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ILLINOIS PETROLEUM

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Oil and Gas Development in Illinois in 1936

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(Presented before the American Institute of Mining and Metallurgical Engineers, New York Meeting, February, 1937)

THE year 1936 in Illinois was marked by considerably increased activity in drilling, both wildcat and proved territory, in leasing, and in seismic and geologic exploration. Of the 92 oil and gas wells completed during 1936 in Illinois, 49 were oil wells, 3 were gas wells and 40 were dry holes. This compares with but 34 completions in 1935. The total of the daily initial productions of the new oil wells was 1755 bbl., or an average of 36 bbl. per well.

One new field was discovered, the Bartelso field in Clinton County.

The leasing of some large blocks of acreage in Clay, Marion, and other counties by the Carter Oil Co. in the late fall of 1935 was followed in 1936 by extensive leasing in southern Illinois by 10 major companies and many smaller companies and individuals. It is estimated that 2½ million acres were under lease by the end of 1936. Seismograph surveying has been carried on by about seven companies, and the number of seismograph parties operating in Illinois has varied from six to eight throughout most of 1936. It is estimated that approximately two million dollars has been spent in the state in seismic and geologic exploration and in leasing during the last quarter of 1935 and all of 1936.

Production of crude oil in Illinois in 1936, according to the Bureau of Mines, was as follows:

	BARRELS		BARRELS
January.....	325,000	July.....	402,000
February.....	294,000	August.....	380,000
March.....	396,000	September.....	386,000
April.....	347,000	October.....	393,000
May.....	389,000	November.....	363,000
June.....	383,000	December.....	387,000
			4,445,000

This 4,445,000 bbl. was an increase of 3 per cent over 1935. Although this increase was due largely to the fact that production was not artificially curtailed, it also reflects some new production and some increases in production from repressuring and water-flooding, which offset the

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TABLE 1.—*Oil and Gas Production in Illinois*

Line Number	Field, County	Age, Years to End of 1936	Area Proved, Acres			Total Oil Production, Bbl.	
			Oil	Gas	Total	To End of 1936	During 1935
1	Warrenton-Borton, <i>Edgar</i>	30	100	0	100	27,600 ±	550 ±
2	Westfield (Parker Twp.), <i>Clark, Coles</i>	32	9,000	55	9,055	x	x
3			850	75	925	x	x
4			9,000	0	9,000	x	x
5			1,500	0	1,500	x	x
6	Siggins (Union Twp.), <i>Cumberland, Clark</i>	30	3,580	75	3,655	x	x
7			3,135	55	3,190	x	x
8			435	15	450	x	x
9			855	105	960	x	x
10	York, <i>Cumberland</i>		310	40	350	x	x
11	Casey, <i>Clark</i>	29	1,925	55	1,980	x	x
12			190	15	205	x	x
13			400	0	400	x	x
14			1,525	15	1,540	x	x
15	Martinsville, <i>Clark</i>	29	710	155	865	x	x
16			15	20	35	x	x
17			275	35	310	x	x
18			105	0	105	x	x
19			170	0	170	x	x
20			195	0	195	x	x
21			5	0	5	x	x
22	North Johnson, <i>Clark</i>	29	1,320	20	1,340	x	x
23			1,115	0	1,115	x	x
24			160	0	160	x	x
25			820	5	825	x	x
26			215	0	215	x	x
27	South Johnson, <i>Clark</i>	29	1,715	65	1,780	x	x
28			185	5	190	x	x
29			295	0	295	x	x
30			1,675	35	1,710	x	x
31			845	5	850	x	x
32	Bellair, <i>Crawford, Jasper</i>	29	1,300	5	1,305	x	x
33			1,165	0	1,165	x	x
34			315	0	315	x	x
35			910	0	910	x	x
36	Clark County Division ¹		19,960	475	20,435	51,450,000 ±	479,000
37	Main ² , <i>Crawford</i>	30	35,135	515	35,650	x	x
38			340	0	340	x	x
39			33,795	510	34,305	x	x
40			1,000	0	1,000	x	x
41	New Hebron, <i>Crawford</i>	27	1,350	210	1,560	x	x
42	Chapman, <i>Crawford</i>	22	1,045	515	1,560	x	x
43	Parker, <i>Crawford</i>	29	1,310	30	1,340	x	x
44	Allison-Weger, <i>Crawford</i>	y	1,075	20	1,095	x	x
45	Flat Rock ³ , <i>Crawford</i>	y	1,375	545	1,820	x	x
46	Birds, <i>Crawford, Lawrence</i>	y	4,370	115	4,485	x	x
47	Crawford County Division ⁴		45,655	1,945	47,600	140,390,000	1,532,000
48	Lawrence, <i>Lawrence, Crawford</i>	30	24,150	1,550	25,700	x	x
49			5,015	35	5,050	x	x
50			2,240	0	2,240	x	x
51			345	1,095	1,440	x	x
52			15,960	220	16,180	x	x
53			4,020	200	4,220	x	x
54			6,950	0	6,950	x	x
55	St. Francisville, <i>Lawrence</i>	y	420	0	420	x	x
56	Lawrence County Division ⁵		24,570	1,550	26,120	219,343,000 ±	1,785,000 ±

¹ Total of lines 1, 2, 6, 10, 11, 15, 22, 27, 32.² Includes Kibbie, Oblong, Robinson and Hardinsville.³ Includes Swearingen gas.⁴ Total of lines 37, 41, 42, 43, 44, 45, 46.⁵ Total of lines 48 and 55.

natural decline in other areas. The price of Illinois crude oil was \$1.23 per barrel from Jan. 5, 1936, until the end of the year, an increase of 10¢ per barrel over that of 1935. This price rise has tended to check

TABLE 1.—(Continued)

Line Number	Total Oil Production, Bbl.		Total Gas Production, Millions Cu. Ft.				Number of Oil and/or Gas Wells							
	During 1936	Daily Average during Nov. 1936	To End of 1936	During 1935	During 1936	Maximum Daily during 1936	Completed to End of 1936	During 1936		At End of 1936				
								Completed	Abandoned	Temporarily Shut Down	Producing Oil Only	Producing Oil and Gas ^b	Producing Gas Only	Total Producing
1	1,095	3.0	0	0	0	0	22	0	0	2	13	0	0	13
2	"	"	"	0	0	0	1,616	6	0	"	418	0	0	418
3	"	"	"	0	0	0	185	1	0	"	"	0	0	"
4	"	"	"	0	0	0	1,435	0	0	"	"	0	0	"
5	"	"	"	"	0	0	12	0	0	"	"	0	0	"
6	"	"	"	0	0	0	995	0	0	"	916	"	0	916
7	"	"	"	0	0	0	854	0	0	"	"	"	0	"
8	"	"	"	0	0	0	90	0	0	"	"	"	0	"
9	"	"	"	0	0	0	192	0	0	"	"	"	0	"
10	"	"	"	0	0	0	70	0	0	"	44	"	0	44
11	"	"	"	0	0	0	532	0	25	15	473	0	0	473
12	"	"	"	0	0	0	41	0	"	"	"	0	0	"
13	"	"	"	0	0	0	82	0	"	"	"	0	0	"
14	"	"	"	0	0	0	319	0	"	"	"	0	0	"
15	"	"	"	0	0	0	213	0	0	"	135	0	0	135
16	"	"	"	0	0	0	7	0	0	"	"	0	0	"
17	"	"	"	0	0	0	63	0	0	"	"	0	0	"
18	"	"	"	0	0	0	21	0	0	"	"	0	0	"
19	"	"	"	0	0	0	34	0	0	"	"	0	0	"
20	"	"	"	0	0	0	39	0	0	"	"	0	0	"
21	"	"	"	0	0	0	1	0	0	0	1	0	0	1
22	"	"	"	"	"	"	485	0	0	"	457	"	0	457
23	"	"	"	"	"	"	296	0	0	"	"	0	0	"
24	"	"	"	"	"	"	32	0	0	"	"	0	0	"
25	"	"	"	"	"	"	177	0	0	"	"	0	0	"
26	"	"	0	0	0	0	44	0	0	"	"	0	0	"
27	"	"	"	"	"	"	534	1	0	"	487	"	0	487
28	"	"	"	"	"	"	38	0	0	"	"	0	0	"
29	"	"	"	"	"	"	59	0	0	"	"	0	0	"
30	"	"	"	"	"	"	401	0	0	"	"	0	0	"
31	"	"	"	"	"	"	170	0	0	"	"	0	0	"
32	"	"	"	"	"	"	485	0	0	"	407	"	0	407
33	"	"	"	"	"	"	309	0	0	"	"	0	0	"
34	"	"	"	"	"	"	63	0	0	"	"	0	0	"
35	"	"	"	"	"	"	182	0	0	"	"	0	0	"
36	463,600	1,225	"	"	"	"	4,974	8	25	17	3,351	"	0	3,351
37	"	"	"	"	"	"	7,318	6	158	"	5,388	"	0	5,388
38	"	"	"	"	"	"	68	0	"	"	"	0	0	"
39	"	"	"	"	"	"	7,134	6	"	"	"	0	0	"
40	"	"	"	"	"	"	108	0	"	"	"	0	0	"
41	"	"	"	"	"	"	295	0	0	0	181	0	0	181
42	"	"	"	"	"	"	193	0	6	"	77	0	0	77
43	"	"	"	"	"	"	255	0	0	"	221	0	0	221
44	"	"	"	"	"	"	146	0	7	"	65	0	0	65
45	"	"	"	"	"	"	283	2	11	"	152	0	0	152
46	"	"	"	"	"	"	684	1	2	"	482	0	0	482
47	1,546,000	3,950	"	"	"	"	9,174	9	184	31	6,534	"	1	6,535
48	"	"	"	"	"	"	4,388	5	38	"	3,304	"	0	3,304
49	"	"	"	"	"	"	1,231	3	"	"	"	"	0	"
50	"	"	"	"	"	"	475	0	"	"	"	"	0	"
51	"	"	"	"	"	"	243	0	"	"	"	"	0	"
52	"	"	"	"	"	"	3,017	0	"	"	"	"	0	"
53	"	"	"	"	"	"	684	0	"	"	"	"	0	"
54	"	"	"	"	"	"	952	2	"	"	"	"	0	"
55	"	"	"	"	"	"	54	0	"	"	45	"	0	45
56	1,908,000±	5,017±	"	"	"	"	9,169	5	38	"	3,349	"	0	3,349

^b Footnotes to column heads and explanation of symbols are given on page 14.

TABLE 1.—(Continued)

Line Number	Depth, Average in Feet		Oil Production Methods at End of 1936			Pressure, Lb. per Sq. In.		Character of Oil, Approx. Average during 1936					Character of Gas, Approx. Average during 1936			
	Bottoms of Productive Wells	To Top of Productive Zone	Number of Wells		Injection into Reservoirs ⁸	Initial	Average at End of		Gravity A.P.I. at 60° F. ²⁶			Sulphur Per Cent	Base ⁹	B.t.u. per Cu. Ft.	Gal. Gasoline per M. Cu. Ft.	
			Flowing	Pumping			1935	1936	Maximum	Minimum	Weighted Average					
																1935
1	215	159		13		x	x	x	x	x	x	y	y			
2				418		200±	x	x	x	38.4	28.3	34.0	y	M		
3	376	281		y		x	x	x	x	y	y	30.0	y	M		
4	446	334		y		x	x	x	x	y	y	33.5	y	M		
5	2,568	2,265		y		x	x	x	x	y	y	37.0	y	M		
6				916	A2	x	x	x	x	(36.9)	27.4	33.0	y	M		
7	465	367		y		x	x	x	x	y	y	34.0	y	M		
8	562	478		y		x	x	x	x	y	y	(33.6)	y	M		
9	590	556		y		x	x	x	x	y	y	(25.7)	y	M		
10	680	588		44		x	x	x	x	33.9	30.0	(30.3)	y	M		
11				473	21	x	x	x	x	37.2	27.2	29.2	y	M		
12	358	263		y		x	x	x	x	y	y	(31.9)	y	M		
13	426	309		y		x	x	x	x	y	y	(30.1)	y	M		
14	505	444		y		x	x	x	x	y	y	(33.6)	y	M		
15				135	A2	x	x	x	x	37.5	30.2	36.8	y	M		
16	411	255		y		x	x	x	x	y	y	y	y	M		
17	511	449		y		x	x	x	x	y	y	y	y	M		
18	506	477		y		x	x	x	x	y	y	y	y	M		
19	1,418	1,340		y		x	x	x	x	y	y	(38.9)	y	M		
29	1,596	1,553		y		x	x	x	x	y	y	y	y	M		
21	2,830	2,708		1		x	x	x	x	y	y	(39.6)	y	M		
22				457		x	x	x	x	36.2	27.2	31.0	y	M		
23	486	416		y		x	x	x	x	y	y	y	y	M		
24	451	314		y		x	x	x	x	y	y	y	y	M		
25	508	465		y		x	x	x	x	y	y	y	y	M		
26	554	534		y		x	x	x	x	y	y	y	y	M		
27				487		x	x	x	x	35.1	28.5	32.2	y	M		
28	549	392		y		x	x	x	x	y	y	y	y	M		
29	518	453		y		x	x	x	x	y	y	y	y	M		
30	570	489		y		x	x	x	x	y	y	y	y	M		
38	618	598		y		x	x	x	x	y	y	28.5	y	M		
32				407	AG2	x	x	x	x	35.6	27.3	33.7	y	M		
33	726	561		y		x	x	x	x	y	y	(32.4)	y	M		
34	907	817		y		x	x	x	x	y	y	y	y	M		
35	920	886		y		x	x	x	x	y	y	(37.0)	y	M		
36				3,351	22	x	x	x	x	39.6	25.8	33.0	y	M		
37				5,388	23	425±	y	y	y	36.8	25.1	33.0	y	M	960	2.5
38	822	508		y		x	x	x	x	y	y	y	y	M		
39	960	900		y		425±	x	x	x	36.8	25.1	32.8	y	M	960	2.5
40	1,416	1,337		y		x	x	x	x	y	y	y	y	M		
41	975	940		181	G2	x	x	x	x	35.0	24.3	30.1	y	M		
42	1,015	995		77	AG1	x	x	x	x	y	y	y	y	M		
43	1,025	1,000		221		x	x	x	x	y	y	y	y	M		
44	930	912		65		x	x	x	x	30.4	22.6	29.5	y	M		
45	945	935		152		x	x	x	x	26.6	20.1	22.5	y	M		
46	950	930		482	A7	x	x	x	x	34.1	26.5	31.3	y	M		
47				6,534	25	425±	x	x	x	38.6	18.5	32.5	y	M	960	2.5
48				3,304	A1	650±	x	x	x	39.3	26.7	32.9	y	M	y	2.4
49	1,000	800		y		x	x	x	x	y	y	y	y	M		
50	1,265	1,250		y		x	x	x	x	y	y	y	y	M		
51	1,345	1,510		y		x	x	x	x	y	y	y	y	M		
52	1,430	1,400		y		600±	x	x	x	y	y	y	y	M		
53	1,580	1,500		y		650	x	x	x	y	y	y	y	M		
55	1,710	1,700		y		x	x	x	x	y	y	y	y	M		
55	1,865	1,843		45		600	x	x	x	37.3	37.3	37.3	y	M		
56				3,349	A1	x	x	x	x	x	x	x	y	M		

⁸ Numbers in this column indicate numbers of injection wells.

²¹ G1, A14.

²² G1, AG13, A8.

²³ G17, AG20, A42.

²⁴ G17, AG20, A42.

²⁵ G26, AG21, A42, W3.

²⁶ All gravities given (except those in parentheses) were from data for the year 1925 furnished by the Illinois Pipe Line Co. Gravities in parentheses are for particular samples; see Illinois State Geol. Survey *Bull.* 54, Table 3. The values have been converted from Baumé to A.P.I. gravities.

the abandonment of old wells, which had been increasing during the years of low prices (1931-1933). A preliminary estimate of the total value of the crude oil produced in Illinois is \$5,500,000.

TABLE 1.—(Continued)

Line Number	Producing Rock						Number of Dry and/ or Near-dry Holes to End of 1936	Deepest Zone Tested to End of 1936	
	Name	Age ^f	Character ^e	Porosity ^a	Net Thickness, Average in Feet	Structure ⁱ		Name	Depth of Hole, Ft.
1	Unnamed	Pen	S	Por	x	ML	0	Pen Trenton	715 2,918
2	See below					D	101		
3	Sballow gas sand	Pen	S	Por	36	D	x		
4	Westfield lime	Mis L	L	Cav	x	D	x		
5	Trenton (Ordo)	Ordo	L	Por	x	D	x		
6	See below					D	28	Dev. limestone	2,010
7	First Siggins sand	Pen	S	Por	x	D	x		
8	Second and third Siggins sand	Pen	S	Por	x	D	x		
9	Lower Siggins sand	Pen	S	Por	x	D	x		
10	York sand	Pen	S	Por	x	AM	2	MisL	960 808
11	See below					AM	20		
12	Upper gas sand	Pen	S	Por	x	AM	5		
13	Lower gas sand	Pen	S	Por	x	AM	12		
14	Casey sand	Pen	S	Por	x	AM	20	St. Peter	3,411
15	See below					D	5		
16	Sballow sands	Pen	S	Por	x	D	1		
17	Casey sand	Pen	S	Por	x	D	5		
18	Martinsville sand	MisL	L	Por	x	D	1		
19	Carper	MisL	S	Por	x	D	1		
20	"Niagara"	Der	L	Por	x	D	3		
21	Trenton	Ordo	L	Por	x	D	1		
22	See below					AM	16	Mis	965
23	Claypool sand	Pen	S	Por	x	AM	12		
24	Sballow sands	Pen	S	Por	x	AM	4		
25	Casey sand	Pen	S	Por	x	AM	12	Mis	1,160
26	Upper Partlow	Pen	S	Por	x	AM	16		
27	See below					AM	29		
28	Claypool sand	Pen	S	Por	x	AM	3		
29	Casey sand	Pen	S	Por	x	AM	11		
30	Upper Partlow	Pen	S	Por	x	AM	29		
31	Lower Partlow	Pen	S	Por	x	AM	10	MisL	1,471
32	See below					AM	14		
33	"500 Ft." sand	Pen	S	Por	x	AM	3		
34	"800 Ft." sand	Pen	S	Por	x	AM	3		
35	"900 Ft." sand	MisU	S	Por	x	AM	12	Trenton (Ordo)	4,620
36	See below				33±		213		
37	See below						202	Trenton (Ordo)	4,620
38	Shallow sand	Pen	S	Por	x	ML	x		
39	Robinson sand	Pen	S	Por	25±	ML	167	Trenton (Ordo)	4,620
40	Oblong	Mis	S or L	Por	x	A, ML	23	Mis	1,479
41	Robinson sand	Pen	S	Por	x	ML	5	Mis L	2,056
42	Robinson sand	Pen	S	Por	x	ML	10	Mis	2,279
43	Robinson sand	Pen	S	Por	x	ML	10	Pen?	1,127
44	Robinson sand	Pen	S	Por	x	ML	6	Pen	1,041
45	Robinson (Flat Rock)	Pen	S	Por	x	ML	8	Pen	1,032
46	Robinson sand	Pen	S	Por	x	ML	12	MisL	1,731
47	Pen, Mis	Pen, Mis	S	Por	x	ML	251	Trenton (Ordo)	4,620
48	See below					A	84	St. Peter	5,190
49	Bridgeport sand	Pen	S	Por	40	A	19		
50	Buchanan	Pen	S	Por	15	A	3		
51	"Gas" sand	MisU	S	Por	15	A	5		
52	Kirkwood	MisU	S	Por	30	A	10		
53	Tracy	MisU	S	Por	20	A	11		
54	McClosky	MisL	L	Por	10	A	24		
55	Kirkwood	MisU	S	Por	22	ML	0	Mis St. Peter	1,900 5,190
56							84		

In most Illinois fields the 1936 oil production differed only slightly from that of 1935. Slight increases took place in Crawford and Lawrence Counties and slight decreases in Clark and St. Clair Counties, no change in these counties being greater than 3 per cent. Production from the Colmar-Plymouth oil field, McDonough and Hancock Counties, nearly doubled, because of air repressuring. The Marion County district of the Illinois Pipe Line Co., which includes the old Carlyle, Sandoval, Wamac

TABLE 1.—(Continued)

Line Number	Field, County	Age, Years to End of 1936	Area Proved, Acres			Total Oil Production, Bbl.	
			Oil	Gas	Total	To End of 1936	During 1935
57	Allendale, <i>Wabash</i>	24	1,670	0	1,670	4,220,000 ±	280,000 ±
58	Total Southeastern Illinois Field ⁶		91,845	3,970	95,815	415,403,000	4,076,000
59	Colmar-Plymouth, <i>Hancock, McDonough</i>	23	2,450	0	2,450	2,140,000	86,800
60	Pike County Gas, <i>Pike</i>	31 ⁷	0	8,960	8,960	0	0
61	Jacksonville, Gas, <i>Morgan</i>	26	30	1,290	1,320	2,100	0
62	Carlinville, <i>Macoupin</i>	27 ¹⁰	30	50	80	x	0
63	Spanish Needle Creek, <i>Macoupin</i>	21 ¹¹	0	80	80	0	0
64	Gillespie-Wyen, <i>Macoupin</i>	21	40	0	40	x	1,925
65	Gillespie-Beald Gas, <i>Macoupin</i>	13 ¹²	0	80	80	0	0
66	Stanton Gas, <i>Macoupin</i>	20 ¹³	0	400	400	0	0
67	Litchfield, <i>Montgomery</i>	57 ¹⁴	100	0	100	22,000	0
68	Collinsville, <i>Madison</i>	27 ¹⁵	40	0	40	715	0
69	Ayers Gas, <i>Bond</i>	14	0	320	320	0	0
70	Greenville Gas, <i>Bond</i>	26 ¹⁶	0	160	160	0	0
71	Carlyle, <i>Clinton</i>	25	915	0	915	3,289,000 ±	39,500
72	Frogtown, <i>Clinton</i>	18 ¹⁷	300	0	300	x	0
73	Sandoval, <i>Marion</i>	27	770	0	770	2,607,000 ±	27,000 ±
74	Centralia, <i>Marion</i>	26	175	0	175	x	y
75	Wamac, <i>Clinton, Marion, Washington</i>	15	250	0	250	353,000 ±	35,000 ±
76	Dupo, <i>St. Clair</i>	8	670	0	670	877,600	51,500
77	Waterloo, <i>Monroe</i>	16 ⁷	125	0	125	166,000	0
78	Sparta Gas, <i>Randolph</i>	19 ¹⁸	65	100	165	x	0
79	Ava-Campbell Hill, <i>Jackson</i>	19 ¹¹	70	370	440	25,000	0
80	Bartleso, <i>Clinton</i>	1	200	0	200	40,700 ±	0
81	Total Illinois ¹⁹		98,085	15,770	113,855	425,495,000 ²⁰	4,322,000 ²⁰

⁶ Total of lines 36, 47, 56, 57.⁷ Abandoned 1930.¹⁰ Abandoned 1925 ±.¹¹ Abandoned 1934.¹² Abandoned 1935.¹³ Abandoned 1919.¹⁴ Abandoned 1904.¹⁵ Abandoned 1921.¹⁶ Abandoned 1923.¹⁷ Abandoned 1933.¹⁸ Abandoned.¹⁹ Total of lines 58 to 79 inclusive.²⁰ The total oil production is the figure furnished by the U. S. Bureau of Mines and is not the exact total of the figures given in the table, which were obtained from other sources.

and Macoupin County fields and the new Bartelso field, had an increased production of approximately 30,000 bbl., or 31 per cent over 1935. The Bartelso field itself produced approximately 40,700 bbl. of oil. A decline in the production of the Carlyle field from 39,500 bbl. in 1935 to 28,200 in 1936 was owing to the fact that about 13 former producers were made input wells for water-flooding, and up to the end of 1936 no increased production from the adjacent wells had been effected by the water. Lack of sufficient gas reduced the amount of pumping in the whole field.

The well that discovered the new Bartelso oil field was located on the crest of a dome that was mapped, described, and recommended in *Bulletin* 20A of the Illinois State Geological Survey, published in 1912. Subsequent test wells on the west flank of the dome had obtained showings of oil but until 1936 there was no drilling on the high part of the structure.

The discovery well of the Bartelso oil field was the Bartelso Oil and Gas Company's C. Trame No. 1 well, SE. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 8, T.1N.,

TABLE 1.—(Continued)

Lane Number	Total Oil Production, Bbl.		Total Gas Production, Millions Cu. Ft.				Number of Oil and/or Gas Wells							
	During 1936	Daily Average during Nov. 1936	To End of 1936	During 1935	During 1936	Maximum Daily during 1936	Completed to End of 1936	During 1936		At End of 1936				
								Completed	Abandoned	Temporarily Shut Down	Producing Oil Only	Producing Oil and Gas ^b	Producing Gas Only	Total Producing
57	220,000±	365±	x	y	y	y	411	4	11	y	319	y	0	319
58	4,137,600	10,557	x	y	y	y	19,005	26	258	48	13,553	y	1	13,554
59	153,000	430	0	0	0	0	463	9	0	69	196	0	0	196
60	0	0	x	0	0	0	68	0	0	0	0	0	0	0
61	0	0	x	x	x	x	53	0	y	y	0	0	y	0
62	0	0	x	0	0	0	8	0	0	0	0	0	0	0
63	0	0	14.4	0	0	0	7	0	y	0	0	0	0	0
64	4,758	0	0	0	0	0	22	0	12	0	0	0	0	0
65	0	0	135.8	0	0	0	4	0	0	0	0	0	0	0
66	0	0	1,050	0	0	0	18	0	0	0	0	0	0	0
67	0	0	x	0	0	0	17	0	0	0	0	0	0	0
68	0	0	0	0	0	0	5	0	0	0	0	0	0	0
69	0	0	117,447	13,420	37,047	y	17	1	0	0	0	0	10	10
70	0	0	990	0	0	0	4	0	0	0	0	0	0	0
71	28,200±	77±	0	0	0	0	164	0	0	21	88	0	0	88
72	0	0	0	0	0	0	12	0	0	0	0	0	0	0
73	30,160±	82±	0	0	0	0	122	0	0	y	45	0	0	45
74	y	y	0	0	0	0	22	0	0	y	3	0	0	3
75	23,200±	65±	0	0	0	0	103	0	4	y	46	0	0	46
76	53,100	138	0	0	0	0	237	7	0	0	45	0	0	45
77	0	0	0	0	0	0	23	0	0	0	0	0	0	0
78	0	0	x	0	0	0	20	0	0	0	0	0	0	0
79	0	0	x	0	0	0	35	0	0	0	0	0	0	0
80	40,700±	230±	0	0	0	0	9	9	0	0	9	0	0	9
81	4,445,000 ²⁰	12,100 ²⁰	x	y	y	y	20,433	52	262	150	13,985	y	11	13,996

In the Dupo field, St. Clair County, seven oil wells were drilled, having average initial daily productions of 33 bbl. per well. Three wildcat wells were drilled in the remainder of the county, all dry holes. Only one of the three was located on known favorable structure—the W. O. Shock et al. Evans-Fritz No. 1, total depth 630 ft., SE. $\frac{1}{4}$ SW. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 32, T.3S., R.6W., on a dome mapped and described in Illinois State Geological Survey Illinois Petroleum No. 18. The well ended near the base of the Chester series and therefore did not test the lower Mississippian and other underlying formations.

An extension of the producing area of the Ayers gas field was made when the Ray, Evans et al. John Merry No. 1, NW. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 30, T.6N., R.3W., Bond County, total depth 942 ft., was completed on Feb. 3, 1936, with an estimated initial open-flow capacity of 1½ million cubic feet per day. This well is approximately $\frac{1}{4}$ mile south of the nearest producing well and extends the proved area. The Ayers gas field furnishes gas for municipal and industrial use in Greenville.

TABLE 1.—(Continued)

Line Number	Producing Rock						Number of Dry and/ or Near-dry Holes to End of 1936	Deepest Zone Tested to End of 1936	
	Name	Age ^f	Character ^e	Porosity ^h	Net Thickness, Average in Feet	Structure ⁱ		Name	Depth of Hole, Ft.
57	Biehl sand	Pen	S	Por	20	AM	43	MisL	2,228
58							595		
59	Hoing sand	Dev	S	Por	21	A	3	Trenton (Ord)	805
60	Niagaran	Sil	L	Por	10	A	0	St. Peter	893
61	Gas sand	Pen, Mis	S, SL	Por	5	ML	8	Trenton (Ord)	1,390
62	Unnamed	Pen	S	Por	r	A	0	Pen	410
63	Unnamed	Pen	S	Por	r	D	1	Pen	495
64	Unnamed	Pen	S	Por	r	T	14	Trenton (Ord)	2,560
65	Unnamed	Pen	S	Por	r	A	0	Pen	575
66	Unnamed	Pen	S	Por	r	A	0	Trenton (Ord)	2,371
67	Unnamed	Pen	S	Por	r	D	0	Pen	681
68	Trenton	Ord	L	Por	20	ML	0	Trenton (Ord)	1,500
69	Lindley (2d)	MisU	S	Por	5	A	0	MisL	1,150
70	Lindley (1st, 2d)	MisU	S	Por	r	A	0	Mis	1,065
71	Carlyle	MisU	S	Por	20	A	17	Sil	2,620
72	Carlyle	MisU	S	Por	7	D	0	Carlyle y	962±
73	Benoist	MisU	S	Por	20±	D	7	Mis	1,732
74	Dykstra, Wilson, Benoist	Pen, MisU	S	Por	20	D, ML	6	MisL	1,779
75	Petro	Pen	S	Por	20	D	0	Benoist	1,484
76	Trenton	Ord	L	Cav	50	A	0	Trenton (Ord)	819
77	Trenton	Ord	L	Por	50	A	19	Trenton (Ord)	845
78	Sparta gas sand	MisU	S	Por	7	D	5	MisU	985
79	Unnamed	MisU	S	Por	18	A	y	Dev	2,530
80	Carlyle	MisU	S	Por	21	D	0	Carlyle	1,065
81							671±		

Of the 30 wells drilling or temporarily shut down at the end of 1936, three are of special interest because of their location in the deep basin area. Two of these, the Pure Oil Company's Bradley No. 1, SW. $\frac{1}{4}$ SW. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 26, T.1N., R.7E., Wayne County, and Weiler No. 1, SE. $\frac{1}{4}$ SW. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 33, T.3N., R.8E., Clay County, were located on the basis of seismograph surveys. These had reached depths of approximately 2050 and 1425 ft., respectively, at the end of the year. The third, the T. E. Baldwin et al. H. Nichols' No. 1, SW. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 12, T.4N., R.4E., Marion County, is on the basis of a surface structure

TABLE 2.—*Summary of Drilling Operations in Illinois*

Wildcats Drilled in 1936										
	County	Location			Total Depth, Ft.	Surface Formation	Deepest Horizon Tested	Drilled by	Initial Production per Day	Remarks
		Sec.	Twp.	Rge.						
		Survey	Lat.	Long.					Oil, U. S. Bbl.	
1	Bond	31	6 N.	3 W.	1118	Pleistocene	Chester	F. S. Ray et al.		Dry
2	Brown	7	2 S.	3 W.	780	Pleistocene	Maquoketa	Super Oil Co.		Dry
3	Champaign	11	18 N.	9 E.	1725	Pleistocene	Trenton	Meyers et al.		Dry
4	Clinton	10	3 N.	2 W.	1283	Pleistocene	Chester	Hempen et al.		Dry
5	Clinton	5	1 N.	4 W.	1090	Pleistocene	Chester	Goldschmidt et al.		Dry
6	Clinton	25	2 N.	4 W.	1097	Pleistocene	Chester	J. Young et al.		Dry
7	Clinton	8	1 N.	3 W.	1118	Pleistocene	Chester	Ohio Oil Co.		Dry
8	Clinton	4	1 N.	3 W.	1090	Pleistocene	Chester	Meyers and Hawley		Dry
9	Clinton	7	1 N.	3 W.	1039	Pleistocene	Chester	Nollem Oil and Gas Co.		Dry
10	Clinton	7	1 N.	3 W.	1026	Pleistocene	Chester	Cooksey et al.		Dry
11	Clinton	4	1 N.	3 W.	1058	Pleistocene	Chester	Jonas et al.		Dry
12	Clinton	3	1 N.	3 W.	1089	Pleistocene	Chester	Hempen and Burgess		Dry
13	Clinton	8	1 N.	3 W.	1037	Pleistocene	Chester	Bartelso Oil and Gas Co.	115	Dry
14	Clinton	8	1 N.	3 W.	1030	Pleistocene	Chester	Nollem Oil and Gas Co.		Dry
15	Douglas	6	14 N.	7 E.	260	Pleistocene	Pennsylvanian	Meyers et al.		Dry
16	Jasper	15	8 N.	14 W.	721	Pleistocene	Pennsylvanian	National Cons. Oil Co.		Dry
17	Jasper	15	8 N.	14 W.	681	Pleistocene	Pennsylvanian	National Cons. Oil Co.	10	Dry
18	Lawrence	5	4 N.	11 W.	1460	Pleistocene	Ste. Genevieve	Yaw, Pierson, Sage		Dry
19	Logan	22	18 N.	2 W.	575	Pleistocene	Pennsylvanian	Ed. Hood et al.		Dry
20	Macoupin	15	8 N.	8 W.	465	Pleistocene	Pennsylvanian	Boone Oil Co.		Dry
21	Macoupin	36	11 N.	9 W.	1076	Pleistocene	Devonian	Hettick Oil Dev. Association		Dry
22	Marion	8	2 N.	4 E.	587	Pleistocene	Pennsylvanian	Iuka Oil and Gas Co.		Dry
23	Pike	19	5 S.	2 W.	412	Pleistocene	Devonian	Super Oil Co.		Dry
24	Pope	18	13 S.	6 E.	1000	Chester	Ste. Genevieve	Rodgers, Rumsey, Barger, et al.		Dry
25	Pope	5	11 S.	7 E.	455	Chester	Chester	O. B. Clark et al.		Dry
26	Randolph	31	4 S.	5 W.	904	Pleistocene	Chester	Cain and Beattie		Dry
27	St. Clair	2	2 N.	6 W.	1085	Pleistocene	Ste. Genevieve	Eisenmayer et al.		Dry
28	St. Clair	32	3 S.	6 W.	630	Pleistocene	Chester	W. O. Schock		Dry
29	St. Clair	2	2 N.	6 W.	1000	Pleistocene	Ste. Genevieve	Eisenmayer et al.		Dry
30	Vermilion	31	20 N.	12 W.	230	Pleistocene	Pennsylvanian	Central Assoc.		Dry
31	Washington	33	3 S.	4 W.	1100	Pleistocene	Ste. Genevieve	Hunlith et al.		Dry
32	Washington	34	1 S.	5 W.	1068	Pleistocene	Chester	J. E. Yock		Dry
33	Washington	10	1 S.	3 W.	1320	Pleistocene	Ste. Genevieve	Fricke et al.		Dry
	Total								225	

	In Proven Fields	Wildcats
Number of wells drilling Dec. 31, 1936	3	6
Number of oil wells completed during 1936	47	2
Number of gas wells completed during 1936	3	0
Number of dry holes completed during 1936	9	31

(the Iola dome) described in a publication of the Illinois State Geological Survey¹. It had reached a depth of 760 ft. at the end of the year.

Of the 33 wildcat wells listed in Table 2, the great majority were not located in areas of known favorable structure.

It has long been recognized that there should be a systematic program of coring oil sands and making laboratory tests on the cores for the purpose of making reliable estimates of oil reserves in the producing fields of the state and to aid in applying improved methods of recovery. During previous years this program has been held back by lack of drilling but during 1936 for the first time substantial progress has been made. During 1936, cores of six sands have been taken in eight wells as follows: three from the Robinson sand (Pennsylvanian) in Crawford County; one from the Bridgeport sand (Pennsylvanian) in western Lawrence County; one from the Kirkwood (Cypress formation, Chester series) in eastern Lawrence County; one from the Hoing sand (Devonian) in the Plymouth

TABLE 3.—Wells Drilled in Illinois in 1936

County	Total Completions	Oil	Gas	Dry	Initial Production	
					Oil, Bbl.	Gas, M. Cu. Ft.
Bond.....	2	0	1	1		1.5
Brown.....	1	0	0	1		
Champaign.....	1	0	0	1		
Clark.....	9	6	1	2	16	"
Clinton.....	19	9	0	10	1016	
Crawford.....	11	9	0	2	49	
Douglas.....	1	0	0	1		
Jasper.....	2	1	0	1	10	
Lawrence.....	6	5	0	1	41	
Logan.....	1	0	0	1		
McDonough.....	13	9	0	4	38	
Macoupin.....	2	0	0	2		
Marion.....	1	0	0	1		
Pike.....	1	0	0	1		
Pope.....	2	0	0	2		
Randolph.....	1	0	0	1		
St. Clair.....	10	7	0	3	352	
Vermilion.....	1	0	0	1		
Wabash.....	5	3	1	1	233	1
Washington.....	3	0	0	3		
Total.....	92	49	3	40	1755	2.5

^a 100 lb. per sq. in. closed pressure.

¹ J. M. Weller and A. H. Bell: Geology and Oil and Gas Possibilities of Parts of Marion and Clay Counties, Illinois, with Discussion of the Central Portion of the Illinois Basin, Illinois State Geol. Survey R. I. 40 (1936).

field, McDonough County; one from the Carlyle sand (Cypress formation, Chester series) in the Bartelso field, Clinton County; and one from the Biehl sand (Pennsylvanian), Allendale field, Wabash County. The Illinois Geological Survey plans to publish the results of tests on the cores.

Three new repressuring plants, two using natural gas and one using air, were installed in Illinois oil fields in 1936. These were all in Crawford County and are using one, three, and six input wells, respectively. In the last-mentioned operation an increase in production has already been noted. In general other repressuring plants continued in operation with few changes in number of key wells (Table 1).

No new water-flooding projects were undertaken in Illinois fields in 1936. In some of the previous projects, as for example in the Carlyle field, Clinton County and Wamac field, Marion County, the number of input wells was increased. Neither of these fields had increased production in 1936.

Acid treatment of "lime pays" was used in 12 wells in Illinois fields in 1936. One of the wells treated was a new producer, so that no comparison is possible between oil production before and after treatment. The particular well referred to was a McClosky "sand" (Ste. Genevieve limestone) well in eastern Lawrence County. It had an initial production (after acid treatment) of 25 bbl. per day. Of the 11 old producing wells treated with acid, 6 had reported increases in production. Total daily production of the 6 wells before treatment was approximately 15 bbl. and after treatment approximately 170 bbl., an eleven-fold increase.

The fourth annual petroleum conference of Illinois-Indiana was held at Robinson, Ill., June 1, 1936 and was attended by about 150 oil operators, geologists, and geophysicists. The program was devoted to discussion of seismograph exploration, the geology and oil possibilities of the Illinois basin² and field problems in the recovery of oil.

The Fourth Annual Mineral Industries Conference of Illinois, held at Urbana April 24 and 25, included two half-day programs on oil and gas, one on Researches in Progress, the other on Needed Researches. Five of the ten papers presented have been published³.

² J. M. Weller: Geology and Oil Possibilities of the Illinois Basin. Illinois State Geol. Survey Ill. Pet. No. 27.

³ M. H. Flood: Problems in Oil Recovery. *Oil Weekly* (June 8, 1936) **81**, No. 13, 37-38.

W. S. Corwin: The Permeability of Oil Sands in Relation to Increased Recovery. *Oil Weekly* (June 15, 1936) **82**, No. 1, 58-62.

W. Bell: A Comprehensive Survey of Reserves and Underground Conditions in Illinois Oil Fields. *Oil Weekly* (Aug. 24, 1936) **82**, No. 11, 38-40.

A. H. Bell: Studies of Repressuring and Water-flooding. *Petr. Engr.*, **7**, No. 12, 60-62.

F. Squires: Present Status and Future Possibilities of Acid Treatment in Illinois Oil Fields. *Petr. Engr.*, **7**, No. 12, 40-42.

At a meeting of the Kansas Geological Society at Topeka, Kansas, Sept. 5, 1936, during the annual field conference, a paper was presented on Recent Oil Activity in the Illinois Basin⁴.

Data on the production of natural gas and natural gasoline in 1936 are not yet available. According to the U. S. Bureau of Mines (Mineral Market Reports No. M.M.S. 530, Feb. 12, 1937) the production of natural gas in Illinois in 1935 was 1448 million cubic feet (compared with 1838 million cubic feet in 1934). The average value in cents per thousand cubic feet at the wells in 1935 was 8.4¢ and the total value at the wells was \$122,000. Data concerning natural gasoline from 1931 to 1935 inclusive are given in Table 4.

TABLE 4.—*Natural Gasoline Produced in Illinois*

Year	Production, Thousands of Gallons	Value		Natural Gas Treated, Millions Cu. Ft.	Yield, Gal. per M. Cu. F.
		Total Thousands of Dollars	Unit Cents		
1931	5024	204	4.6	2106	2.39
1932	4558	139	3.2	1924	2.37
1933	3673	194	5.3	1701	2.14
1934	3810	183	4.8	1512	2.52
1935	2642	141	5.3	1076	2.64

PRODUCED BY COUNTIES IN 1935

Counties	Production, Thousands of Gallons	Total Value, Thousands of Dollars	Natural Gas Treated Millions Cu. Ft.	Yield, Gal. per M. Cu. Ft.
Clark and Cumberland.....	352	20	96	3.65
Crawford.....	1583	86	632	2.50
Lawrence and Wabash.....	707	43	348	2.03
State total.....	2642	140	1076	2.46

ACKNOWLEDGMENTS

Production data for oil and gas were furnished by the U. S. Bureau of Mines; the Illinois Pipe Line Co., Findlay, Ohio; the Ohio Oil Co., Marshall, Ill.; Petro Oil and Gas Co., St. Louis, Mo.; Bond County Gas Co., Greenville, Ill.; and Southwestern Oil and Gas Co., Sandoval, Ill. Mr. George V. Cohee, of the Survey Staff, assisted the writer in assembling the statistical data for this report.

⁴ A. H. Bell: Recent Oil Activity in the Illinois Basin. Abstract, Kansas Geol. Soc. (Sept. 1936).

FOOTNOTES TO COLUMN HEADINGS—TABLE 1

* In areas where both oil and gas are produced, unless gas is marketed outside the field, such areas are included in column headed "Oil." Manufacture of casinghead gasoline and carbon black is interpreted as outside marketing of gas.

^b Wells producing both oil and gas are classified as "Producing Oil Only" unless gas from them is marketed off the lease.

^c W, water; G, gas; A, air; AG, air-gas mixture. Numbers following letters indicate numbers of injection wells.

^d Bottom-hole pressures are preceded by "e." All other figures represent pressures at casinghead with well closed.

^e P, paraffin; A, asphalt; M, mixed.

^f Cam, Cambrian; Ord, Ordovician; Sil, Silurian; Dev, Devonian; Mis, Mississippian; MisL, Lower Mississippian; MisU, Upper Mississippian; Pen, Pennsylvanian; Per, Permian; Tri, Triassic; Jur, Jurassic; CreL, Lower Cretaceous; CreU, Upper Cretaceous; Eoc, Eocene; Olig, Oligocene; Mio, Miocene; Pli, Pliocene.

^g S, sandstone; SH, sandstone, shaly; Ss, soft sand; H, shale; L, limestone; LS, limestone, sandy; C, chalk; A, anhydrite; D, dolomite; Da, arkosic dolomite; GW, granite wash; P, serpentine; O, oolite; Slt, siltstone.

^h Figures are entered only for fields where the reservoir rock is of pore type. Figures represent ratio of pore space to total volume of net reservoir rock expressed in per cent. "Por" indicates that the reservoir rock is of pore type but said ratio is not known by the author. "Cav" indicates that the reservoir rock is of cavernous type; "Fis," fissure type.

ⁱ A, anticline; AF, anticline with faulting as important feature; Af, anticline with faulting as minor feature; AM, accumulation due to both anticlinal and monocline structure; H, strata are horizontal or near horizontal; MF, monocline-fault; MU, monocline-unconformity; ML, monocline lens; MC, monocline with accumulation due to change in character of stratum; MI, monocline with accumulation against igneous barrier; MUP, monocline with accumulation due to sealing at outcrop by asphalt; D, dome; Ds, salt dome; T, terrace; TF, terrace with faulting as important feature; N, nose; S, syncline.

^j Information will be found in text as indicated by symbols; A, name of author, other than above, who has compiled the data on the particular field; C, chemical treatment of wells; G, gas-oil ratios; P, proration; U, unit operation; R, references; W, water; O, other information.

INTERPRETATIONS*

Generally in Table 1 the unit for presentation of data is a field. For our purposes a field is defined as the whole of a surface area wherein productive locations are continuous. Such unit commonly includes and surrounds nonproductive areas. Such unit commonly includes a great variety of geologic conditions—several units of continuous productive reservoirs of distinctly different structure and of distinctly different stratigraphy. Therefore it is hoped that our authors will subdivide "field" so as to enable students to make analyses that may have scientific and/or commercial value.

As to each space in the tabulation, it is either (1) not applicable, (2) the proper entry is not determinable, (3) the proper entry is determinable, but not determinable from data available to the author, (4) the proper entry is determinable by the author. In spaces not applicable, the author will please draw horizontal lines; in spaces where the proper entries are not determinable, the author will please insert *x*; in spaces where the proper entries are determinable but not determinable from data available to the author, the author will please insert *y*; in spaces where the proper entries are determinable by the author he will, of course, make such entries. Generally, *y* implies a hope that in some future year a definite figure will be available.

Inability to determine precisely the correct entry for a particular space should not lead the author to insert merely *y*. Contributions of great value may be made by the author in many cases where entries are not subject to precise determination. In such cases the author should use his good judgment and make the best entry possible under the circumstances. For many spaces, the correct entries represent the opinion of the

* Quoted from Circular to Authors by Frank A. Herald, Consulting Petroleum Geologist and Engineer; Vice Chairman for Production, A.I.M.E. Petroleum Division, 1933 and 1934.

author (for example, "Area Proved") and in such cases the entries need not be hedged to such extent as in cases where the quantities are definite yet can be ascertained only approximately by the author.

In cases under definite headings but where figures are only approximate, the author may use x . For example, if the total production of a field is known to be between 1,800,000 and 1,850,000, the author may report 1,8 xx,xxx ; or if the production is between 1,850,000 and 1,900,000, the author may report 1,9 xx,xxx .

Where a numeral is immediately to the left of x or y , such numeral represents the nearest known number in that position.

As to quantity of gas produced from many fields the question will arise as to whether the figures should include merely the gas marketed or should include also estimates of gas used in operations and gas wasted. Although rough approximations may be involved, our figures should represent as nearly as possible the total quantity of gas removed from the reservoir.

While we have not provided a column for showing the thickness of the productive zone, generally the difference between average depth to bottoms of productive wells and average depth to top of productive zone will represent approximately the average thickness of the productive zone. For fields where this is not true because of unusually high dips, or for other reasons, it is suggested that the authors indicate in their texts the approximate average thickness of the productive zone.

The figure representing net thickness of producing rock should correspond to the total of the net portions of the producing zone which actually yield oil into the drill hole. It is recognized that for some fields the authors can make only rough guesses—so rough that figures would be of no value. In such cases the authors should enter either x or y , whichever is more appropriate.

We are particularly anxious to have every author give due consideration to the determination of structural conditions of each oil and/or gas body. Please consider each oil and/or gas reservoir and indicate its structure. The mere fact that a reservoir is on an anticline is not proof that the structural condition affecting the accumulation is anticlinal; for example, an oil and/or gas body limited by the upper margin of a lens on the limb of an anticline is "ML" as to structure. By all means, if the oil body occupies any position in the lens other than its upper limit, please so indicate clearly by footnote, for "ML" means, unless modified, that the accumulation is at the upper part of the lens. In every case where the oil and/or gas body terminates short of the up-dip continuity of the reservoir, please carefully check your evidence and then appropriately record your conclusion. "Terrace," "Nose" and "Syncline" are the only terms in our legend which presume such continuity.

Please note that the heading "Number of Dry and/or Near-dry Holes" is intended to cover only such holes as are within the limits of the defined fields.

In Table 2 are listed the important wildcat wells completed during the year. By the term "important" is meant: wells discovering new fields; wells resulting in the discovery of important extensions to old fields; wells discovering new zones in old fields; wells condemning important areas or resulting in significant stratigraphic information, even if the wells are dry; and exceptionally deep wells. At the foot of this table the total number of wells drilled in each district is given, segregated as to oil wells, gas wells and dry holes. The number of wells drilling on Dec. 31, 1936 are in two divisions, designated as wildcat wells and wells in proven fields.

