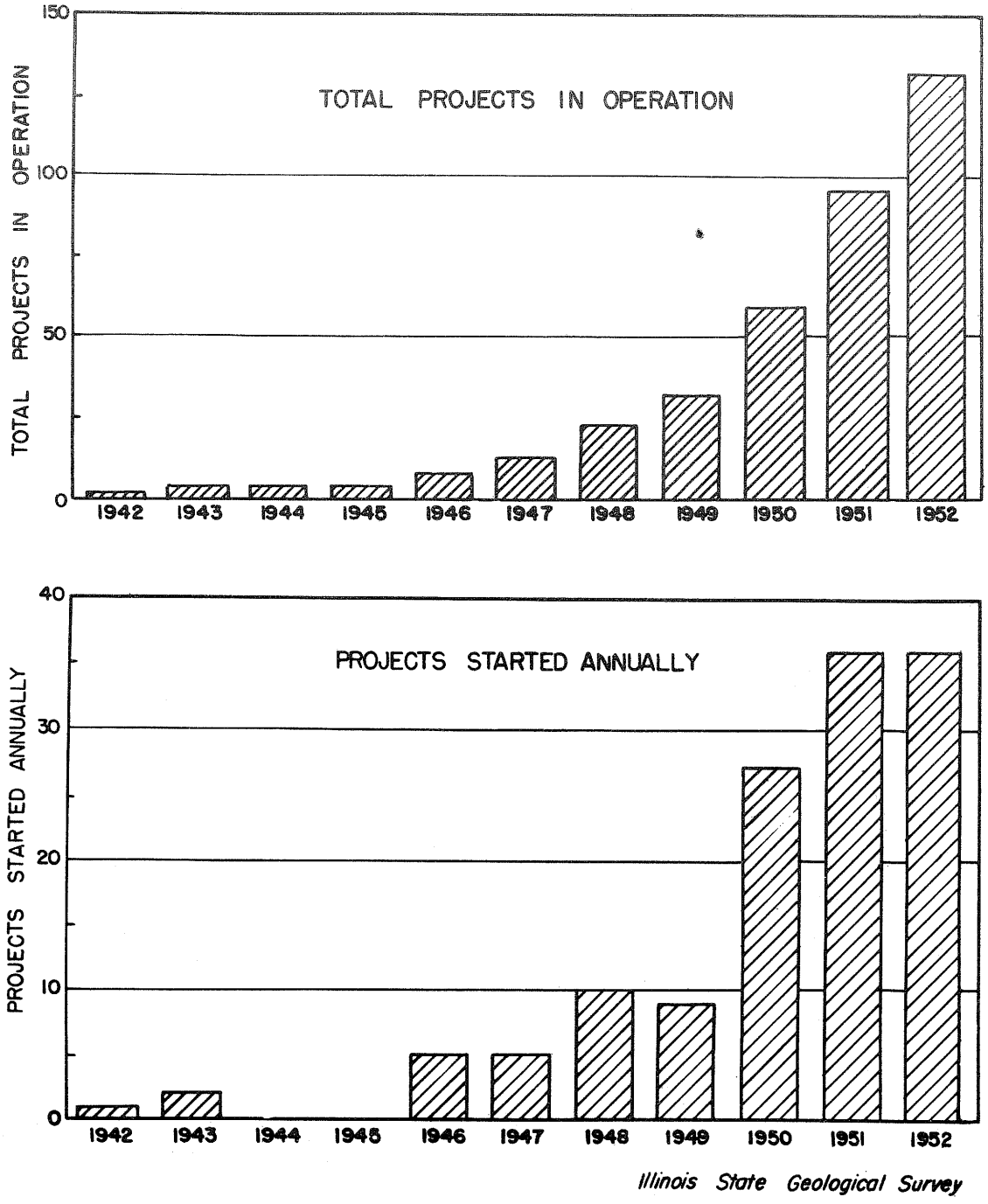
The Texas Company
Salem, Illinois

R. A. Wilson
Tide Water Associated Oil Company
Robinson, Illinois

Figure 2.

DEVELOPMENT OF WATER FLOOD PROJECTS IN ILLINOIS



Illinois State Geological Survey

As a means to collect information on water injection projects in operation during 1952, the Study Committee set up a questionnaire on February 10, 1953. The Geological Survey sent the questionnaire to all water flood operators in Illinois and compiled the data returned. This questionnaire did not request data on gas injection operations other than whether or not gas injection had previously been used.

This report supplements three previous summaries of water flood operations as follows:

(1) "Summary of Water Flooding Operations in Illinois, 1950," which reported operations during 1949. Published by Interstate Oil Compact Commission and reprinted by Illinois State Geological Survey as Circular 165.

(2) "Summary of Water Flooding Operations in Illinois to 1951," which reported operations during 1950. Published by Interstate Oil Compact Commission and reprinted by Illinois State Geological Survey as Circular 176.

(3) "Summary of Water Flooding Operations in Illinois Oil Pools During 1951." Published by Illinois State Geological Survey as Circular 182.

SUMMARY OF RESULTS

Water flooding as a means of improving oil recoveries is playing an increasingly important role in Illinois. This method of secondary recovery produced approximately 11,000,000 barrels of oil during 1952, or 18 per cent of the State's total recovery of 60,071,000 barrels. Of this water flood oil, 8,752,000 barrels are reported in Table I and an additional 2,000,000 barrels are estimated to have been recovered by "dump" flooding. The 1952 water flood recovery is 30 per cent higher than the 1951 recovery of 8,200,000 barrels, which includes an estimated 1,800,000 barrels of "dump" flood oil.

Figure 1 shows the effect of water flood (including "dump" flood) operations on the State's annual crude oil production since 1936. It is interesting to note that the rate of decline in annual production has been noticeably decreased as a result of increasing secondary oil recoveries. In fact, Illinois oil production appears to be stabilized for the first time since 1936 at approximately 60,000,000 barrels per year. It is quite possible that the increasing production of oil by water flooding will more than offset the normal decline and will slowly increase the annual rate of oil recovery in Illinois over the next few years.

The cumulative water flood recovery at the end of 1952 was approximately 41,000,000 barrels, which includes an estimated 12,000,000 barrels of "dump" flood oil.

Table I presents a summary of the information collected concerning water flood projects in operation during 1952. The data are arranged alphabetically by fields and include 131 water flood projects. Excluding the "dump" floods in the Clay City Consolidated field, there were approximately 140 water floods in operation in Illinois during 1952. Table I provides the data on 94 per cent of these projects. In terms of cumulative figures, however, this summary approaches 100 per cent coverage for the controlled floods.

A total of 72,951,000 barrels of water was injected during 1952 in recovering 8,752,000 barrels of water flood oil, or a ratio of 8.3 barrels of water for each barrel of oil. A cumulative total of 221,078,000 barrels of water had been injected by the end of 1952 in recovering 28,332,000 barrels of oil, or an input water-oil ratio of 7.8. The cumulative input water-oil ratio is lower than the 1952 ratio because a considerable number of new projects were started in 1951 and 1952 from which appreciable increases in oil production had not been realized by the end of the year.

Figure 2 shows the development of water floods in Illinois by years since 1942. The increasing development of water flood projects in recent years is very evident. For example, the number of projects has more than doubled in the past two years, from 59 projects at the end of 1950 to 131 projects at the end of 1952. As listed in Table I these 131 projects had developed 31,330 acres for water flooding, or eight per cent of the State's total oil-productive acreage.

Figure 3.

MAP SHOWING

WATER FLOOD AND PRESSURE-MAINTENANCE

OPERATIONS IN ILLINOIS DURING 1952

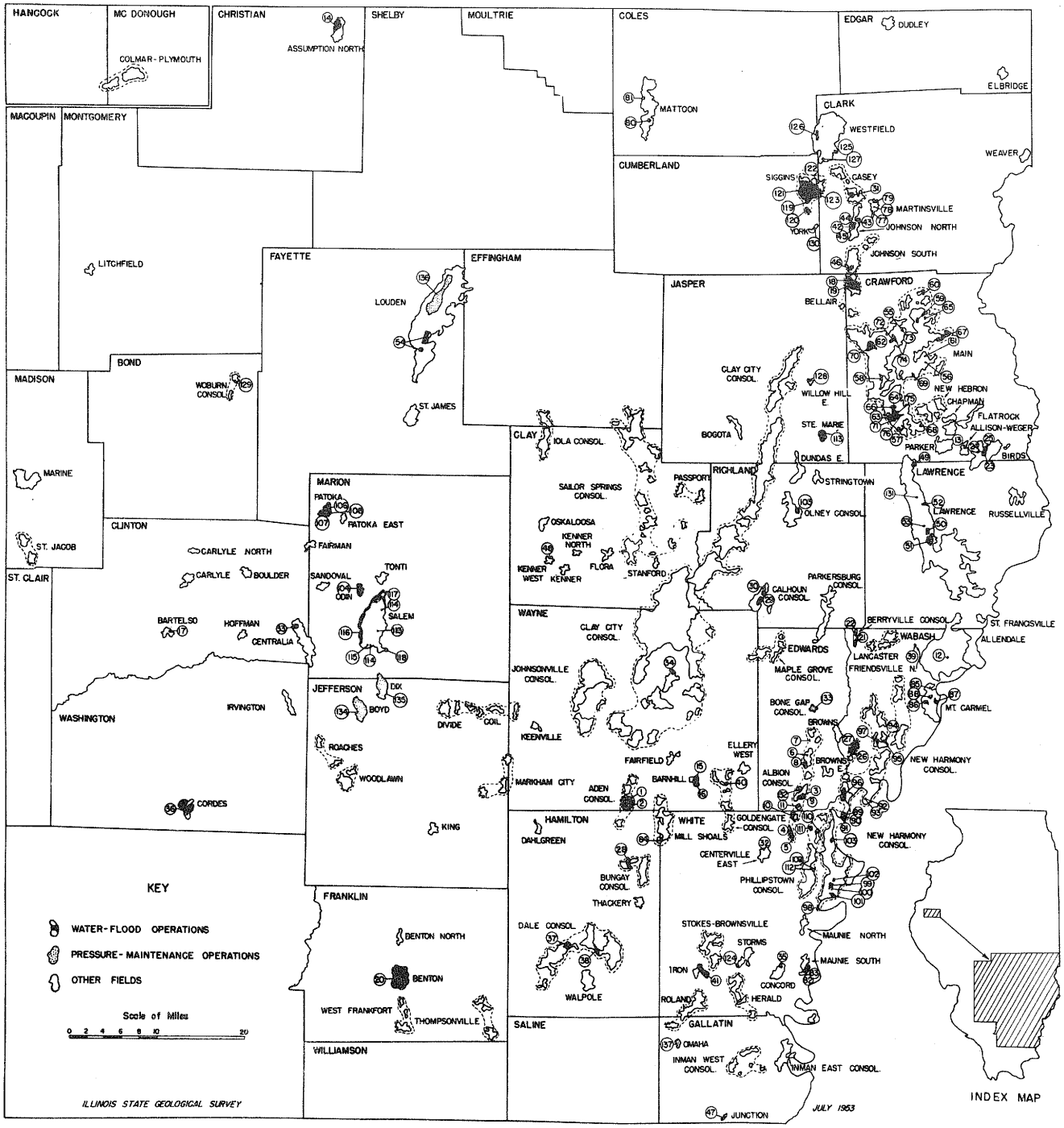


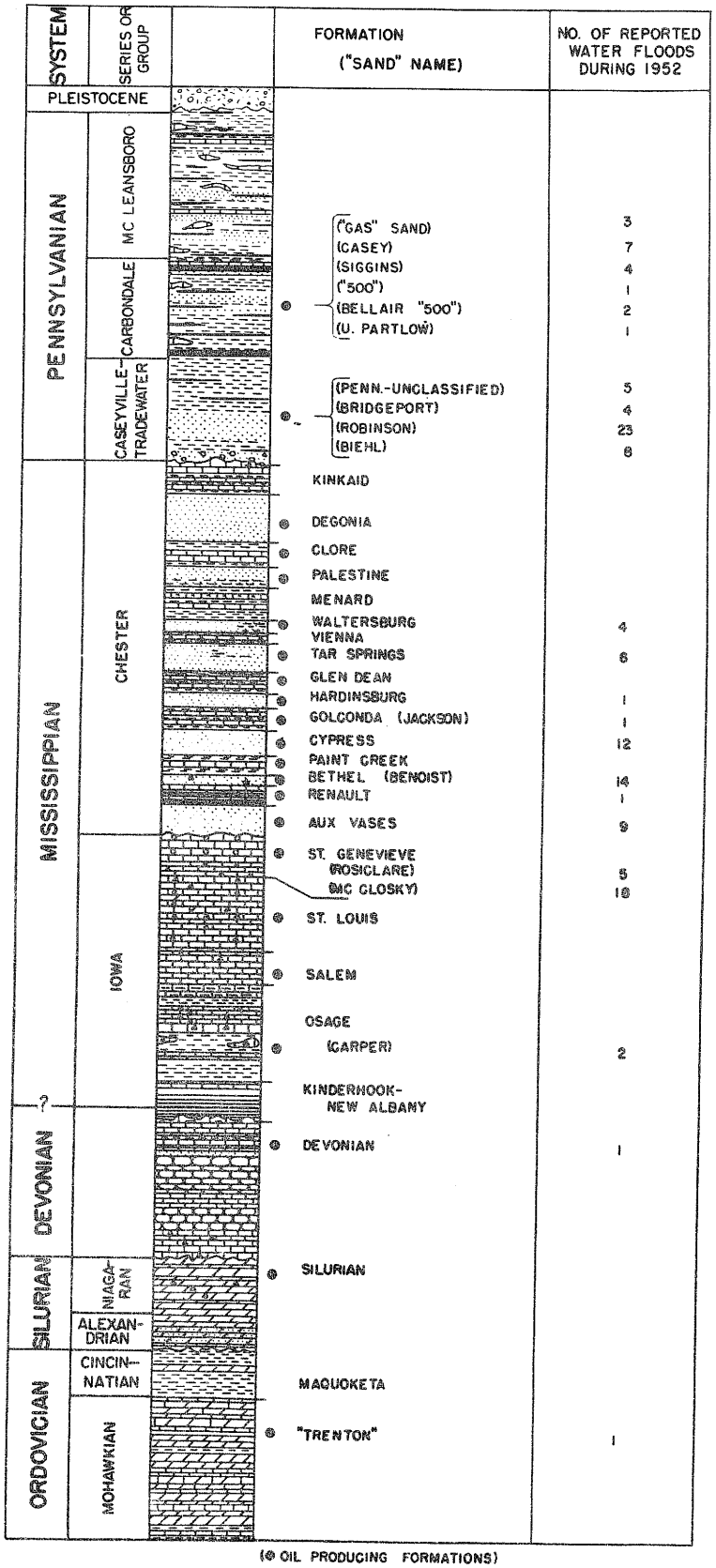
Table II presents data on the six pressure maintenance operations that used water injection during 1952. The oil-production statistics include both primary recovery and any additional oil obtained by pressure maintenance operations.

Each project listed in Tables I and II has been numbered, and corresponding numbers on Figure 3 show the location of water flood and pressure maintenance operations in Illinois during 1952.

A generalized geologic column is shown in Figure 4 which indicates the stratigraphic sequence of oil-producing formations in the Illinois basin. Listed opposite these oil-producing formations are the number of reported water floods as taken from Table I. An index map of counties, townships, and ranges in Illinois is shown in Figure 5.

Figure 4.

GENERALIZED GEOLOGIC COLUMN SHOWING FORMATIONS SUBJECTED TO WATER FLOODING IN THE ILLINOIS BASIN



(⊛ OIL PRODUCING FORMATIONS)

Figure 5

INDEX MAP FOR COUNTIES, TOWNSHIPS, AND RANGES

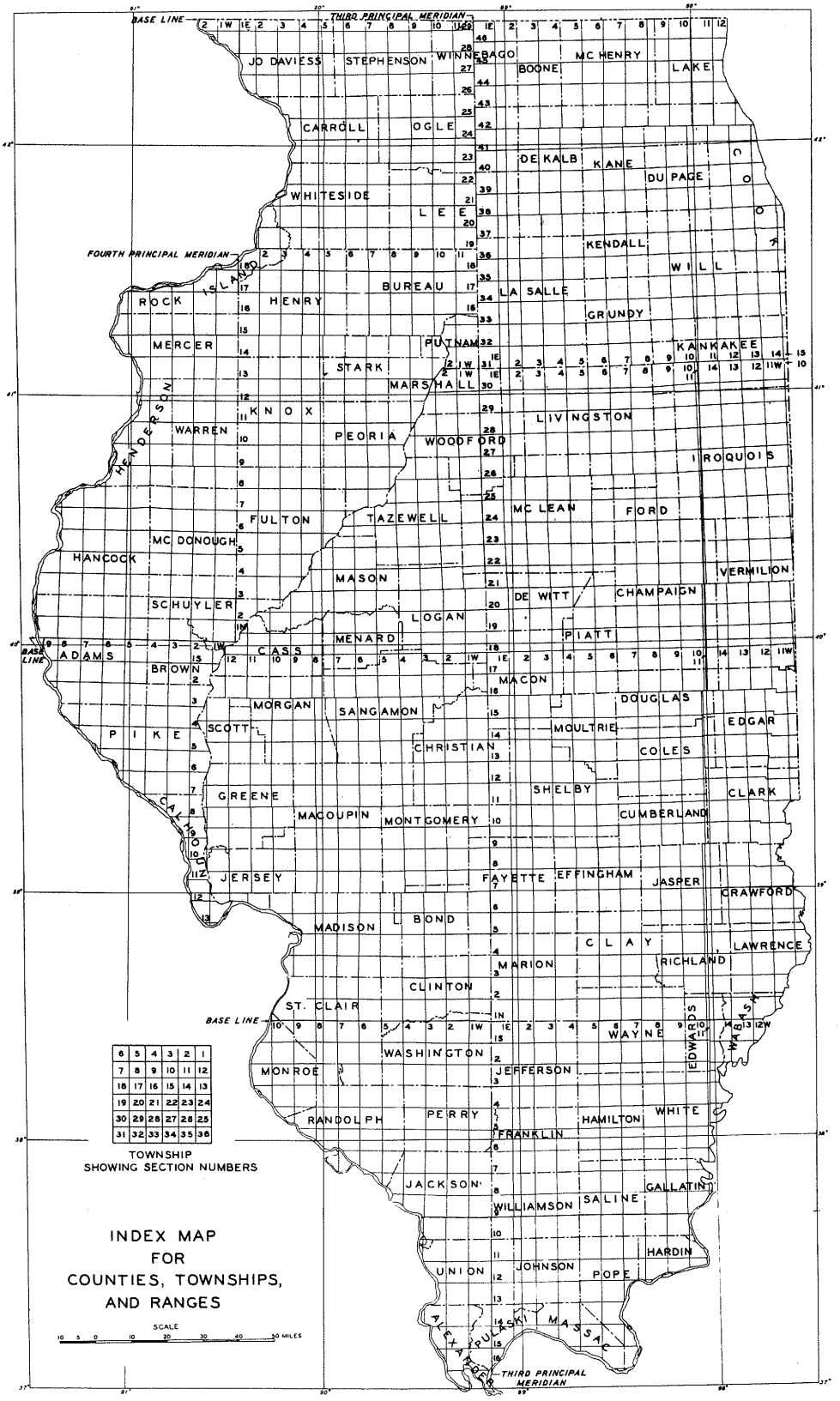


TABLE I

ILLINOIS WATER FLOOD PROJECTS DURING 1952

GENERAL INFORMATION

Map No.	Field	Operator	Project	Formation "Sand"	County
1	Aden Consolidated	Texas	Aden	Aux Vases	Wayne
2	Aden Consolidated	Texas	Aden	McClosky	Wayne
3	Albion Consolidated	Carter	Albion	Lower Bridgeport	Edwards
4	Albion Consolidated	Concho Petroleum	-	Cypress	White
5	Albion Consolidated	Concho Petroleum	-	Tar Springs	White
6	Albion Consolidated	Continental	Stafford	McClosky	Edwards
7	Albion Consolidated	First National Petroleum Trust	Brown Lease	Aux Vases	Edwards
8	Albion Consolidated	Jarvis Brothers and Marcel	-	McClosky	Edwards
9	Albion Consolidated	Superior	South Albion	Bridgeport	Edwards
10	Albion Consolidated	Yingling	Biehl Unit #1	Biehl	White
11	Albion Consolidated	Yingling	Biehl Unit #2	Biehl	Edwards
12	Allendale	F. C. Luecking	Mattaliano et al.	Biehl	Wabash
13	Allison-Weger	Skiles	Weger	Robinson	Crawford
14	Assumption, North	Continental	Benoist	Benoist	Christian
15	Barnhill	Ashland	Barnhill	McClosky	Wayne
16	Barnhill	Wayne Development	Walter	McClosky	Wayne
17	Bartelso	T. R. Kerwin	-	Cypress	Clinton
18	Bellair	Forest	Bellair	Bellair "500"	Crawford
19	Bellair	Pure	Fulton	Bellair "500"	Crawford
20	Benton	Shell	Benton Unit	Tar Springs	Franklin
21	Berryville Consolidated	Phillips	Tarpley	McClosky	Wabash
22	Berryville Consolidated	Phillips	Townsend	McClosky	Wabash
23	Birds	Franchot	Highsmith	Robinson	Crawford
24	Birds	Tide Water	Birds Area	Robinson	Crawford
25	Birds	Yingling	Lindsay	Robinson	Crawford
26	Browns, East	Magnolia	Bellmont	Cypress	Wabash
27	Browns, East	Magnolia	Bellmont Water Flood Association	Cypress	Wabash
28	Bungay Consolidated	Texas	Blairsville	Aux Vases	Hamilton
29	Calhoun Consolidated	Ashland	Calhoun	McClosky	Richland
30	Calhoun Consolidated	Phillips	Bohlander	McClosky	Richland
31	Casey	Forest	Casey	Casey	Clark
32	Centerville, East	Sun	East Centerville	Tar Springs	White
33	Centralia	Sohio	Copple Trenton	Trenton	Clinton
34	Clay City Consolidated	F & W Oil Company	Miller Lambrich Unit	O'Hara, Rosiclare, & McClosky	Wayne

Location			Date First	PRODUCTION AND INJECTION STATISTICS (Barrels)						Map
				Water Injection		Secondary Recovery Oil Production		Water Production		
Section	Township	Range	Injection	Total 1952	Cumulative 12-31-52	Total 1952	Cumulative 12-31-52	Total 1952	Cumulative 12-31-52	No.
8,9,16,17, 20	-3S	-7E	August, 1946	264,174	1,153,048	98,021	175,602))	128,372	238,706	1
8,9,16,17, 20	-3S	-7E	August, 1946	380,414	1,133,169	35,312	141,102)			2
11,12	-3S	-10E	December, 1947	52,694	235,140	7,760	50,900	42,580	-	3
26,27,34, 35	-3S	-10E	October, 1952	104,322	104,322	None	None	-	-	4
26,27,34, 35	-3S	-10E	October, 1952	28,858	28,858	None	None	-	-	5
13	-2S	-10E	May, 1943	4,709	-	3,607	25,839	4,709	-	6
6	-2S	-11E	April, 1952	39,914	39,914	None	None	None	None	7
24	-2S	-10E	July, 1951	46,384	52,504	None	None	50,747	50,747	8
1,11,12	-3S	-10E	August, 1946	-	854,511*	-	173,502*	-	789,679*	9
23	-3S	-10E	August, 1949	491,118	1,373,402	121,741	365,032	-	-	10
14	-3S	-10E	December, 1950	288,614	474,752	89,594	136,009	-	-	11
15	-1N	-12W	June, 1952	16,250	16,250	None	None	8,400	8,400	12
18,19	-5N	-11W	November, 1952	12,775	12,775	None	None	4,000	4,000	13
13,24	-5N	-12W								
3,4,9,10,15, 16,21	-13N	-1E	July, 1950	550,481	1,418,854	134,873	295,282	147,532	280,558	14
26,34,35	-2S	-8E	January, 1951							15
26	-2S	-8E	December, 1950	492,000(est.)	575,185	17,039*	-	78,000(est.)	-	16
4	-1N	-3W	April, 1952	65,427	65,427	19,819	19,819	7,120	7,120	17
2,11,12	-8N	-14W	July, 1948	1,670,430	8,647,293	82.871	299,528	-	-	18
1,2,11,12	-8N	-14W	July, 1948	4,366,391	17,218,441	153,725	520,600	2,012,841	5,127,274	19
-	-6S	-2E -3E	November, 1949	10,095,048	30,092,631	2,516,773	4,268,300	3,030,970	4,651,685	20
2	-1N	-14W	September, 1952	28,085	28,085	None	None	16,139	16,139	21
35	-2N	-14W	February, 1952	18,300	18,300	None	None	22,169	22,169	22
21	-5N	-11W	June, 1951	364,909	594,769	11,888	12,598	31,000*	40,800*	23
16,20,21	-5N	-11W	February, 1952	177,319	177,319	2,295	2,295	49,120	49,120	24
16	-5N	-11W	August, 1950	948,675	1,566,681	26,918	48,372	-	-	25
2,11	-2S	-14W	November, 1947	80,892	536,953	66,532*	401,650*	42,885	81,663	26
1,2,11,12	-2S	-14W	January, 1951	564,630	1,175,887	355,575*	448,874*	62,008	62,008	27
16,17,20,21	-4S	-7E	June, 1948	263,748	757,116	22,784	61,548	12,758	-	28
7,18	-2N	-10E	September, 1951							29
13	-2N	-9E								
6,7	-2N	-10E	June, 1950	198,085	407,137	46,475	50,273	105,661	110,219	30
14,15,23	-10N	-14W	March, 1950	1,068,000	2,191,634	85,600	157,277	-	-	31
7	-4S	-10E	October, 1950	55,150	81,223	11,789	13,163	445	445	32
35	-2N	-1W	November, 1951	183,745	216,883	24,879*	27,945*	4,397	12,145	33
29	-1N	-8E	August, 1950	-	250,000*(est.)	-	-	-	-	34

TABLE I (Continued)

Map No.	DEVELOPMENT AS OF 12-31-52						INJECTION WATER			
	Number of Wells		Injection Pattern	Spacing Acres Per Input Well	Productive Acreage Subjected To Injection	Total	Source	Type	Avg. Bbls. Per Day Per Well Per Foot	Average Wellhead Pressure PSI
	Injection	Producers								
1	(7	20	Perimeter	-	640	1,050	Pennsylvanian sand	Brine	10.3	1,223
2	(6	20	Perimeter	-	520	920	Pennsylvanian sand	Brine	48.2	1,101
3	1	5	Flank	-	60	60	Produced	Brine	11.1	200
4	8	21	Perimeter	-	250	300	Little Wabash River	Fresh	11.9	800
5	4	-	Perimeter	-	-	-	Little Wabash River	Fresh	13.1	800
6	1	7	-	-	80	80	Produced	Brine	3.2	2
7	1	1	Spot	-	30	50	Hardinsburg	Brine	7.2	150
8	1	6	-	-	140	140	-	Brine	4.2	Vacuum
9	2	12	-	-	203	-	Produced	Brine	-	-
10	3	13	Flank	-	220	220	Pennsylvanian sand	Brine	26.4	363
11	1	6	Flank	-	90	90	Pennsylvanian sand	Brine	35.9	636
12	1	2	-	-	44	-	Shallow sand	Fresh	5.5	-
13	9	11	5-spot	10	90	110	Creek water and produced	Fresh and brine	1.5	150
14	13	27	Perimeter	-	440	440	Shallow sand and produced	Brine	9.1	920
15	7	22	-	-	320	-	Cypress	Brine	-	-
16	1	2	-	-	40	40	Cypress	Brine	74.8	-
17	2	5	5-spot	5	10	350	Tar Springs	Brine	11.7	575
18	56	51	5-spot	4.4	200	-	Gravel bed	Fresh	2.2	280
19	131	125	5-spot	4.4	443	443	Gravel bed	Fresh	4.3	265
20	107	121	5-spot	20	2,200	2,200	Lake	Fresh	7.4	501
21	1	2	-	-	14	30	Produced and Tar Springs	Brine	23.0	Vacuum
22	1	2	-	-	27	30	Produced and Tar Springs	Brine	15.0	Vacuum
23	9	6	5-spot	10	60	2,100	Tar Springs	Brine	4.3	284
24	4	14	5-spot	10	47	277	Tar Springs	Brine	7.7	258
25	23	24	5-spot	4.4	160	360	1,300-ft. sand	Brine	3.6	323
26	3	11	Line Drive	10	184	184	Tar Springs	Brine	-	1,650
27	13	20	5-spot	20	290	330	Tar Springs	Brine	-	1,230
28	2	19	-	-	640	-	Pennsylvanian sand	Brine	23.3	1,052
29	3	7	Flank	-	195	-	Cypress	Brine	-	-
30	3	10	Irregular	-	160	280	Upper sand and produced	Brine	18.1	0-1,080
31	62	39	5-spot	4.4	240	-	Gravel bed	Fresh	4.7	210
32	1	5	Spot	-	80	-	Gravel bed	Fresh	25.2	1,100
33	2	12	-	20	160	200	Devonian	Brine	11.4	359
34	4	13	Irregular	10	80	180	Cypress and produced	Brine	-	-

RESERVOIR STATISTICS (Average Values)						REMARKS	
Depth Feet	Net Pay Thickness Feet	Porosity Per Cent	Permeability Millidarcys	Oil Gravity API	Oil Viscosity Centipoises		Map No.
3,200	10	22	150	35.4	-		1
3,350	3.6	-	-	35.4	6.5 @ 100° F.		2
1,900	13	20	305	35	6.0 @ 100° F.		3
2,850	12	18	-	37	-		4
2,460	6	18	-	37	-		5
3,222	4	16.3	898	39	-		6
3,005	21	-	-	-	-		7
3,150	30	-	-	37	-		8
1,900	20	19.7	304	32.5	6.3 @ 95° F.	Stopped injection early in 1952. Now disposal project. *As of 6-1-52.	9
2,000	17	20.2	265	37.6	5.3 @ 88° F.	Original BHP 800 psi.	10
1,950	22	19.3	303	35.8	6.0 @ 84° F.		11
1,385	15	-	-	34.5	-		12
900	20	17	37	-	-		13
1,050	12.7	19.4	102.5	39.8	-		14
3,350	9	-	-	39	-		15
3,450	18	-	-	-	-	*Includes primary production since start of flood.	16
971	15	22.2	1,655	37	-		17
550	38	17.1	148	32.4	16 @ 77° F.	Previously subjected to gas injection. Producing wells flowe	18
560	21	18.6	149	32	18.7 @ 77° F.		19
2,100	35	19	65	38	3.5 @ 86° F.		20
2,890	10	-	-	-	-		21
2,890	10	-	-	-	-		22
950	26	18.9	162	31.7	21	*Estimated.	23
950	18	19.4	197	30.1	-	Subjected to gas injection 1946 to 1952.	24
960	31	19.1	135	31.6	17 @ 80° F.		25
2,570	-	-	-	36.0	4.6 @ 90° F.	*Includes primary production since start of flood.	26
2,570	-	-	-	-	-	*Includes primary production since start of flood.	27
3,330	15.5	19.6	92	35 to 40	1.8 @ 99° F.		28
3,150	6	-	-	37	-		29
3,130	10	11.2	67.5	36	-		30
450	10	17.4	173	31.9	16.6 @ 70° F.	Previously subjected to gas injection.	31
2,530	6	-	-	35	-		32
3,950	22	10	-	39.8	2.7	*Includes primary production since start of flood.	33
3,060	5	-	-	-	-	*Dump flood.	34

TABLE I (Continued)

GENERAL INFORMATION

Map No.	Field	Operator	Project	Formation "Sand"	County
35	Concord	Phillips	Tuley	McClosky	White
36	Cordes	Shell	Cordes	Benoist	Washington
37	Dale Consolidated	Inland	North Rural Hill Unit	Aux Vases	Hamilton
38	Dale Consolidated	Texas	West Dale Unit	Aux Vases	Hamilton
39	Friendsville, North	Magnolia	J. L. Litherland	Biehl	Wabash
40	Golden Gate Consolidated	Cities Service	Golden Gate Water Flood Unit	St. Genevieve Lime	Wayne
41	Iron	Shell	Iron Unit	Hardinsburg	White
42	Johnson, North	McMahon	Block A	Casey	Clark
43	Johnson, North	McMahon	Block B	500-foot	Clark
44	Johnson, North	H. V. Sherrill	V. Jones	Casey	Clark
45	Johnson, North	Tide Water	Clark County #1	Casey	Clark
46	Johnson, South	Forest	South Johnson	Upper Partlow	Clark
47	Junction	J. A. Lewis	-	Waltersburg	Gallatin
48	Kenner, West	Phillips	West Kenner Unit	Cypress	Clay
49	Lawrence	George & Wrather	Klondike	Benoist	Lawrence
50, 51	Lawrence	Ohio	Two Projects	Bridgeport	Lawrence
52, 53	Lawrence	Ohio	Two Projects	Kirkwood	Lawrence
54	Louden	Carter	Loudon	Chester	Fayette
55	Main	Arkansas Fuel	North Morris	Robinson	Crawford
56	Main	Buckeye Supply	J. S. Kirk	Robinson	Crawford
57	Main	E. Constantin	Sanders	Pennsylvanian Sand	Crawford
58	Main	E. Constantin	Short	Pennsylvanian Sand	Crawford
59	Main	E. Constantin	Wood	Pennsylvanian Sand	Crawford
60	Main	A. J. Leverton	Stanfield	Robinson	Crawford
61	Main	Logan Oil	Alexander-Reynolds	Robinson	Crawford
62,63, 64	Main	Ohio	Three Projects	Robinson	Crawford
65	Main	Petroleum Producing Company	-	Robinson	Crawford
66	Main	W. L. Pickens	Hughes-Robinson	Robinson	Crawford
67	Main	Skiles	Dennis-Lloyd	Robinson #4	Crawford
68	Main	Skiles	Highsmith	Robinson #1 & #2	Crawford
69	Main	Skiles	Walter Community	Robinson #1 & #3	Crawford
70	Main	Tide Water	Clarke-Hulse	Robinson	Crawford
71	Main	Tide Water	Dennis-Hardin	Robinson	Crawford
72	Main	Tide Water	Henry-Ikemire	Robinson	Crawford

Location			Date First	PRODUCTION AND INJECTION STATISTICS (Barrels)						
				Water Injection		Secondary Recovery Oil Production		Water Production		
Section	Township	Range	Injection	Total 1952	Cumulative 12-31-52	Total 1952	Cumulative 12-31-52	Total 1952	Cumulative 12-31-52	Map No.
21	-6S	-10E	July, 1951	305,494	411,428	16,444	34,847	235,124	244,306	35
14,15,22,23	-3S	-3W	August, 1950	1,419,753	3,312,301	595,641	1,124,949	695,640	1,330,054	36
5,6,7,8	-6S	-6E	February, 1952	222,520	222,520	-	-	-	-	37
11	-6S	-6E	August, 1951	339,347	521,200	8,362	8,563	15,678	-	38
1,12	-1N	-13W	July, 1947	76,043	299,186	12,543*	121,909*	25,819	92,294	39
28,32,33	-2S	-9E	November, 1952	*	*	None	None	-	-	40
23,24,25	-6S	-8E	December, 1950	1,155,655	2,410,747	178,043	161,305*	68,803	82,466	41
2	-9N	-14W	April, 1949	861,337	3,417,233	42,292	175,941	537,747	1,386,614	42
35,36	-10N	-14W	May, 1951	275,330	318,975	1,817	1,817	4,210	4,210	43
1,3	-9N	-14W	September, 1951	24,861	35,288	325	325	None	None	44
2	-9N	-14W	February, 1950	415,818	1,330,944	11,368	32,368	114,557	244,512	45
27,34,35	-9N	-14W	March, 1949	2,908,156	8,493,156	62,000	318,210	-	-	46
16,17,20,21	-9S	-9E	May, 1951	129,000	210,000	7,000	7,700	-	-	47
23	-3N	-5E	February, 1952	299,856	299,856	None	None	492,890	-	48
25	-5N	-13W	June, 1952	180,310	180,310	4,977	4,977	-	-	49
-	-	-	-	4,443,718	9,760,259	735,431	1,256,226	1,067,777	1,625,693	50, 51
-	-	-	January, 1952	376,988	376,988	18,211	18,211	3,810	3,810	52, 53
-	-7N -8N	-3E	October, 1950	2,239,347	3,089,888	435,667	467,479	45,850	-	54
2	-7N	-13W	April, 1951	145,533	205,397	10,171	11,421	47,238	218,353	55
29	-7N	-12W	August, 1951	28,370	41,679	1,600	1,600	-	-	56
34,35,36,26 1,2,3	-6N -5N	-13W -13W	August, 1952	87,348	87,348	None	None	-	-	57
32 5,6	-7N -6N	-13W -13W	February, 1952	315,257	315,257	None	None	-	-	58
31	-8N	-12W	August, 1952	188,928	188,928	None	None	-	-	59
17	-8N	-12W	May, 1952	24,400	24,400	None	None	-	-	60
20	-7N	-12W	December, 1951	134,554	139,554	2,515	2,515	2,100	2,100	61
-	-	-	-	5,535,590	12,419,553	445,666	973,096	1,715,484	2,999,551	62,63 64
29,32	-8N	-12W	August, 1951	134,575	175,575	-	-	-	-	65
22,27,28	-6N	-13W	June, 1951	116,172	*	None	None	None	None	66
10	-7N	-12W	July, 1951	117,173	157,330	None	None	760	-	67
31	-6N	-12W	September, 1951	140,140	153,104	None	None	36,800	-	68
1 36	-6N -7N	-13W -13W	December, 1951	23,871	25,821	None	None	29,000	-	69
18	-7N	-13W	January, 1952	186,363	186,363	8,971	8,971	15,372	15,372	70
27,34	-6N	-13W	August, 1950	787,303	1,220,952	27,573	35,473	119,140	142,487	71
10,15	-7N	-13W	February, 1948	431,514	1,513,365	54,571	212,371	223,385	477,961	72

DEVELOPMENT AS OF 12-31-52

Map No.	Number of Wells: Injection	Number of Wells: Producers	Injection Pattern	Spacing Acres Per Input Well	Productive Acreage Subjected To Injection	Productive Acreage: Total
35	1	5	Irregular	-	65	120
36	36	68	5-spot	20	640	640
37	11	16	5-spot	20	-	325
38	3	14	-	-	295	295
39	2	3	-	-	40	50
40	1	16	-	-	19	340
41	19	22	5-spot	20	390	430
42	28	26	5-spot	4.4	125	-
43	27	8	5-spot	4.4	80	-
44	3	2	5-spot	4.4	15	65
45	15	23	5-spot	4.4	65	80
46	47	56	5-spot	4.4	300	-
47	5	9	Modified 5-spot	-	50	-
48	4	23	Edge	10	35	300
49	10	14	5-spot	13.5	195	300
50, 51	70	155	-	-	644	-
52, 53	8	18	-	-	72	-
54	43	117	5-spot	20	1,225	16,000
55	5	7	Modified 5-spot	4.4	44	400
56	4	4	5-spot	10	10	100
57	24	21	5-spot	10	110	1,000
58	15	12	5-spot	10	70	360
59	13	4	5-spot	10	70	260
60	3	2	5-spot	4.4	20	130
61	6	20	5-spot	Irregular	20	290
62,63, 64	156	201	-	-	949	-
65	4	2	5-spot	10	40	700
66	15	12	5-spot	10	40	298
67	18	17	5-spot	10	180	-
68	13	23	5-spot	10	130	-
69	5	6	5-spot	10	40	-
70	8	15	5-spot	7	59	98
71	10	16	5-spot	10	89	93.5
72	25 1-2	25	5-spot	4.4	100	115

INJECTION WATER

Source	Type	Avg. Bbls. Per Day Per Well Per Foot	Average Wellhead Pressure PSI
Upper sand and produced	Brine	27.9	0
Pottsville	Brine	7.7	285
Cypress	Brine	4.1	0
Produced and shallow sand	Brine and fresh	22.1	368
Shallow sand	Fresh	-	720
Pennsylvanian sandstone	Brine	-	-
Tar Springs	Brine	6.7	399
Shallow sand and produced	Fresh and brine	-	300
Shallow sand and produced	Fresh and brine	1.3	300
Shallow sand	Fresh	1.2	162
Shallow sand and produced	Fresh and brine	4.5	225
Produced	Brine	2.6	240
Gravel bed	Fresh	5.0	650
Produced	Brine	9.4	436
Shallow sand	Fresh	5.0	407
-	Fresh	-	-
-	Fresh	-	-
Tar Springs	Brine	4.8	72
Buchanan	Brine	6.6	310
1,325-ft. sand	Brine	0.9	57
Lower Pennsylvanian	Brine	1.2	335
-	Brine	2.3	212
Lower Pennsylvanian	Brine	3.2	143
-	Fresh	1.4	77
Cypress	Brine	2.8	24
-	Fresh and brine	-	-
Shallow sand and pond	Fresh	6.1	0
Shallow sand	Fresh	-	300
Creek water and Pennsylvanian	Fresh and brine	0.9	300
Upper Pennsylvanian	Brine	-	563
Upper Pennsylvanian	Brine	-	200
Gravel bed	Fresh	3.2	206
Gravel bed	Fresh	6.3	218
Pennsylvanian sand	Brine	3.3	377

RESERVOIR STATISTICS (Average Values)						REMARKS	
Depth Feet	Net Pay Thickness Feet	Porosity Per Cent	Permeability Millidarcys	Oil Gravity API	Oil Viscosity Centipoises		Map No.
2,960	30	-	-	-	-		35
1,230	14	20	250	37	-	Cooperative: Shell, Magnolia, McBride and Horton.	36
3,125	14.7	23.9	-	-	-		37
3,050	14	17	125	38.0	-	Previously subjected to gas injection.	38
1,620	-	-	-	35.6	7.5 @ 86° F.	*Includes primary production since start of flood.	39
3,260	14	-	-	34	-	*Dump flood.	40
2,500	25	17.6	152	36	-	*1951 production 16,738 barrels below normal.	41
450	10-30	20.8	399	33.9	10.7 @ 70° F.	Previously subjected to gas injection.	42
480	22	18.3	66	33	10 @ 70° F.		43
440	19	19.8	252	35.4	-		44
425	17	20.6	415	33.9	10.7 @ 70° F.	Subjected to gas injection 1946-47.	45
490	48	16.6	319	29.2	14.7 @ 77° F.	Previously subjected to gas injection.	46
1,750	14	-	-	34.7	6.7 @ 81° F.		47
2,600	26	18	125	-	-		48
1,625	18	17.2	80	37.8	5.2 @ 80° F.		49
-	-	-	-	-	-		50, 51
-	-	-	-	-	-		52, 53
1,500	30	20	105	38	2.6 @ 79° F.	Previously subjected to gas injection.	54
983	12	21	243	32	73 @ 65° F.	Previously subjected to gas injection.	55
913	22	22.5	51.5	34	-		56
850	20	21	205	32	-	Previously subjected to gas injection.	57
850	30	22	130	32	-	Previously subjected to gas injection.	58
850	30	21	105	32	-	Previously subjected to gas injection.	59
977	30	23	57	36	-		60
940	22	20.5	167	36	7 @ 80° F.		61
-	-	-	-	-	-		62,63, 64
1,000	15	20	75	-	-		65
850	30	19.5	125	32	10 @ 80° F.		66
1,035	20	22.2	100	33	13.5 @ Reservoir temp.	Previously subjected to gas injection.	67
830	10	21.5	50	32	12		68
940 950 1,010	30 10 15	20.1	93	36	12.5 @ Reservoir temp.		69
910	20	19.9	278	34	-	Subjected to gas injection since 1941.	70
875	34	19.8	175	32.7	-	Previously subjected to gas injection 1932 to 1950.	71
935	14	21	175	35	7 @ 60° F.	Previously subjected to gas injection 1934 to 1948.	72

TABLE I (Continued)

GENERAL INFORMATION

Map No.	Field	Operator	Project	Formation "Sand"	County
73	Main	Tide Water	W. A. Howard	Robinson	Crawford
74	Main	Tide Water	Stifle-Drake	Robinson	Crawford
75	Main	Tide Water	G. L. Thompson	Robinson	Crawford
76	Main	Wilson	Hughes-Walker	Robinson	Crawford
77	Martinsville	J. B. Buchman	-	Carper	Clark
78	Martinsville	Magnolia	Carper	Carper	Clark
79	Martinsville	Magnolia	Casey	Casey	Clark
80	Mattoon	Carter	Mattoon	Cypress & Rosiclare	Coles
81	Mattoon	Phillips	Mattoon	Rosiclare	Coles
82	Maunie South	Magnolia	Tar Springs Unit	Tar Springs	White
83	Maunie South	Magnolia	Tar Springs Unit #2	Tar Springs	White
84	Mill Shoals	Sohio	B. R. Gray, Trustee	Aux Vases	Hamilton
85	Mt. Carmel	G. S. Engle	G. Dunkel	Biehl	Wabash
86	Mt. Carmel	First National Petroleum Trust	Shaw Courter	Biehl	Wabash
87	Mt. Carmel	Superior	North Mt. Carmel	Biehl	Wabash
88	Mt. Carmel	Texas	Stein	Tar Springs	Wabash
89	New Harmony Consolidated	Luboil	Helm	Aux Vases	Wabash
90	New Harmony Consolidated	Luboil	Helm	Benoist	Wabash
91	New Harmony Consolidated	Luboil	Helm	Waltersburg	Wabash
92	New Harmony Consolidated	Phillips	Schultz	Upper Cypress	Wabash
93	New Harmony Consolidated	Phillips	Schultz	Lower Cypress	Wabash
94	New Harmony Consolidated	Skiles	East Maud	Benoist	Wabash
95	New Harmony Consolidated	Skiles	East Maud	Cypress	Wabash
96	New Harmony Consolidated	Skiles	Siegert Bottoms	Benoist	Wabash
97	New Harmony Consolidated	Skiles	West Maud	Benoist	Edwards Wabash
98	New Harmony Consolidated	Sun	Ford "A"	McClosky	White
99	New Harmony Consolidated	Sun	Greathouse	Bethel	White
100	New Harmony Consolidated	Sun	Greathouse	McClosky	White
101	New Harmony Consolidated	Superior	Waltersburg	Waltersburg	White, Ill. Posey, Ind.
102	New Harmony Consolidated	Tide Water	E. S. Dennis "A"	Bethel	White
103	New Harmony Consolidated	Tide Water	O. R. Evans	Aux Vases	White
104	Odin	Ashland	Odin	Cypress	Marion
105	Olney Consolidated	Texas	Olney, East	McClosky	Richland
106	Patoka	Sohio	Patoka Benoist	Benoist	Marion

Location			Date First	PRODUCTION AND INJECTION STATISTICS (Barrels)						Map
				Water Injection		Secondary Recovery Oil Production		Water Production		
Section	Township	Range	Injection	Total 1952	Cumulative 12-31-52	Total 1952	Cumulative 12-31-52	Total 1952	Cumulative 12-31-52	No.
11	-7N	-13W	December, 1952	10,233	10,233	434*	434*	2,480	2,480	73
10	-7N	-13W	June, 1952	117,428	117,428	None	None	20,116	20,116	74
26,27	-6N	-13W	September, 1952	54,225	54,225	None	None	366	366	75
26	-6N	-13W	August, 1950	-	-	8,529*	11,366*	-	-	76
31	-10N	-13W	October, 1952	5,240	5,240	None	None	1,215	-	77
30	-10N	-13W	January, 1951	425,914	589,057	2,480*	4,890*	2,534	4,802	78
19	-10N	-13W	August, 1950	428,867	837,911	772*	1,840*	4,703	22,422	79
35	-12N	-7E	May, 1952	140,702	140,702	None	None	790	790	80
22	-12N	-7E	November, 1950	18,559	32,539	5,573*	-	41,496*	-	81
24	-6S	-10E	August, 1947	474,253	2,493,325	38,244*	723,953*	231,803	924,494	82
19 24 19	-6S -6S -6S	-11E -10E -11E	November, 1949	56,913	316,000	2,325*	59,120*	35,464	116,497	83
1	-4S	-7E	May, 1952	-	-	-	-	-	-	84
5	-1S	-12W	June, 1952	22,805	22,805	6,240*	-	-	-	85
7	-1S	-12W	February, 1950	48,493	143,435	15,006	42,012	35,224	60,935	86
9	-1S	-12W	June, 1949	53,940	185,853	None	None	54,000*	250,000*	87
5,8	-1S	-12W	February, 1952	113,833	113,833	1,622	1,622	2,359	-	88
22	-3S	-14W	December, 1951	56,192	58,543	None	None	None	None	89
22	-3S	-14W	December, 1951	442,043	455,300	7,900	7,900	None	None	90
22	-3S	-14W	December, 1950	191,101	340,502	29,585	51,550	-	-	91
7	-3S	-13W	May, 1952	103,040	103,040	1,302	1,302	None	None	92
7	-3S	-13W	July, 1951	278,125	363,938	49,462	49,680	48,295	48,295	93
32,33	-1S	-13W	April, 1952	91,891	91,891	None	None	1,850	1,850	94
4,5 32,33 4,5	-2S -1S -2S	-13W -13W -13W	November, 1952	3,869	3,869	None	None	900	900	95
34 2,3,10	-2S -3S	-14W -14W	October, 1951	379,883	464,683	4,750	2,350*	1,030	-	96
5 32	-2S -1S	-13W -13W	October, 1950	333,064	413,942	42,991	44,288	5,250	-	97
18	-5S	-14W	May, 1948	6,158*	57,823*	921*	13,076*	36*	626*	98
33	-4S	-14W	January, 1949	346,755	1,321,513	20,013	50,992	3,036	159,850	99
4 33 4	-5S -4S -5S	-14W -14W -14W	August, 1947	150,233	639,598	36,877	80,236	1,421	101,687	100
4,5,9,10	-5S	-14W	August, 1946	659,009*	3,158,371*	76,673*	534,571*	64,315*	456,504*	101
28,33	-4S	-14W	July, 1951	805,840	1,030,709	54,834	55,000	18,924	20,440	102
4,5	-4S	-14W	October, 1949	121,461	266,334	25,778	39,355	7,468	7,468	103
-	-2N	-1E -2E	October, 1949	-	-	-	-	-	-	104
23,24,25,26	-4N	-10E	March, 1951	71,994	188,312	2,807	4,144	14,659	-	105
20,21,28,29	-4N	-1E	September, 1943	4,127,960	27,848,919	148,645	5,871,103	3,764,547	21,158,359	106

DEVELOPMENT AS OF 12-31-52

Map No.	Number of Wells		Injection Pattern	Spacing Acres Per Input Well	Productive Acreage Subjected To Injection	Productive Acreage Total
	Injection	Producers				
73	3	3	5-spot	10	30	90
74	6	10	5-spot	10	52	160
75	2	5	5-spot	10	20	40
76	8*	7	-	-	30*	40
77	2	6	5-spot	20	40	40
78	4	1	5-spot	10	10	50
79	8	3	5-spot	10	23	110
80	4	8	5-spot	20	67	120
81	1	5	-	-	10	60
82	11	13	5-spot	20	230	240
83	3	2	5-spot	20	50	50
84	5	8	5-spot	20	170	170
85	1	3	Modified	28.9	87	68
86	1	2	Spot	-	30	30
87	2	10	-	10	50	150
88	2	8	-	-	50	73
89	8	10	5-spot & irregular	12	50	150
90	15	17	5-spot	12	180	300
91	3	4	Irregular	3.3	10	15
92	1	2	-	-	9	30
93	2	5	Irregular	-	21	70
94	6	20	5-spot	20	60	140
95	2	12	5-spot	20	20	100
96	17	22	5-spot	20	170	-
97	17	26	5-spot	20	340	-
98	1*	1*	Spot	-	40	40
99	6	10	5-spot	20	130	-
100	1	2	Spot	20	100	-
101	3	34	Line Drive	-	725	725
102	17	18	5-spot	10	160	185
103	4	9	5-spot	20	140	160
104	10	22	Perimeter	-	196	290
105	1	17	-	-	90	515
106	67	64	5-spot	10	527	-

INJECTION WATER

Source	Type	Avg. Bbls. Per Day Per Well Per Foot	Average Wellhead Pressure PSI
Pennsylvanian sand	Brine	9.1	0
Pennsylvanian sand	Brine	6.1	105
Gravel bed	Fresh	11.2	226
Gravel bed	Fresh	-	-
Shallow sand	Fresh	0.8	350
Gravel bed	Fresh	-	300
Gravel bed	Fresh	-	300
Pennsylvanian sand	Brine	11.8	63
Produced	Brine	5.1	0-500
Gravel bed	Fresh	-	950
Gravel bed	Fresh	-	950
Gravel bed	Fresh	-	-
Shallow sand	Fresh	17.2	660
Shallow sand and produced	Fresh and brine	8.3	1,100
Produced	Brine	10.6	0
Shallow sand and produced	Fresh and brine	14.8	486
Shallow sand	Fresh	1.6	446
Shallow sand	Fresh	5.8	417
Shallow sand	Fresh	7.0	300
Shallow sand and produced	Fresh and brine	44.2	50
Shallow sand and produced	Fresh and brine	19.0	456
Hardinsburg	Brine	6.6	767
Hardinsburg	Brine	5.9	0
Gravel bed	Fresh	3.4	1,045
Hardinsburg	Brine	4.5	1,250
Gravel bed	Fresh	-	55
Gravel bed	Fresh	6.8	1,410
Gravel bed	Fresh	82.2	1,670
Shallow sand and produced	Fresh and brine	14.0	Vacuum
Gravel bed	Fresh	4.3	417
Shallow sand	Fresh	3.5	1,475
Tar Springs	Brine	-	-
Weiler sand and produced	Brine	37.2	293
Tar Springs	Brine	6.2	239

RESERVOIR STATISTICS (Average Values)						REMARKS	
Depth Feet	Net Pay Thickness Feet	Porosity Per Cent	Permeability Millidarcys	Oil Gravity API	Oil Viscosity Centipoises		Map No.
950	13	19.6	184	35.3	-	Subjected to gas injection since 1935. *Due to Arkansas Fuel line input well.	73
980	15	18.2	221	33.5	-	Subjected to gas injection since 1934.	74
860	21	19.8	108	33	-		75
880	25	19	83	32	-	Previously subjected to gas injection. *Due to Ohio line input wells.	76
1,346	40	16	11	34	-		77
1,334	-	-	-	-	-	Pilot flood. *Includes primary production since start of flood.	78
464	-	-	-	-	-	Pilot flood. *Includes primary production since start of flood.	79
1,750 & 1,950	13	16	84	39	1.7 @ 85° F.		80
1,952	10	15	990	37	-	*Due to natural water drive.	81
2,270	-	-	-	37.3	4.6 @ 89° F.	*Includes primary production since start of flood.	82
2,275	-	-	-	-	-	*Includes primary production since start of flood.	83
3,245	11	21	-	-	-	Pilot flood.	84
1,500	6.7	15.3	310	36.6	3.9 @ 104° F.	*Includes primary production.	85
1,375	16	-	-	40.2	4.7 @ 70° F.		86
1,500	7	16.6	50	-	-	Previously subjected to gas injection. *Estimate.	87
2,040	11.6	18.9	221	36	4.0		88
2,750	12	16	20	-	-		89
2,640	14	17.1	44	-	-		90
2,115	25	20.1	171	-	-		91
2,500	10	-	-	-	-		92
2,500	20	18	50	-	-		93
2,520	8.5	17	57	36.1	5.1 @ 94° F.		94
2,400	8	18.5	75	36.2	5.0 @ 90° F.		95
2,680	18	17	75	36.5	3.8 @ 81° F.	*1951 production 2,400 barrels below normal.	96
2,620	12	17.2	57	37	4.6 @ Reservoir temp.		97
2,900	7	-	-	38	-	*Plugged and abandoned July, 1952.	98
2,750	23.2	18	20	38	-	Previously subjected to gas injection.	99
2,900	5	-	-	35	-		100
2,200	43	19.2	190	36.8	2.9 @ 86° F.	Previously subjected to gas injection. *Includes Indiana data.	101
2,700	30	16	50	39	2.2 @ 92° F.	Previously subjected to gas injection.	102
2,800	24	14.5	50	-	-	Previously subjected to gas injection.	103
1,700	15	20	78	38	8.3 @ 69° F.		104
3,100	5.3	13.8	522	36	2.6 @ 99° F.		105
1,410	27	19	110	39	-		106

TABLE I (Continued)

GENERAL INFORMATION

Map No.	Field	Operator	Project	Formation "Sand"	County
107	Patoka	Sohio	Patoka Rosiclare	Rosiclare	Marion
108	Patoka	Sohio	Stein Unit	Stein	Marion
109	Phillipstown Consolidated	C. E. Brehm	Phillipstown Unit "A"	Pennsylvanian	White
110	Phillipstown Consolidated	British-American	North Calvin	Pennsylvanian #7 Sand	White
111	Phillipstown Consolidated	Magnolia	Schmidt-Seifried	Biehl	White
112	Phillipstown Consolidated	Phillips	Laura	Benoist	White
113	St. Marie	S. Lebow	St. Marie	McClosky	Jasper
114	Salem	Texas	Salem Unit	Benoist	Marion
115	Salem	Texas	Salem Unit	Renault-Aux Vases	Marion
116	Salem	Texas	Salem Unit	McClosky	Marion
117	Salem	Texas	Salem Unit	Devonian	Marion
118	Salem	Texas	Rosiclare Sand Unit	Rosiclare	Marion
119	Siggins	Bell Brothers	Flood #1	Upper Siggins	Cumberland
120	Siggins	L. Fikes	Vevay Park	Siggins	Cumberland
121	Siggins	Forest	Siggins	First Siggins	Cumberland
122	Siggins	Hammonds & Wheless	Siggins	Casey	Clark & Cumberland
123	Siggins	Pure	Union Group	First & Second Siggins	Clark & Cumberland
124	Storms	Mabee	-	Waltersburg	White
125	Westfield	E. Constantin	Hawkins	"Gas Sand"	Clark
126	Westfield	E. Constantin	Johnson	"Gas Sand"	Coles
127	Westfield	Forest	Parker	Pennsylvanian "Gas Sand"	Clark
128	Willow Hill, East	M. M. Spickler	-	McClosky	Jasper
129	Woburn	Arrow Drilling Company	Spindler	Benoist	Bond
130	York	Trans-Southern	York	Casey	Cumberland
131	Lawrence	H. V. Sherrill	Applegate	Jackson & Cypress	Lawrence

TABLE II

ILLINOIS PRESSURE MAINTENANCE PROJECTS USING WATER INJECTION DURING 1952

GENERAL INFORMATION

Map No.	Field	Operator	Project	Formation "Sand"	County
132	Albion Consolidated	Calvert	South Albion Biehl	Biehl	Edwards
133	Bone Gap Consolidated	Gallagher	-	Waltersburg	Edwards
134	Boyd	Superior	Boyd Repressure	Bethel	Jefferson
135	Dix	Carter	Dix	Bethel	Jefferson
136	Loudon	Carter	Loudon Devonian	Devonian	Fayette
137	Omaha	Carter	Omaha	Palestine	Gallatin

PRODUCTION AND INJECTION STATISTICS (Barrels)

Location Section	Township	Range	Date First Injection	Secondary Recovery: Water Injection Total 1952	Water Injection Cumulative 12-31-52	Oil Production Total 1952	Oil Production Cumulative 12-31-52	Water Production Total 1952	Water Production Cumulative 12-31-52	Map No.
21,28,29	-4N	-1E	1948	661,454	2,306,790	132,687*	1,017,101*	207,747	568,134	107
28	-4N	-1E	August, 1951	76,700	93,830	11,695*	13,327*	44,649	50,329	108
30	-4S	-11E	June, 1952	10,706	10,706	4,379*	4,379*	None	None	109
19,30	-4S	-14W								
31	-3S	-14W	June, 1951	300,372	755,475*	219,623	309,923	75,223	125,523	110
30,31	-3S	-11E	May, 1951	174,570	374,172	113,990*	208,805*	16,171	46,255	111
19	-4S	-11E	March, 1952	16,352	16,352	None	None	None	None	112
5,6,7,8	-5N	-14W	October, 1948	144,000*	986,000*	None	31,000	144,000*	344,000*	113
-	-1N	-2E	October, 1950	471,220	813,142	36,477	44,222	557,610	-	114
	-2N	-2E								
-	-1N	-2E	October, 1950	247,397	735,664	None	None	350,600	-	115
	-2N	-2E								
-	-1N	-2E	April, 1951	2,015,564	3,022,740	55,153	87,623	908,740	-	116
	-2N	-2E								
-	-1N	-2E	October, 1950	5,318,452	9,300,539	30,762	39,252	2,144,369	-	117
	-2N	-2E								
15	-1N	-2E	April, 1950	194,455	445,667	16,431	31,719	24,193	-	118
13	-10N	-10E	September, 1950	94,386	138,590	10,865	19,865	16,400(est.)	-	119
25	-10N	-14W	December, 1950	81,782	182,725	431	977	6,000(est.)	-	120
7	-10N	-11E	June, 1942	3,700,000	27,221,365	665,000	4,535,736	-	-	121
11,12,13,14	-10N	-10E								
7	-10N	-14W	December, 1951	251,441	276,764	562	562	3,395(est.)	-	122
7	-10N	-11E								
13	-10N	-14W	December, 1946	1,333,097	8,170,591	235,434	1,638,338	1,329,309	4,790,425	123
18	-10N	-11E								
22	-6S	-9E	July, 1951	46,250	68,200	None	None	None	None	124
21	-11N	-14W	August, 1951	137,823	162,577	None	None	-	-	125
17,18	-11N	-11E	June, 1951	195,012	288,868	None	None	-	-	126
30	-11N	-14W	June, 1950	118,000	365,234	7,000	10,186	-	-	127
36	-7N	-10E	June, 1952	*	*	-	-	-	-	128
10	-6N	-2W	September, 1951	51,911	52,531	5,373*	6,640*	51,911	52,531	129
6	-9N	-11E	October, 1950	133,481	332,283	4,915	5,993	6,065	-	130
7	-4N	-12W	September, 1952	44,122	44,122	None	None	-	-	131
Totals				72,950,735	221,078,168	8,751,598	28,332,216			

PRODUCTION AND INJECTION STATISTICS (Barrels)

Location Section	Township	Range	Date First Injection	Water Injection Total 1952	Water Injection Cumulative 12-31-52	Oil Production† Total 1952	Oil Production† Cumulative 12-31-52	Water Production Total 1952	Water Production Cumulative 12-31-52	Map No.
1	-3S	-10E	April, 1951	60,612*	60,612*	108,321	250,471	71,668*	71,668*	132
35,36	-2S	-10E								
18	-1S	-14W	June, 1952	39,000	39,000	104,026	107,641	38,500	46,000	133
18,19,30	-1S	-2E	June, 1945	1,110,563	5,268,103	417,927	6,173,784	860,583	5,068,197	134
13,24	-1S	-1E								
3,4,9,10, 15,16	-1S	-2E	January, 1948	871,800	1,647,620	299,772	6,489,026	200,877	2,653,651	135
-	-8N	-3E	September, 1943	11,036,232	75,497,045	657,266	13,783,028	8,830,788	77,130,000	136
33	-7S	-8E	October, 1944	102,754	671,067	97,572	1,547,103	89,364	790,629	137
4	-8S	-8E								
Totals				13,220,961	83,183,447	1,684,884	28,351,053	10,091,780	85,760,145	

†Includes both primary recovery and any additional oil obtained by pressure maintenance.

Map No.	DEVELOPMENT AS OF 12-31-52						INJECTION WATER			
	Number of Wells		Injection Pattern	Spacing Acres Per Input Well	Productive Acreage Subjected To Injection	Total	Source	Type	Avg. Bbls. Per Day Per Well Per Foot	Average Wellhead Pressure PSI
	Injection	Producers								
107	16	10	Perimeter	-	445	445	Tar Springs	Brine	12.6	447
108	4	6	Peripheral	-	61	61	Tar Springs	Brine	5.3	308
109	1	5	Irregular	-	90	90	Pennsylvanian sand	Brine	2.2	-
110	9	15	5-spot	10	130	130	Produced water and 1,300-ft. sand	Brine	3.2	750
111	5	9	5-spot	10	60	140	Shallow sand	Fresh	-	963
112	1	3	-	-	16	40	Produced	Brine	5.4	0
113	1	14	Spot	-	400	500	Cypress	Brine	-	0
114	2	967	Peripheral & 5-spot	20	7,975	7,975	Gravel bed and produced	Fresh and brine	23.1	585
115	2	616	Peripheral	-	4,881	4,881	Gravel bed and produced	Fresh and brine	10.3	433
116	49	589	Peripheral	-	7,711	7,711	Gravel bed and produced	Fresh and brine	5.6	104
117	20	280	Peripheral	-	5,414	5,414	Gravel bed, upper sand and produced	Fresh and brine	38.3	0
118	3	5	Flank	-	100	100	Pennsylvanian sand	Brine	12.7	448
119	9*	36	5-spot	4.4	80	80	Surface and produced	Fresh and brine	1.8	200
120	2	4	5-spot	4.4	10	-	Surface and produced	Fresh and brine	6.5	212
121	407	329	5-spot	4.4	1,800	-	Gravel bed and produced	Fresh and brine	0.8	200
122	27	20	5-spot	4.4	135	227	Fresh water and produced	Fresh and brine	0.5	69
123	127	121	5-spot	4.4	468	575	Gravel bed	Fresh	0.9	245
124	1	2	-	-	40	40	Pennsylvanian sand	Brine	8.4	-
125	16	5	5-spot	4.4	40	640	Carper	Brine	-	198
126	24	11	5-spot	4.4	70	1,760	Westfield lime	Brine	-	125
127	9	12	5-spot	2.5	20	-	Gravel bed	Fresh	1.4	120
128	1	1	-	-	20	20	-	Brine	-	-
129	1	4	Spot	-	20	20	Produced	Brine	10.2	219
130	3	7	Line Drive	4.4	15	125	Shallow sand and produced	Fresh and brine	12.2	301
131	4	1	5-spot	10	10	225	Gravel bed	Fresh	6.2	310
					31,330†					

†Includes only 8,800 acres for the Salem Unit.

Map No.	DEVELOPMENT AS OF 12-31-52					INJECTION WATER		
	Number of Wells		Injection Pattern	Productive Acreage Subjected To Injection	Total	Source	Type	Average Wellhead Pressure PSI
	Injection	Producers						
132	2	7	Periphery	60	119	Produced	Brine	556
133	1	11	-	40	120	Produced	Brine	Vacuum
134	3	60	Flank	750	750	Produced	Brine	66
135	4	64	Periphery	1,200	1,200	Tar Springs and produced	Brine	103
136	6	69	Periphery	2,600	2,600	Produced	Brine	200
137	1	15	Flank	260	260	Produced	Brine	225

RESERVOIR STATISTICS (Average Values)						REMARKS	Map No.
Depth Feet	Net Pay Thickness Feet	Porosity Per Cent	Permeability Millidarcys	Oil Gravity API	Oil Viscosity Centipoises		
1,550	9	18.8	223	40	4.1	*Includes primary production since start of flood.	107
1,280	10	21	32	39	3.5 @ 60° F.	*Includes primary production since start of flood.	108
1,912	23	13	36	38	4.5 @ 84° F.	*Includes primary production since start of flood.	109
1,550	29	17.6	86	29	20 @ Reservoir temp.	*Includes estimated 300,000 barrels in pilot flood from 4-49 to 5-51.	110
1,830	-	-	-	32.2	11.2 @ 78° F.	*Includes primary production since start of flood. Pilot flood (1-input) from 9-47 to 5-51.	111
2,800	10	15	46	-	-		112
2,860	7	-	-	-	-	Dump flood. *Estimated.	113
1,770	28	17.9	150	37	3.9 @ 93° F.		114
1,825	7	16.5	18	37	4.8 @ 93° F.		115
	26	16.3	28		4.4 @ 93° F.		
1,950	20	15.8	700	37	-		116
3,400	19	16.8	300	36.5	-		117
2,093	14	11.5	43	36.5	-		118
320	16	18.9	73	34	12 @ 63° F.	Previously subjected to gas injection. *15 line wells operated jointly with Forest.	119
600	16	20.3	349	30.1	-		120
400	32	17.5	56	36.6	8 @ 60° F.	Previously subjected to gas injection.	121
447	56	21.5	40.2	33.8	10.5 @ 69° F.	Previously subjected to gas injection.	122
404	25	18.5	45	36	8.8 @ 68° F.		123
464	6	18.3	66				
2,241	15	-	-	-	-		124
-	-	22	120	30	28 @ 62° F.		125
-	-	21.5	86	29	-		126
270	25	17.9	153	28.1	54 @ 60° F.	Previously subjected to gas injection.	127
2,615	10+	-	-	-	-	*Dump flood.	128
1,006	14	-	-	-	-	*Includes primary production since start of flood.	129
590	10	21.9	231.2	30.3	10 @ 75° F.		130
1,320	22.7	20.1	62	34.7	4.3 @ 81° F.	Pilot flood.	131

RESERVOIR STATISTICS (Average Values)						REMARKS	Map No.
Depth Feet	Net Pay Thickness Feet	Porosity Per Cent	Permeability Millidarcys	Oil Gravity API	Oil Viscosity Centipoises		
2,080	9.2	16.8	384	32.3	10.4 @ 85° F.	*Since May, 1952.	132
2,310	20	18	120	34.6	5.6 @ 85° F.		133
2,065	19*	17.5	175	-	-	Previously subjected to gas injection.	134
1,950	12	16.4	128	39	2.5 @ 87° F.		135
3,100	-	-	-	29	6.5 @ 96° F.		136
1,700	17	18.9	427	27	17 @ 76° F.		137