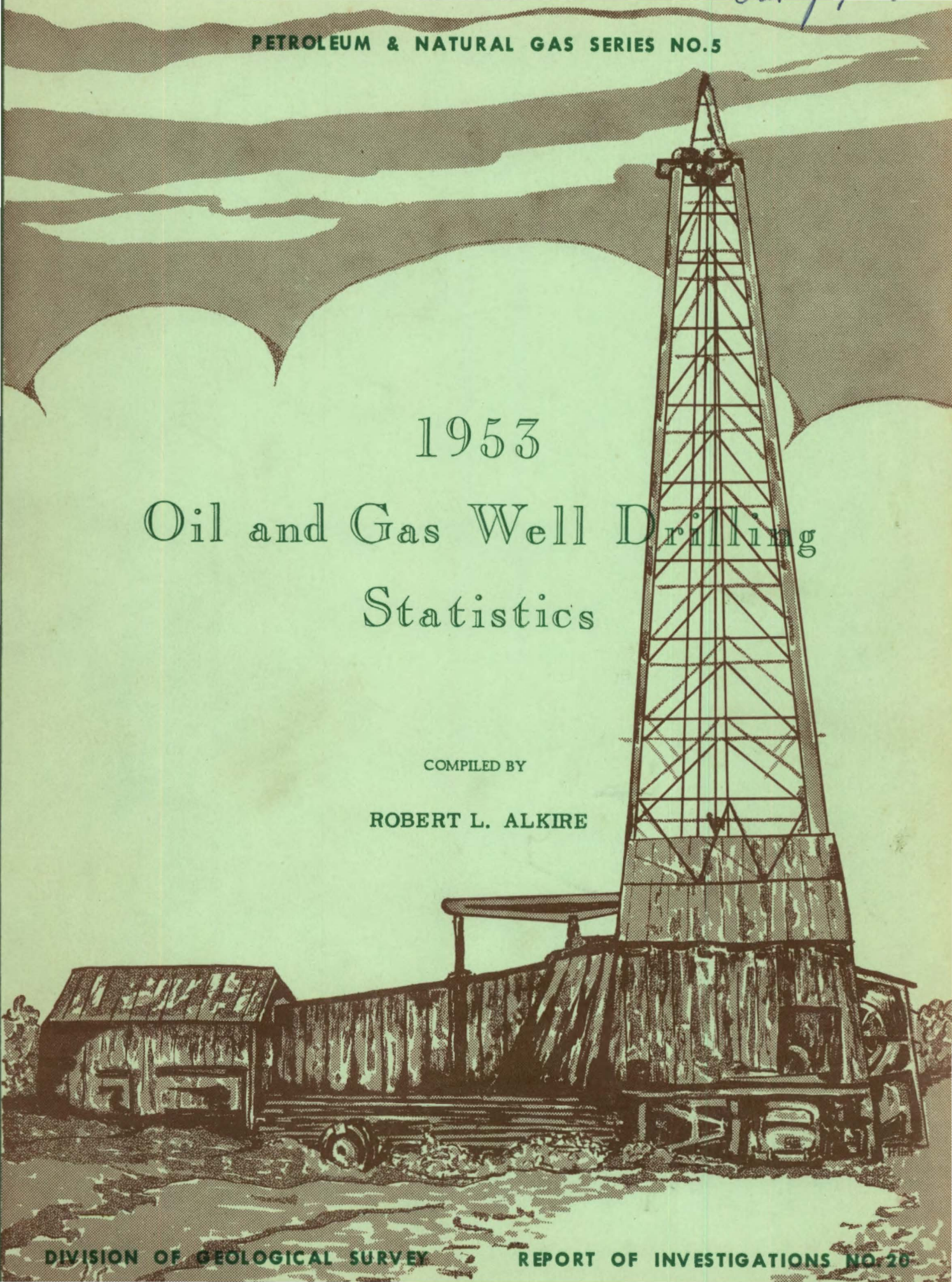


1953
Oil and Gas Well Drilling
Statistics

COMPILED BY

ROBERT L. ALKIRE



STATE OF OHIO

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REPORT OF INVESTIGATIONS NO. 20
PETROLEUM AND NATURAL GAS SERIES NO. 5

1953
Oil and Gas Well Drilling
Statistics

COMPILED BY

ROBERT L. ALKIRE

Columbus
1954

ACKNOWLEDGMENTS

The source data for Part I, "Oil and Gas Well Drilling Statistics for 1953," were obtained from the semi-monthly drilling reports published by the Ohio Oil and Gas Association and from the files of the Ohio Division of Mines. Additional information was contributed by the Ohio Fuel Gas Company.

"The Development of Underground Storage in Ohio," by J. J. Schmidt, Assistant to the President, East Ohio Gas Company, Cleveland, and K. C. Cottingham, Chief Geologist, Ohio Fuel Gas Company, Columbus, is presented in Part II. This is the second report prepared for the Petroleum and Natural Gas Series by authors not employed by the Survey. The first, "The Canton Gas Pool," which appeared in Series No. 3, 1952, was prepared by Henry Belden, III, whose company was a principal operator in the Canton pool. Mr. Cottingham and Mr. Schmidt have been closely associated with the development of underground gas storage in Ohio. They have presented an authoritative review of this relatively new procedure, which, as the demand for natural gas continues to increase, will become of greater importance to the citizens of Ohio if they are to be assured of a constant supply of this convenient fuel.

The writer expresses sincere appreciation to all who have contributed to this bulletin and to the staff members who assisted in compiling, editing, and typing the assembled data.

Robert L. Alkire
April 6, 1954

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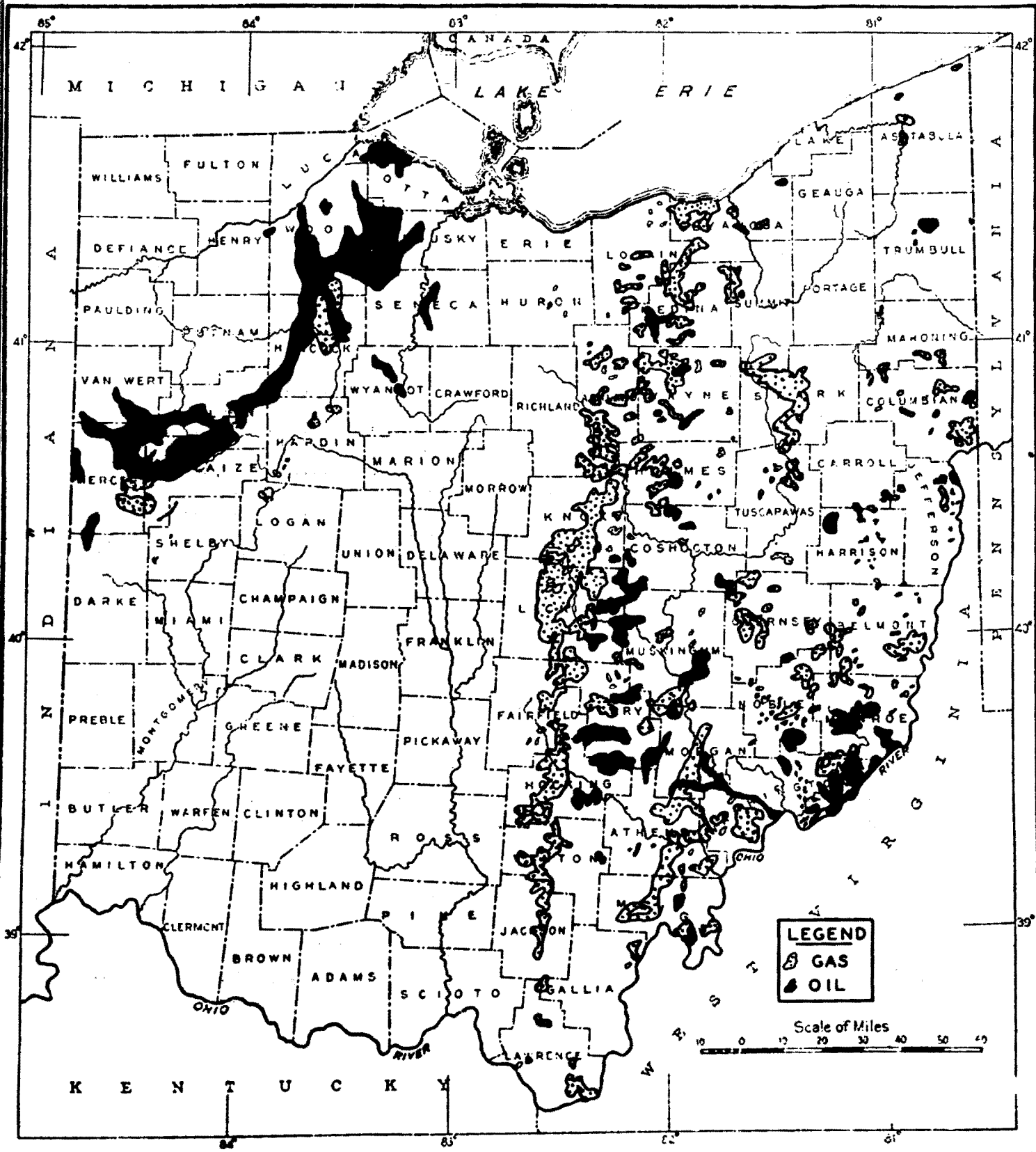
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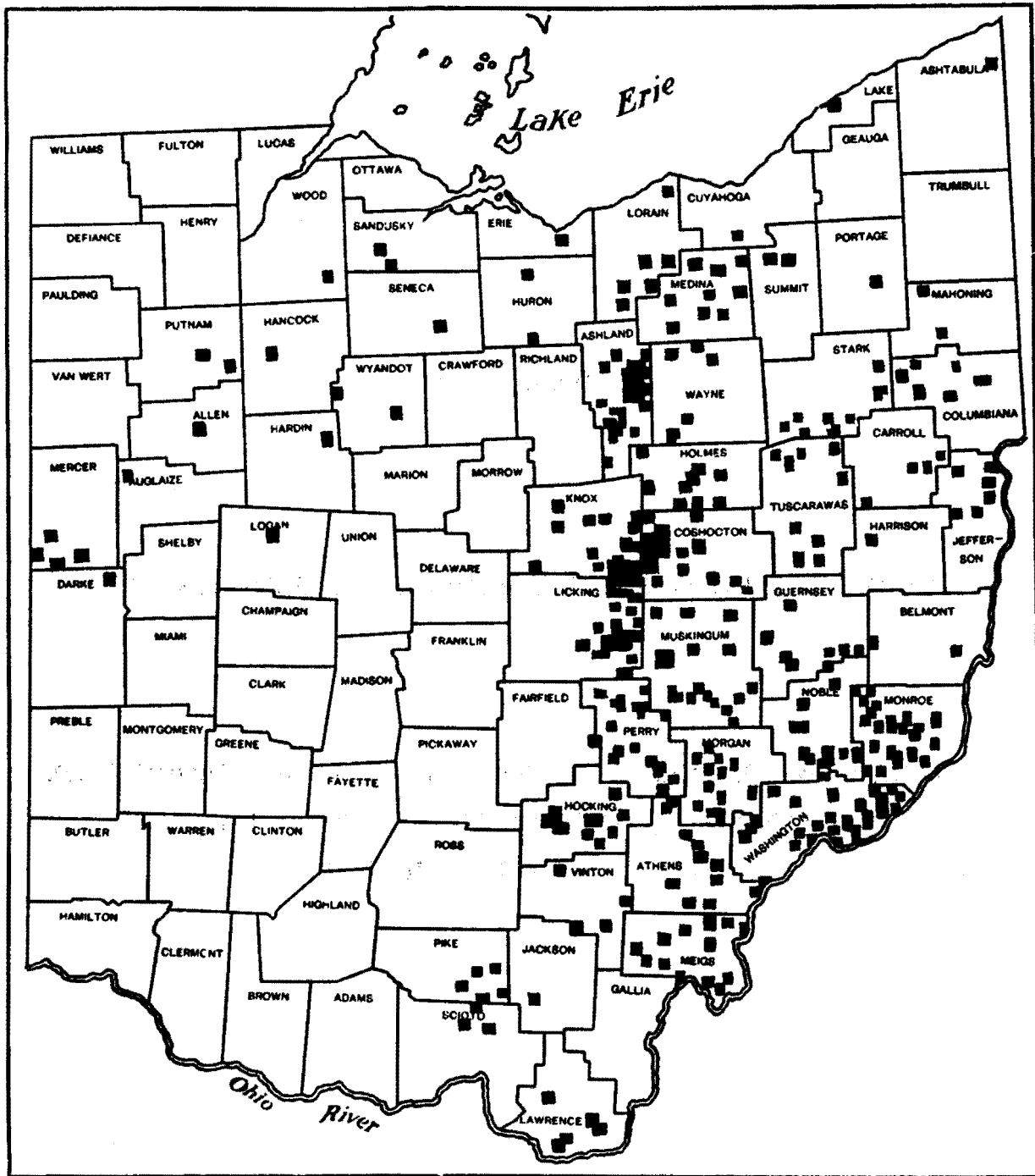
OIL AND GAS FIELDS OF OHIO



PART I

OHIO OIL AND GAS WELL DRILLING STATISTICS - 1953

**ANNUAL WELL COMPLETIONS; OIL AND GAS PRODUCTION,
RESERVES; AND GAS CONSUMPTION DATA,
AND 1953 CRUDE OIL PRICES**



AREAS OF OIL AND GAS WELL DRILLING ACTIVITY
IN 1953



SUMMARY OF OIL AND GAS WELL DRILLING ACTIVITY IN OHIO IN 1953

The most notable development in oil and gas well drilling in Ohio during 1953 was the widespread acceptance of the hydraulic fracture method for increasing production in new Clinton sand wells. Indications as to the success of this process were realized in the latter half of 1952 but it was not until the early months of 1953 that operators generally began to employ the new procedure. Although some favorable increases were recorded in gas well open flows, the outstanding results were attained in oil wells. A review of the records for the year finds numerous well logs with 10 to 25 barrels of oil natural in the Clinton reporting 200 to 300 barrels after fracture. This is particularly true in Coshocton, Knox, and Licking counties where approximately 150 wells were treated. The 945 barrels per day average initial increase in Corning grade production recorded for the year is largely due to the success of fracturing the Clinton sand in these counties. Other sands have been fractured in Ohio, but, with the exception of the Oriskany and 2nd Berea wherein a number of good increases were obtained in gas wells, the quantity is as yet insufficient to be conclusive.

Coshocton and Knox counties retained their positions as the most active areas of Clinton sand oil drilling in the State. Seventy-three new wells in Coshocton County averaged 133 barrels the first 24 hours after completion and 90 wells in Knox County averaged 113 barrels. Eastern Licking County moved into prominence with 35 new Clinton wells averaging 102 barrels after fracture.

Two new Clinton sand oil pools of note were developed during the year. The first, known as the Shearer pool and located in the northwest corner of Bethlehem Township, Coshocton County, was initiated by the James I. Shearer-Charles Fox No. 1 well which produced 50 barrels the first 24 hours after shot. Nine wells averaged 133 barrels initial, the largest reporting 272 barrels after fracture. The limits of this pool have not been determined. The second new Clinton oil pool of note, called the Fry pool, is located in Pike Township, Stark County. The discovery well was the M. B. Belden-James Cuinger No. 1, Section 24, which produced 35 barrels after fracture. Four wells were completed, the largest reporting 40 barrels.

Other areas of successful Clinton sand oil development were located in Hocking, Holmes, and Perry counties.

Ashland County continued as the most active area of Berea sand oil drilling with 83 new wells which averaged 9 barrels at completion. Other successful areas were located in Licking, Medina, Meigs, and Perry counties.

Gas well drilling declined to the lowest number of successful completions since 1890. There were no major discoveries, but several promising wild-cat completions may forecast new pool developments during the coming year. The principal areas of successful gas development were located in Athens, Lake, Lorain, Muskingum, Perry, Stark, Tuscarawas, and Washington counties.

The largest gas well for the year was the Ohio Fuel Gas Company-C. G. Krile No. 1, Lot 10, Wellington Township, Lorain County, which reported 14,241,000 cubic feet natural with 1,150 psi rock pressure. The Clinton occurred from 2,301 to 2,304 and 2,310 to 2,322 with total depth 2,326 feet. The largest oil well was the Everett Bucy et al - Howard Mizer No. 4, Section 4, Pike Township, Coshocton County, which recorded 630 barrels after fracture. The Clinton was found from 3,159 to 3,225 and total depth was 3,225 feet.

The most active counties were Ashland with 130 wells completed, Knox 130, Washington 114, Coshocton 102, Licking 75, Monroe 59, Noble 38, and Holmes 37.

In new gas discovered Lorain County led with 27,584,000 cubic feet; Knox followed with 17,517,000; Coshocton 12,839,000; Washington 9,921,000; and Licking County 9,440,000 cubic feet. The leading counties in new oil discovered were Knox with 10,131 barrels, Coshocton 9,731, Licking 3,627, Perry 1,295, and Ashland 748 barrels per day.

A total of 1,097 new wells, in 50 counties, were reported completed in 1953. Seven hundred and eleven were successful and 386 were dry, an average of 35.2 per cent failures. Initial discoveries were 137,316,000 cubic feet of gas and 28,147 barrels of oil per day. Footage drilled totalled 2,102,950 feet. Successful gas wells amounted to 397,463 feet; oil wells 817,452 feet; combination oil and gas wells 186,402; and dry holes 701,633 feet. Thirty-six per cent of all new wells tested the Clinton sand and 33 per cent the Berea. Ninety-one per cent of all oil and 66 per cent of all gas discovered during the year was found in the Clinton.

The initial average daily oil production of 53 barrels is a 20-barrel increase over 1952 and the 565,000 cubic feet average initial for gas is a decrease of 44,000 cubic feet per well.

The average depth of all new wells drilled was 1,917 feet, of new gas wells 2,196, oil wells 1,754, combination 2,913, and dry holes 1,818 feet. Average depth of all new wells drilled by horizons follows:

Shallow sands	843 feet
Berea	997 feet
Ohio shale	2,180 feet
Oriskany	2,880 feet
Newburg	2,493 feet
Clinton	3,237 feet
Medina	3,827 feet
Trenton	1,372 feet (western Ohio)
Sub-Trenton	3,256 feet

Fourteen wells were drilled deeper during the year. They discovered 1,411,000 cubic feet of gas and 18 barrels of oil per day initial and added 8,427 feet of drilling. Ninety gas storage wells added 230,706 feet of drilling in this category. Eleven water input wells (3,148 feet) and 18 producers (6,008 feet) added 9,156 feet to the secondary oil recovery footage in the State.

Including all types of wells drilled the totals for 1953 are as follows:

Wells - new wells	1,097 Wells	2,102,950 Feet
drilled deeper	14	8,427
gas storage	90	230,706
secondary recovery	29	9,156
core tests	2	3,117
Totals	1,232 Wells	2,354,356 Feet

Gas -	new wells	181 Wells	115,302 MCF	397,463 Feet
	drilled deeper	6	1,411	5,493
	Totals	187 Wells	116,713 MCF	402,956 Feet
Oil -	new wells	466 Wells	22,731 Bbls.	817,452 Feet
	drilled deeper	5	18	2,149
	Totals	471 Wells	22,749 Bbls.	819,601 Feet
Combination -	new wells	64 Wells	22,014 MCF 5,416 Bbls.	186,402 Feet
Dry Holes -	new wells	386 Wells		701,633 Feet
	drilled deeper	1		385
	Totals	387 Wells		702,018 Feet
Total Gas - 138,727 MCF				
Total Oil - 28,165 Bbls.				

Oil Development

In addition to the Shearer pool and the Fry pool developments, a number of notable extensions were made to existing pools. They were as follows: Ashland County, Jackson, Mohican, and Perry townships, 77 wells averaged 9 barrels initial and 675 feet through the Berea sand; Coshocton County, Newcastle Township, 25 wells averaged 150 barrels and 3,325 feet through the Clinton sand; 16 wells in Perry Township and 6 wells in Pike Township, Coshocton, had average initials of 60 and 314 barrels respectively; Knox County, Jackson Township, 89 wells averaged 124 barrels and 3,000 feet through the Clinton; 18 wells in Hanover Township, Licking County, averaged 119 barrels initial and 2,800 feet through the Clinton sand; 12 wells in Fallsbury Township, Licking County, averaged 86 barrels initial and 2,970 feet through the Clinton sand.

An interesting shallow sand development occurred at the close of the year in the Seneca Lake area, Richland Township, Guernsey County. Several wells with initials in excess of 100 barrels were reported completed in sands or shales underlying the No. 6 coal at depths ranging from 500 to 600 feet. Drilling is progressing rapidly so that the extent and character of this new pool will soon be known.

Estimated total productive acreage developed for oil in Ohio during 1953 is 5,100 acres and proved for future development 2,700 acres.

Gas Development

Two new Clinton sand gas pools of note were developed during the year. In Lorain County, Wellington Township, 6 wells were completed with average initial open flow of 4,354,000 cubic feet of gas per day, average initial rock pressure 981 psi, and average depth 2,346 feet. The discovery well was the Ohio Fuel Gas Company-Botsford No. 1 in Lot 15. In Knox County, Butler Township, 5 wells averaged 1,489,000 cubic feet, 689 psi, and 3,119 feet. The discovery well was the Ohio Fuel Gas Company-C. W. Blue No. 1 in Section 19.

A new Oriskany sand gas pool was developed in Richland Township, Summit County, in which 13 wells averaged 448,000 cubic feet, 619 psi, and 2,220 feet. The discovery well was the V. Newman-V. Newman No. 1 in Section 19.

The more important extensions to old gas pools were as follows: Holmes County, Killbuck Township, 5 wells averaged 40,000 cubic feet, 100 psi, and 650 feet through the Berea sand; Meigs County, Olive Township, 7 wells averaged 811,000 cubic feet, 575 psi, and 2,040

feet through the Berea; Lawrence County, Windsor Township, 6 wells averaged 100,000 cubic feet, 350 psi, and 2,350 feet through the Ohio Shale; Athens County, Troy Township, and Washington County, Belpre Township, 4 wells averaged 660,000 cubic feet, 1,525 psi, and 4,150 feet through the Oriskany sand; Licking County, Hanover Township, 13 combination oil and gas wells averaged 400,000 cubic feet, 64 barrels, 655 psi, and 2,820 feet through the Clinton sand.

Considerable gas was discovered along with the oil development in southwest Jackson Township, Knox County, and northwest Fallsbury Township, Licking County. Initial averages were 516,000 cubic feet of gas, 120 barrels of oil and 2,976 feet depth.

An unexpected gas discovery was made by a core rig drilling for salt at Painesville, Lake County, at 1,534 feet, in the Oriskany sand horizon, 4,000,000 cubic feet was encountered and considerable difficulty was had before the well was brought under control.

Estimated acreage proven as result of new discoveries in both gas and casing-head gas pools totalled 6,600 acres. Extensions to existing gas and casing-head gas pools proved approximately 9,100 acres.

Exploratory Drilling

Ninety-three exploratory wells were completed during the year. Four tested the St. Peter horizon, 2 the Trenton, 46 Clinton, 3 Newburg, 7 Oriskany, 2 Ohio shale, and 29 the Berea. Twenty-six were productive and 67 were dry. The deepest was the Natural Gas Company of West Virginia-E. C. Unkefer No. 1, Section 34, Washington Township, Stark County, which recorded Clinton sand from 5,301 to 5,337 feet, dry, and reached total depth 5,448 feet.

The more notable of the successful exploratory wells were: R. McConnell-C. Tinker No. 1, Section 15, Monroe Township, Ashtabula County, Clinton sand 2,898 to 2,965, total depth 3,028, 285,000 cubic feet gas after shot, rock pressure 1,000 psi; B. G. Davis-C. A. Wallick No. 1, 2nd Quarter, Jackson Township, Coshocton County, Clinton 3,826 to 3,883, total depth 4,001, 445,000 cubic feet gas after fracture, rock pressure 1,000 psi; Ohio Fuel Gas Company-R. E. Walker No. 1, Section 6, Penfield Township, Lorain County, Clinton 2,445 to 2,449, total depth 2,537, 960,000 cubic feet gas after fracture, rock pressure 775 psi; Waverly Oil Company-F. Kreager No. 2, 4th Quarter, Madison Township, Licking County, Newburg 2,120 to 2,130, total depth 2,130, 1,103,000 cubic feet gas natural; Boyle & Ravoir-C. L. Boyle No. 1, Section 29, Salem Township, Columbiana County, Berea 840 to 884, total depth 907, 506,000 cubic feet gas natural.

The St. Peter horizon was found dry at the City of Ashtabula, Ashtabula County, by the N. J. Pinney-K. P. Wells No. 1, total depth 5,320 feet, and in Pleasant Township, Knox County, by the H. E. Perkins-Frank Hall No. 1, at total depth 4,617 feet. The Oriskany sand was dry in the Great Lakes Carbon Corporation-H. Pabst No. 1, Elk Township, Noble County, total depth 5,080 feet, and in the M. B. Belden-J. E. Carney No. 1, Section 3, Salem Township, Jefferson County, total depth 4,942 feet.

The total exploratory footage drilled during the year was 262,387 feet.

Counties in which no oil or gas test wells were reported drilled during 1953 are: Adams, Brown, Butler, Champaign, Clark, Clermont, Clinton, Crawford, Defiance, Delaware, Fayette, Franklin, Fulton, Gallia, Geauga, Greene, Hamilton, Henry, Highland, Lucas, Madison, Marion, Miami, Montgomery, Morrow, Ottawa, Paulding, Pickaway, Preble, Richland, Ross, Shelby, Trumbull, Union, Van Wert, Warren, and Williams.

TABLE I
SUMMARY OF OIL AND GAS WELL DRILLING - BY COUNTIES
1953

MCF - Thousand cubic feet of gas

Bbls. - Standard 42-gallon barrels of oil

County	GAS		OIL		COMBINATION			Producing Wells	Total MCF	Total Bbls	Dry Holes	Total Wells	Total Feet	Per Cent Dry
	Wells	MCF	Wells	Bbls	Wells	MCF	Bbls							
Allen			1	30				1	0	30	0	1	1,322	0.0
Ashland			83	748				83	0	748	47	130	104,453	36.7
Ashtabula	1	285						1	285	0	1	2	8,348	50.0
Athens	22	5,583	5	52				27	5,583	52	7	34	53,937	21.9
Auglaize			1	5				1	0	5	0	1	1,170	0.0
Belmont	1	39						1	39	0	2	3	4,959	66.6
Carroll			1	5				1	0	5	4	5	5,822	80.0
Columbiana	2	636	3	11				5	636	11	4	9	7,486	44.4
Coshocton	8	6,904	60	7,965	13	5,935	1,766	81	12,839	9,731	21	102	329,343	20.8
Cuyahoga	2	3,452						2	3,452	0	1	3	10,180	33.8
Darke								0	0	0	1	1	1,217	100.0
Erie								0	0	0	2	2	752	100.0
Fairfield								0	0	0	1	1	2,692	100.0
Guernsey	1	30	8	116				9	30	116	7	16	17,096	43.8
Hancock			1	28				1	0	28	0	1	1,326	0.0
Hardin								0	0	0	1	1	1,345	100.0
Hocking	3	1,818	3	144				6	1,818	144	6	12	26,090	50.0
Holmes	6	424	13	474	3	684	109	22	1,108	583	15	37	62,376	40.5
Huron								0	0	0	2	2	6,734	100.0
Jackson								0	0	0	1	1	650	100.0
Jefferson	2	131	1	5				3	131	5	5	8	11,190	62.5
Knox	13	11,147	78	9,152	14	6,370	979	105	17,517	10,131	25	130	372,925	19.2
Lake	2	7,100						2	7,100	0	1	3	7,522	33.3
Lawrence	4	574						4	574	0	2	6	15,852	33.3
Licking	5	3,755	34	2,258	16	5,685	1,369	55	9,440	3,627	20	75	177,926	26.6
Logan								0	0	0	1	1	1,629	100.0
Lorain	9	27,584						9	27,584	0	6	15	32,990	40.0
Mahoning			1	1				1	0	1	1	2	817	50.0
Medina			19	77				19	0	77	12	31	18,577	38.3
Meigs	11	6,390	13	163	1	314	5	25	6,704	168	11	36	48,973	30.6

Table I - Continued
 Summary of Oil and Gas Well Drilling - By Counties*

MCF - Thousand cubic feet of gas

Bbls. - Standard 42-gallon barrels of oil

County	GAS		OIL		COMBINATION			Producing Wells	Total MCF	Total Bbls	Dry Holes	Total Wells	Total Feet	Per Cent Dry
	Wells	MCF	Wells	Bbls	Wells	MCF	Bbls							
Mercer			10	173	1	150	2	11	150	175	0	11	12,869	0.0
Monroe	16	1,330	20	138	2	397	22	38	1,727	160	21	59	88,835	35.6
Morgan	2	217	14	63				16	217	63	20	36	20,843	55.5
Muskingum	6	8,333	4	70	3	550	325	13	8,883	395	17	30	90,205	56.6
Noble	5	999	14	50				19	999	50	19	38	46,719	50.0
Perry	5	5,290	13	461	8	1,654	834	26	6,944	1,295	8	34	96,550	23.9
Pike	4	150						4	150	0	1	5	2,673	20.0
Portage								0	0	0	1	1	4,437	100.0
Putnam			1	5				1	0	5	1	2	2,757	33.3
Sandusky								0	0	0	2	2	2,907	100.0
Scioto	3	30						3	30	0	1	4	1,490	25.0
Seneca			1	5				1	0	5	2	3	6,051	66.6
Stark	5	3,073	5	116				10	3,073	116	9	19	80,740	47.4
Summit	12	6,343						12	6,343	0	10	22	50,289	45.5
Tuscarawas	9	2,759						9	2,759	0	19	28	84,306	67.8
Vinton	3	180						3	180	0	2	5	8,234	40.0
Washington	18	9,746	53	274	2	175	3	73	9,921	277	41	114	143,220	35.8
Wayne	1	1,000	2	49				3	1,000	49	2	5	12,712	40.0
Wood			1	3	1	100	2	2	100	5	0	2	2,422	0.0
Wyandot			3	90				3	0	90	3	6	8,992	50.0
TOTALS	181	115,302	466	22,731	64	22,014	5,416	711	137,316	28,147	386	1,097	2,102,950	

AVERAGE OF DRY HOLES - 35.2 Per Cent.

*Based on reported production at completion.
 Wells drilled deeper, for gas storage or secondary oil recovery not included.

TABLE II
SUMMARY OF OIL AND GAS WELL DRILLING - BY SANDS*

Sand	GAS		OIL		COMBINATION			Producing Wells	Total MCF	Total Bbls	Dry Holes	Total Wells	Total Feet	Per cent Dry
	Wells	MCF	Wells	Bbls	Wells	MCF	Bbls							
Goose Run			1	2				1	0	2	1	2	372	50.0
Peeker			32	143				32	0	143	12	44	28,332	27.0
Cow Run	5	749	31	280				36	749	280	33	69	41,877	47.8
Buell			3	8				3	0	8	6	9	4,790	66.6
Freeport	3	450						3	450	0	1	4	2,597	25.0
Macksburg	1	288	1	2				2	288	2	3	5	4,905	60.0
Stray			8	21				8	0	21	10	18	12,368	60.0
Germantown			8	35				8	0	35	4	12	12,388	33.3
Salt Sand	3	436	1	1				4	436	1	0	4	3,674	25.0
Maxton	3	659	1	8				4	659	8	2	6	6,722	33.3
Lime Sand								0	0	0	1	1	914	100.0
Keener	2	433	7	48	1	100	2	10	533	50	3	13	17,920	23.1
Injun	3	229	14	177	1	250	20	18	479	197	7	25	31,645	28.0
Squaw	4	933	2	6	2	222	3	8	1,155	9	8	16	24,580	50.0
Hamden	3	105						3	105	0	0	3	1,763	0.0
Berea	64	13,423	155	1,269	1	314	5	220	13,737	1,274	139	359	357,988	38.7
Shale	9	1,140	1	3				10	1,140	3	11	21	45,754	54.5
Oriskany	22	20,630	3	27	1	150	25	26	20,780	52	18	44	126,739	40.9
Newburg	4	5,495						4	5,495	0	0	4	9,974	0.0
Clinton	55	70,332	179	20,362	55	20,478	5,307	289	90,810	25,669	105	394	1,276,358	26.5
Medina					1	250	50	1	250	50	7	8	30,612	87.5
Trenton			19	339	2	250	4	21	250	343	9	30	41,159	27.5
St. Peter								0	0	0	6	6	19,519	100.00
TOTALS	181	115,302	466	22,731	64	22,014	5,416	711	137,316	28,147	386	1,097	2,102,950	

DRY HOLE AVERAGE - 35.2

* Based on reported production at completion.

Wells drilled deeper, for gas storage, or secondary oil recovery not included.

TABLE III
WELLS DRILLED DEEPER, FOR GAS STORAGE, AND
SECONDARY OIL RECOVERY - 1953

Wells Drilled Deeper

<u>Horizon</u>	<u>Number</u>	<u>GAS</u>		<u>OIL</u>		<u>DRY</u> <u>Feet</u>
		<u>MCF</u>	<u>Feet</u>	<u>Bbbs.</u>	<u>Feet</u>	
Lime to Buell	1			2	337	
Buell to Cow Run	1			1	164	
Cow Run to Macksburg	2	491	378			
Cow Run to Injun	1	25	633			
Cow Run to Berea	1	383	1,945			
Macksburg to Berea	1	297	776			
Germantown to Berea	1			4	280	
Lime Sand to Injun	1			1	271	
Keener to Berea	2			10	1,097	
Injun to Berea	1					385
Berea to 2nd Berea	1	125	126			
Berea to Shale	1	90	1,635			
<u>TOTALS</u>	14	1,411	5,493	18	2,149	385

Gas Storage Wells

<u>Horizon</u>	<u>Number</u>	<u>Feet</u>
Berea	4	1,590
Clinton	86	229,116
<u>TOTALS</u>	90	230,706

Secondary Oil Recovery

<u>Horizon</u>	<u>Input Wells</u>		<u>Producer Wells</u>		<u>Core Tests</u>	
	<u>Number</u>	<u>Feet</u>	<u>Number</u>	<u>Feet</u>	<u>Number</u>	<u>Feet</u>
Air Repressuring						
Cow Run	1	124				
Berea	1	661				
Water Flooding	11	3,148	18	6,008		
Core Tests						
Keener					2	3,117
<u>TOTALS</u>	13	3,933	18	6,008	2	3,117

TABLE IV
SUMMARY OF OIL AND GAS WELL DRILLING - 1953*
FOOTAGE DRILLED

<u>COUNTY</u>	<u>GAS WELLS</u>	<u>OIL WELLS</u>	<u>COMBINATION</u>	<u>DRY HOLES</u>	<u>TOTAL</u>
	Feet	Feet	WELLS Feet	Feet	Feet
Allen		1,322			1,322
Ashland		61,835		42,618	104,453
Ashtabula	3,028			5,320	8,348
Athens	44,813	3,838		5,286	53,937
Auglaize		1,170			1,170
Belmont	1,496			3,463	4,959
Carroll		1,240		4,582	5,822
Columbiana	1,684	2,178		3,624	7,486
Coshocton	26,983	195,729	42,295	64,336	329,343
Cuyahoga	6,730			3,450	10,180
Darke				1,217	1,217
Erie				752	752
Fairfield				2,692	2,692
Guernsey	1,313	5,902		9,881	17,096
Hancock		1,326			1,326
Hardin				1,345	1,345
Hocking	6,160	8,718		11,212	26,090
Holmes	3,973	23,535	9,502	25,366	62,376
Huron				6,734	6,734
Jackson				650	650
Jefferson	2,726	1,351		7,113	11,190
Knox	36,002	228,435	42,775	65,713	372,925
Lake	4,540			2,982	7,522
Lawrence	9,969			5,883	15,852
Licking	9,648	67,812	46,214	54,252	177,926
Logan				1,629	1,629
Lorain	20,257			12,733	32,990
Mahoning		245		572	817
Medina		7,702		10,875	18,577
Meigs	16,872	16,969	1,698	13,434	48,973
Mercer		11,661	1,208		12,869
Monroe	25,618	27,453	3,069	32,695	88,835
Morgan	1,805	4,485		14,553	20,843
Muskingum	21,809	10,920	10,626	46,850	90,205
Noble	9,843	12,513		24,363	46,719
Perry	16,519	31,136	24,894	24,001	96,550
Pike	1,998			675	2,673
Portage				4,437	4,437
Putnam		1,356		1,401	2,757
Sandusky				2,907	2,907
Scioto	1,090			400	1,490
Seneca		1,329		4,722	6,051
Stark	23,558	24,590		32,592	80,740
Summit	26,717			23,572	50,289
Tuscarawas	28,339			55,967	84,306

Table IV - continued
 Summary of Oil and Gas Well Drilling - 1953*
 Footage Drilled

COUNTY	GAS WELLS	OIL WELLS	COMBINATION	DRY HOLES	TOTAL
	Feet	Feet	WELLS Feet	Feet	Feet
Vinton	4,024			4,210	8,234
Washington	37,203	50,704	2,911	52,402	143,220
Wayne	2,746	6,531		3,435	12,712
Wood		1,212	1,210		2,422
Wyandot		4,255		4,737	8,992
TOTALS	397,463	817,452	186,402	701,633	2,102,950

Average Depth - Gas Wells 2,196 Feet - Dry Holes 1,818 Feet
 - Oil Wells 1,754 Feet - All Wells 1,917 Feet
 - Combination Wells 2,913 Feet

* Wells drilled deeper, for gas storage or secondary oil recovery not included.

CHART I
 WELLS DRILLING AND COMPLETED AND DRILLING
 PERMITS ISSUED
 1953

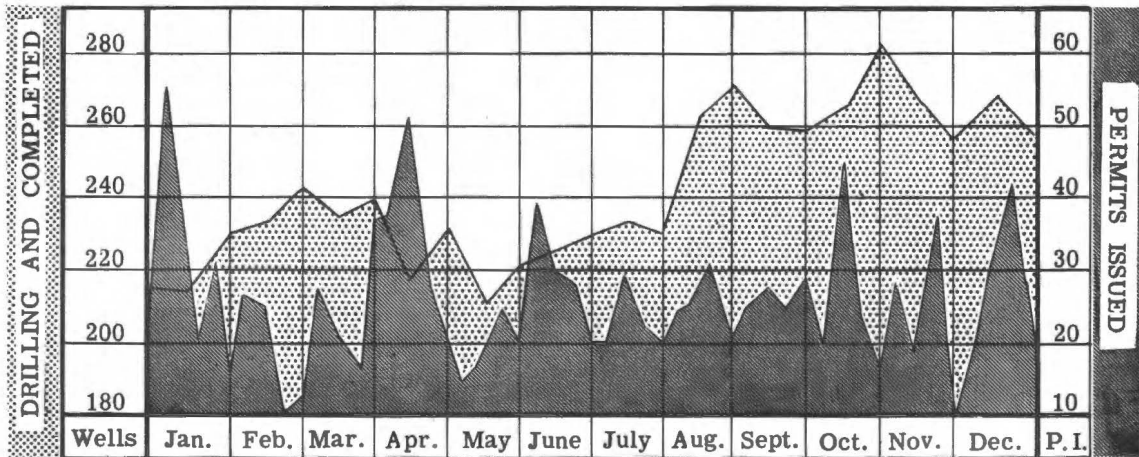


TABLE V
AVERAGE INITIAL DAILY PRODUCTION FOR
WELLS COMPLETED IN 1953
BY SANDS *

SANDS	<u>GAS WELLS</u>		<u>OIL WELLS</u>		<u>COMBINATION</u>		
	No. of Wells	Average Initial Daily Per Well-MCF	No. of Wells	Average Initial Daily Per Well-Bbl.	No. of Wells	Average Initial Daily Per Well-MCF	Average Initial Daily Per Well-Bbl.
Shallow	27	159	109	7	4	143	6
Berea	64	210	155	8	1	314	5
Ohio Shale	9	127	1	3			
Oriskany	22	938	3	9	1	150	25
Newburg	4	1,374					
Clinton	55	1,279	179	114	55	372	96
Medina					1	250	50
Trenton			19	18	2	125	2
Sub-Trenton							
Total or Wts.							
Average	<u>181</u>	<u>635</u>	<u>466</u>	<u>49</u>	<u>64</u>	<u>344</u>	<u>85</u>

* Wells drilled deeper, for gas storage or secondary oil recovery not included.



TABLE VI
OIL AND GAS WELL DRILLING - BY SANDS*
1953

Abbreviations:

MCF - thousand cubic feet of gas
Bbls - standard 42-gallon barrels of oil

GOOSE RUN SAND

County	Wells	<u>GAS</u>		<u>OIL</u>			<u>COMBINATION</u>			<u>DRY HOLE</u>		
		MCF	Feet	Wells	Bbls	Feet	Wells	MCF	Bbls	Feet	Wells	Feet
Washington				1	2	186					1	186
<u>Totals</u>				1	2	186					1	186
<u>Total Wells</u>	2											
<u>Total Bbls</u>	2											
<u>Total Feet</u>	372											
<u>Per Cent Dry</u>	50.0											

PEEKER SAND

Morgan				4	39	1,247					8	2,400
Noble				1	1	626						
Washington				27	103	21,459					4	2,600
<u>Totals</u>				32	143	23,332					12	5,000
<u>Total Wells</u>	44											
<u>Total Bbls</u>	143											
<u>Total Feet</u>	28,332											
<u>Per Cent Dry</u>	27.0											

COW RUN SAND

Athens	3	624	2,361	2	14	617					3	2,240
Guernsey				6	114	3,226						
Meigs				6	101	4,474					4	2,239
Monroe											2	1,106
Morgan	1	110	510	8	22	2,803					7	3,811
Muskingum											4	691
Washington	1	15	1,330	9	29	8,580					13	7,889
<u>Totals</u>	5	749	4,201	31	280	19,700					33	17,976
<u>Total Wells</u>	69											
<u>Total MCF</u>	749											
<u>Total Bbls</u>	280											
<u>Total Feet</u>	41,877											
<u>Per Cent Dry</u>	47.8											

BUELL SAND

Athens											2	354
Noble											4	1,798
Washington				3	8	2,638						
<u>Totals</u>				3	8	2,638					6	2,152

*Wells drilled deeper for gas storage or secondary oil recovery not included.

SQUAW SAND

County	<u>GAS</u>			<u>OIL</u>			<u>COMBINATION</u>				<u>DRY HOLE</u>	
	Wells	MCF	Feet	Wells	Bbls	Feet	Wells	MCF	Bbls	Feet	Wells	Feet
Guernsey	1	30	1,313									
Monroe				1	2	1,402	1	147	2	1,435	2	3,279
Washington	3	903	4,624	1	4	1,575	1	75	1	1,496	6	9,456
<u>Totals</u>	4	933	5,937	2	6	2,977	2	222	3	2,931	8	12,735
<u>Total Wells</u>	16											
<u>Total MCF</u>	1,155											
<u>Total Bbls</u>	9											
<u>Total Feet</u>	24,580											
<u>Per Cent Dry</u>	50.0											

HAMDEN SAND

Pike	1	30	391			
Vinton	2	75	1,372			
<u>Totals</u>	3	105	1,763			
<u>Total Wells</u>	3					
<u>Total MCF</u>	105					
<u>Total Feet</u>	1,763					
<u>Per Cent Dry</u>	0.0					

BEREA SAND

Ashland				83	748	61,835					44	33,857
Athens	12	2,438	18,559	2	30	2,232					1	1,836
Belmont											1	1,943
Carroll				1	5	1,240					3	3,692
Columbiana	2	636	1,684	3	11	2,178					3	2,378
Coshocton											2	1,963
Guernsey				2	2	2,676					7	9,881
Hocking	1	200	793								3	2,458
Holmes	6	424	3,973	8	223	5,718					10	7,135
Jackson											1	650
Jefferson	2	131	2,726	1	5	1,351					5	7,113
Knox	1	260	684	1	1	805					5	3,507
Licking	1	168	737	15	45	10,921					1	778
Lorain											1	92
Mahoning				1	1	245					1	572
Medina				19	77	7,702					10	3,871
Meigs	7	5,652	14,393	7	62	12,495	1	314	5	1,698	2	3,786
Monroe	13	592	22,659	4	23	8,322					7	13,476
Morgan	1	107	1,295								3	4,387
Muskingum				1	5	1,139						
Noble	4	674	4,763	2	5	3,534					7	10,843
Perry				5	26	5,364					1	1,090
Pike	1	20	398								1	675
Scioto	3	30	1,090								1	400
Stark											3	2,616
Tuscarawas	4	1,009	4,574								9	9,064
Vinton											1	1,077
Washington	6	1,082	11,254								5	9,377
Wayne											1	434
<u>Totals</u>	64	13,423	89,582	155	1,269	127,757	1	314	5	1,698	139	138,951

NEWBURG SAND - continued

County	<u>GAS</u>			<u>OIL</u>			<u>COMBINATION</u>				<u>DRY HOLE</u>	
	Wells	MCF	Feet	Wells	Bbls	Feet	Wells	MCF	Bbls	Feet	Wells	Feet
<u>Total Wells</u>	4											
<u>Total MCF</u>	5,495											
<u>Total Feet</u>	9,974											
<u>Per Cent Dry</u>	0.0											

CLINTON SAND

Ashland											3	8,761
Ashtabula	1	285	3,028									
Coshocton	8	6,904	26,983	60	7,965	195,729	13	5,935	1,766	42,295	19	62,373
Cuyahoga	1	352	3,607								1	3,450
Fairfield											1	2,692
Hocking	2	1,618	5,367	3	144	8,718					3	8,754
Holmes				5	251	17,817	3	684	109	9,502	5	18,231
Knox	11	10,587	32,894	76	9,149	225,320	14	6,370	979	42,775	17	53,719
Lake	1	3,100	3,002								1	2,982
Lawrence											1	3,451
Licking	2	2,846	5,482	19	2,213	56,891	16	5,685	1,369	46,214	18	52,038
Lorain	8	27,509	19,322								5	12,641
Medina											2	7,004
Muskingum	6	8,333	21,809	1	40	3,423	1	150	250	3,123	5	18,195
Perry	4	3,870	14,222	8	435	25,772	8	1,654	834	24,894	5	15,299
Portage											1	4,437
Stark	5	3,073	23,558	5	116	24,590					6	29,976
Summit											1	3,486
Tuscarawas	5	1,750	23,765								9	43,450
Vinton	1	105	2,652								1	3,133
Wayne				2	49	6,531					1	3,001
<u>Totals</u>	<u>55</u>	<u>70,332</u>	<u>185,691</u>	<u>179</u>	<u>20,362</u>	<u>564,791</u>	<u>55</u>	<u>20,478</u>	<u>5,307</u>	<u>168,803</u>	<u>105</u>	<u>357,073</u>
<u>Total Wells</u>	394											
<u>Total MCF</u>	90,810											
<u>Total Bbls</u>	25,669											
<u>Total Feet</u>	1,276,358											
<u>Per Cent Dry</u>	26.5											

MEDINA SAND

Muskingum							1	250	50	4,377	5	18,623
Perry											2	7,612
<u>Totals</u>							<u>1</u>	<u>250</u>	<u>50</u>	<u>4,377</u>	<u>7</u>	<u>26,235</u>
<u>Total Wells</u>	8											
<u>Total MCF</u>	250											
<u>Total Bbls</u>	50											
<u>Total Feet</u>	30,612											
<u>Per Cent Dry</u>	87.5											

TRENTON SAND

Allen				1	30	1,322						
Auglaize				1	5	1,170						
Darke											1	1,217
Hancock				1	28	1,326						
Hardin											1	1,345

TRENTON SAND - continued

County	Wells	<u>GAS</u>		<u>OIL</u>		<u>COMBINATION</u>			<u>DRY HOLE</u>			
		MCF	Feet	Wells	Bbls	Feet	Wells	MCF	Bbls	Feet	Wells	Feet
Huron										1	3,413	
Mercer				10	173	11,661	1	150	2	1,208		
Putnam				1	5	1,356					1	1,401
Sandusky											2	2,907
Seneca				1	5	1,329					1	2,072
Wood				1	3	1,212	1	100	2	1,210		
Wyandot				3	90	4,255					2	2,755
<u>Totals</u>				19	339	23,631	2	250	4	2,418	9	15,110

<u>Total Wells</u>	30
<u>Total MCF</u>	250
<u>Total Bbls</u>	343
<u>Total Feet</u>	41,159
<u>Per Cent Dry</u>	27.5

ST. PETER

Ashtabula										1	5,320
Huron										1	3,321
Knox										1	4,617
Logan										1	1,629
Seneca										1	2,650
Wyandot										1	1,982
<u>Totals</u>										6	19,519

<u>Total Wells</u>	6
<u>Total Feet</u>	19,519
<u>Per Cent Dry</u>	100.0

GRAND TOTALS

<u>Wells</u>	1,097
<u>MCF</u>	137,316
<u>Bbls</u>	28,147
<u>Footage</u>	2,102,950
<u>Gas</u>	397,463
<u>Oil</u>	817,452
<u>Comb.</u>	186,402
<u>Dry</u>	701,633
	2,102,950

Dry Hole Average - 35.2

TABLE VII
OIL AND GAS WELL DRILLING - BY COUNTIES
1953

Abbreviations:

- MCF - Thousand cubic feet of gas - reported open flow at completion.
Bbls - Barrels of oil reported for first 24 hours at completion.
Feet - Total feet (footage) drilled.

ALLEN COUNTY

Sand	First Half				Last Half				Total			
	Wells	MCF	Bbls	Feet	Wells	MCF	Bbls	Feet	Wells	MCF	Bbls	Feet
<u>Oil Wells</u> Trenton					1		30	1,322	1		30	1,322

ASHLAND COUNTY

<u>Oil Wells</u> Berea	43		335	31,990	40		413	29,845	83		748	61,835
<u>Dry Holes</u> Berea	22			16,602	22			17,255	44			33,857
Clinton	2			6,065	1			2,696	3			8,761
<u>Totals</u>	24			22,667	23			19,951	47			42,618

<u>Total Wells</u>		67				63				130		
<u>Total Bbls</u>		335				413				748		
<u>Total Feet</u>		54,657				49,796				104,453		
<u>Per Cent Dry</u>	- 36.7											
<u>Gas Storage Wells</u>	- 44 Clinton, Total Feet: 124,411											

ASHTABULA COUNTY

<u>Gas Wells</u> Clinton					1	285		3,028	1	285		3,028
<u>Dry Holes</u> St. Peter	1			5,320					1			5,320
<u>Total Wells</u>		1				1				2		
<u>Total MCF</u>						285				285		
<u>Total Feet</u>		5,320				3,028				8,348		
<u>Per Cent Dry</u>	- 50.0											

ATHENS COUNTY

<u>Gas Wells</u> Cow Run	1	380		634	2	244		1,727	3	624		2,361
Maxton	1	70		774	1	489		900	2	559		1,674
Berea	1	60		1,651	11	2,378		16,908	12	2,438		18,559
Oriskany	1	356		4,275	4	1,606		17,944	5	1,962		22,219
<u>Totals</u>	4	866		7,334	18	4,717		37,479	22	5,583		44,813

ATHENS COUNTY - continued

Sand	First Half				Last Half				Total			
	Wells	MCF	Bbls	Feet	Wells	MCF	Bbls	Feet	Wells	MCF	Bbls	Feet
<u>Oil Wells</u>												
Cow Run	1		2	321	1		12	296	2		14	617
Maxton					1		8	989	1		8	989
Berea	1		2	990	1		28	1,242	2		30	2,232
<u>Totals</u>	2		4	1,311	3		48	2,527	5		52	3,838
<u>Dry Holes</u>												
Cow Run					3			2,240	3			2,240
Buell	2			354					2			354
Maxton	1			856					1			856
Berea	1			1,836					1			1,836
<u>Totals</u>	4			3,046	3			2,240	7			5,286
<u>Total Wells</u>		10				24				34		
<u>Total MCF</u>		866				4,717				5,583		
<u>Total Bbls</u>		4				48				52		
<u>Total Feet</u>		11,691				42,246				53,937		
<u>Per Cent Dry</u>	- 21.9											
<u>Drilled Deeper</u>	- 2 Cow Run to Berea, 383 MCF, Total Feet: 1945											
	1 Macksburg to 2nd Berea, 297 MCF, Total Feet: 776											

AUGLAIZE COUNTY

<u>Oil Wells</u>												
Trenton					1		5	1,170	1		5	1,170

BELMONT COUNTY

<u>Gas Wells</u>												
Injun					1	39		1,496	1	39		1,496
<u>Dry Holes</u>												
Injun					1			1,520	1			1,520
Berea					1			1,943	1			1,943
<u>Totals</u>					2			3,463	2			3,463
<u>Total Wells</u>					3					3		
<u>Total MCF</u>					39					39		
<u>Total Feet</u>					4,959					4,959		
<u>Per Cent Dry</u>	- 66.6											

CARROLL COUNTY

<u>Oil Wells</u>												
Berea					1		5	1,240	1		5	1,240
<u>Dry Holes</u>												
Injun	1			890					1			890
Berea	3			3,692					3			3,692
<u>Totals</u>	4			4,582					4			4,582
<u>Total Wells</u>		4			1					5		
<u>Total Bbls</u>					5					5		
<u>Total Feet</u>		4,582			1,240					5,822		
<u>Per Cent Dry</u>	- 80.0											

COLUMBIANA COUNTY

Sand	First Half				Last Half				Total			
	Wells	MCF	Bbls	Feet	Wells	MCF	Bbls	Feet	Wells	MCF	Bbls	Feet
<u>Gas Wells</u>												
Berea	1	536		907	1	100		777	2	636		1,684
<u>Oil Wells</u>												
Berea	1		3	672	2		8	1,506	3		11	2,178
<u>Dry Holes</u>												
Berea	1			793	2			1,585	3			2,378
Shale					1			1,246	1			1,246
<u>Totals</u>	<u>1</u>			<u>793</u>	<u>3</u>			<u>2,831</u>	<u>4</u>			<u>3,624</u>
<u>Total Wells</u>		3				6				9		
<u>Total MCF</u>		536				100				636		
<u>Total Bbls</u>		3				8				11		
<u>Total Feet</u>		2,372				5,114				7,486		
Per Cent Dry - 44.4												
Gas Storage Wells - 4 Berea, Total Feet: 1,590												
Air Repressuring Wells - 1 Berea Input, Total Feet: 661												

COSHOCTON COUNTY

<u>Gas Wells</u>												
Clinton	4	3,334		12,861	4	3,570		14,122	8	6,904		26,983
<u>Oil Wells</u>												
Clinton	31		2,526	100,615	29		5,439	95,114	60		7,965	195,729
<u>Combination Wells</u>												
Clinton	7	3,743	428	22,695	6	2,192	1,338	19,600	13	5,935	1,766	42,295
<u>Dry Holes</u>												
Berea	2			1,963					2			1,963
Clinton	8			26,116	11			36,257	19			62,373
<u>Totals</u>	<u>10</u>			<u>28,079</u>	<u>11</u>			<u>36,257</u>	<u>21</u>			<u>64,336</u>
<u>Total Wells</u>		52				50				102		
<u>Total MCF</u>		7,077				5,762				12,839		
<u>Total Bbls</u>		2,954				6,777				9,731		
<u>Total Feet</u>		164,250				165,093				329,343		
Per Cent Dry - 20.8												

CUYAHOGA COUNTY

<u>Gas Wells</u>												
Newburg	1	3,100		3,123					1	3,100		3,123
Clinton	1	352		3,607					1	352		3,607
<u>Totals</u>	<u>2</u>	<u>3,452</u>		<u>6,730</u>					<u>2</u>	<u>3,452</u>		<u>6,730</u>
<u>Dry Holes</u>												
Clinton					1			3,450	1			3,450
<u>Total Wells</u>		2				1				3		
<u>Total MCF</u>		3,452								3,452		
<u>Total Feet</u>		6,730				3,450				10,180		
Per Cent Dry - 33.8												

DARKE COUNTY

<u>Sand</u>	<u>First Half</u>				<u>Last Half</u>				<u>Total</u>			
	<u>Wells</u>	<u>MCF</u>	<u>Bbls</u>	<u>Feet</u>	<u>Wells</u>	<u>MCF</u>	<u>Bbls</u>	<u>Feet</u>	<u>Wells</u>	<u>MCF</u>	<u>Bbls</u>	<u>Feet</u>
<u>Dry Holes</u> Trenton					1			1,217	1			1,217

ERIE COUNTY

<u>Dry Holes</u> Shale					2			752	2			752
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FAIRFIELD COUNTY

<u>Dry Holes</u> Clinton					1			2,692	1			2,692
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GUERNSEY COUNTY

<u>Gas Wells</u> Squaw	1	30		1,313					1	30		1,313
<u>Oil Wells</u> Cow Run					6		114	3,226	6		114	3,226
Berea	$\frac{1}{1}$		$\frac{1}{1}$	$\frac{1,314}{1,314}$	$\frac{1}{7}$		$\frac{1}{115}$	$\frac{1,362}{4,588}$	$\frac{2}{8}$		$\frac{2}{116}$	$\frac{2,676}{5,902}$
<u>Totals</u>	$\frac{1}{1}$		$\frac{1}{1}$	$\frac{1,314}{1,314}$	$\frac{7}{7}$		$\frac{115}{4,588}$		$\frac{8}{8}$		$\frac{116}{116}$	$\frac{5,902}{5,902}$
<u>Dry Holes</u> Berea	3			4,663	4			5,218	7			9,881
<u>Total Wells</u>		5					11			16		
<u>Total MCF</u>		30								30		
<u>Total Bbls</u>		1					115			116		
<u>Total Feet</u>		7,290					9,806			17,096		
<u>Per Cent Dry</u>	-	43.8										

HANCOCK COUNTY

<u>Oil Wells</u> Trenton					1		28	1,326	1		28	1,326
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HARDIN COUNTY

<u>Dry Holes</u> Trenton	1			1,345					1			1,345
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HOCKING COUNTY

<u>Gas Wells</u> Berea					1		200	793	1	200		793
Clinton	$\frac{2}{2}$	$\frac{1,618}{1,618}$		$\frac{5,367}{5,367}$	$\frac{1}{1}$		$\frac{200}{200}$	$\frac{793}{793}$	$\frac{2}{3}$	$\frac{1,618}{1,818}$		$\frac{5,367}{6,160}$
<u>Totals</u>	$\frac{2}{2}$	$\frac{1,618}{1,618}$		$\frac{5,367}{5,367}$	$\frac{1}{1}$		$\frac{200}{200}$	$\frac{793}{793}$	$\frac{3}{3}$	$\frac{1,818}{1,818}$		$\frac{6,160}{6,160}$
<u>Oil Wells</u> Clinton					3		144	8,718	3		144	8,718

HOCKING COUNTY - continued

Sand	First Half				Last Half				Total			
	Wells	MCF	Bbls	Feet	Wells	MCF	Bbls	Feet	Wells	MCF	Bbls	Feet
<u>Dry Holes</u>												
Berea	1		806		2		1,652		3			2,458
Clinton	2		6,027		1		2,727		3			8,754
<u>Totals</u>	<u>3</u>		<u>6,833</u>		<u>3</u>		<u>4,379</u>		<u>6</u>			<u>11,212</u>
<u>Total Wells</u>		5				7				12		
<u>Total MCF</u>		1,618				200				1,818		
<u>Total Bbls</u>						144				144		
<u>Total Feet</u>		12,200				13,890				26,090		
<u>Per Cent Dry - 50.0</u>												
<u>Gas Storage Wells - 30 Clinton, Total Feet: 67,870</u>												

HOLMES COUNTY

<u>Gas Wells</u>												
Berea	1	98		668	5	326		3,305	6	424		3,973
<u>Oil Wells</u>												
Berea	6		199	4,407	2		24	1,311	8		223	5,718
Clinton	2		50	7,127	3		201	10,690	5		251	17,817
<u>Totals</u>	<u>8</u>		<u>249</u>	<u>11,534</u>	<u>5</u>		<u>225</u>	<u>12,001</u>	<u>13</u>		<u>474</u>	<u>23,535</u>
<u>Combination Wells</u>												
Clinton	1	184	24	3,027	2	500	85	6,475	3	684	109	9,502
<u>Dry Holes</u>												
Berea	7			4,885	3			2,250	10			7,135
Clinton	3			10,998	2			7,233	5			18,231
<u>Totals</u>	<u>10</u>			<u>15,883</u>	<u>5</u>			<u>9,483</u>	<u>15</u>			<u>25,366</u>
<u>Total Wells</u>		20				17				37		
<u>Total MCF</u>		282				826				1,108		
<u>Total Bbls</u>		273				310				583		
<u>Total Feet</u>		31,112				31,264				62,376		
<u>Per Cent Dry - 40.5</u>												

HURON COUNTY

<u>Dry Holes</u>												
Trenton	1			3,413					1			3,413
St. Peter					1			3,321	1			3,321
<u>Totals</u>	<u>1</u>			<u>3,413</u>	<u>1</u>			<u>3,321</u>	<u>2</u>			<u>6,734</u>

JACKSON COUNTY

<u>Dry Holes</u>												
Berea					1			650	1			650

JEFFERSON COUNTY

<u>Gas Wells</u>												
Berea					2	131		2,726	2	131		2,726
<u>Oil Wells</u>												
Berea					1		5	1,351	1		5	1,351

LAWRENCE COUNTY

Sand	First Half				Last Half				Total			
	Wells	MCF	Bbls	Feet	Wells	MCF	Bbls	Feet	Wells	MCF	Bbls	Feet
<u>Gas Wells</u>												
Shale	4	574		9,969					4	574		9,969
<u>Dry Holes</u>												
Shale	1			2,432					1			2,432
Clinton	1			3,451					1			3,451
<u>Totals</u>	2			5,883					2			5,883
<u>Total Wells</u>		6								6		
<u>Total MCF</u>		574								574		
<u>Total Feet</u>			15,852								15,852	
<u>Per Cent Dry</u>				33.3								
<u>Drilled Deeper</u>				1 Berea to Shale, 90 MCF, Total Feet: 1,635								
<u>Brine Test Wells</u>				1 Niagara, Total Feet: 2,340								

LICKING COUNTY

<u>Gas Wells</u>												
Berea					1	168		737	1	168		737
Shale	1	66		1,299					1	66		1,299
Newburg					1	675		2,130	1	675		2,130
Clinton	2	2,846		5,482					2	2,846		5,482
<u>Totals</u>	3	2,912		6,781	2	843		2,867	5	3,755		9,648
<u>Oil Wells</u>												
Berea	7		22	5,410	8		23	5,511	15		45	10,921
Clinton	6		426	18,187	13		1,787	38,704	19		2,213	56,891
<u>Totals</u>	13		448	23,597	21		1,810	44,215	34		2,258	67,812
<u>Combination Wells</u>												
Clinton	8	2,645	674	22,728	8	3,040	695	23,486	16	5,685	1,369	46,214
<u>Dry Holes</u>												
Berea	1			778					1			778
Shale					1			1,436	1			1,436
Clinton	11			31,830	7			20,208	18			52,038
<u>Totals</u>	12			32,608	8			21,644	20			54,252
<u>Total Wells</u>		36				39				75		
<u>Total MCF</u>		5,557				3,883				9,440		
<u>Total Bbls</u>		1,122				2,505				3,627		
<u>Total Feet</u>			85,714			92,212				177,926		
<u>Per Cent Dry</u>				26.6								

LOGAN COUNTY

<u>Dry Holes</u>												
St. Peter	1			1,629					1			1,629

LORAIN COUNTY

<u>Gas Wells</u>												
Shale					1	75		935	1	75		935

LORAIN COUNTY - continued

Sand	First Half				Last Half				Total			
	Wells	MCF	Bbls	Feet	Wells	MCF	Bbls	Feet	Wells	MCF	Bbls	Feet
Clinton	6	24,519		14,446	2	2,990		4,876	8	27,509		19,322
<u>Totals</u>	6	24,519		14,446	3	3,065		5,811	9	27,584		20,257
<u>Dry Holes</u>												
Berea	1			92					1			92
Clinton	4			10,211	1			2,430	5			12,641
<u>Totals</u>	5			10,303	1			2,430	6			12,733
<u>Total Wells</u>		11				4				15		
<u>Total MCF</u>		24,519				3,065				27,584		
<u>Total Feet</u>		24,749				8,241				32,990		
<u>Per Cent Dry</u>	- 40.0											
<u>Salt Test Wells</u>	- 1 Salina, Total Feet: 1,969											
<u>Water Flood Wells</u>	- 1 Input, Total Feet: 225											
	6 Producers, Total Feet: 1,316											

MAHONING COUNTY

<u>Oil Wells</u>												
Berea	1		1	245					1		1	245
<u>Dry Holes</u>												
Berea					1		572		1			572

MEDINA COUNTY

<u>Oil Wells</u>												
Berea					19		77	7,702	19		77	7,702
<u>Dry Holes</u>												
Berea	4			1,352	6			2,519	10			3,871
Clinton	2			7,004					2			7,004
<u>Totals</u>	6			8,356	6			2,519	12			10,875
<u>Total Wells</u>		6				25				31		
<u>Total Bbls</u>						77				77		
<u>Total Feet</u>		8,356				10,221				18,577		
<u>Per Cent Dry</u>	- 38.3											
<u>Water Flood Wells</u>	- 5 Inputs, Total Feet: 1,096											
	10 Producers, Total Feet: 3,915											

MEIGS COUNTY

<u>Gas Wells</u>												
Freeport	3	450		1,932					3	450		1,932
Macksburg	1	288		547					1	288		547
Berea	5	4,752		10,155	2	900		4,238	7	5,652		14,393
<u>Totals</u>	9	5,490		12,634	2	900		4,238	11	6,390		16,872
<u>Oil Wells</u>												
Cow Run					6	101	4,474		6	101	4,474	
Berea	4		37	7,187	3	25	5,308		7	62	12,495	
<u>Totals</u>	4		37	7,187	9	126	9,782		13	163	16,969	

MEIGS COUNTY - continued

Sand	First Half				Last Half				Total			
	Wells	MCF	Bbls	Feet	Wells	MCF	Bbls	Feet	Wells	MCF	Bbls	Feet
<u>Combination Wells</u>												
Berea					1	314	5	1,698	1	314	5	1,698
<u>Dry Holes</u>												
Freeport	1			665					1			665
Cow Run	2			644	2			1,595	4			2,239
Stray					2			1,465	2			1,465
Berea	1			1,911	1			1,875	2			3,786
Shale	1			2,634	1			2,645	2			5,279
<u>Totals</u>	<u>5</u>			<u>5,854</u>	<u>6</u>			<u>7,580</u>	<u>11</u>			<u>13,434</u>
<u>Total Wells</u>		18				18				36		
<u>Total MCF</u>		5,490				1,214				6,704		
<u>Total Bbls</u>		37				131				168		
<u>Total Feet</u>		25,675				23,298				48,973		
<u>Per Cent Dry</u>	- 30.6											
<u>Drilled Deeper</u>	- 1 2nd Cow Run to Macksburg, 280 MCF, Total Feet: 208											
	1 1st Berea to 2nd Berea, 125 MCF, Total Feet: 126											

MERCER COUNTY

<u>Oil Wells</u>												
Trenton	2		48	2,323	8		125	9,338	10		173	11,661
<u>Combination Wells</u>												
Trenton					1	150	2	1,208	1	150	2	1,208
<u>Total Wells</u>		2				9				11		
<u>Total MCF</u>						150				150		
<u>Total Bbls</u>		48				127				175		
<u>Total Feet</u>		2,323				10,546				12,869		
<u>Per Cent Dry</u>	- 0.0											

MONROE COUNTY

<u>Gas Wells</u>												
Salt Sand					2	345		1,644	2	345		1,644
Keener	1	393		1,315					1	393		1,315
Berea	5	186		8,661	8	406		13,998	13	592		22,659
<u>Totals</u>	<u>6</u>	<u>579</u>		<u>9,976</u>	<u>10</u>	<u>751</u>		<u>15,642</u>	<u>16</u>	<u>1,330</u>		<u>25,618</u>
<u>Oil Wells</u>												
Germantown					2		7	2,191	2		7	2,191
Keener					3		15	4,364	3		15	4,364
Injun	1		10	1,667	8		78	6,387	9		88	8,054
Squaw	1		2	1,402					1		2	1,402
Berea	1		3	2,185	3		20	6,137	4		23	8,322
Shale	1		3	3,120					1		3	3,120
<u>Totals</u>	<u>4</u>		<u>18</u>	<u>8,374</u>	<u>16</u>		<u>120</u>	<u>19,079</u>	<u>20</u>		<u>138</u>	<u>27,453</u>
<u>Combination Wells</u>												
Injun					1	250	20	1,634	1	250	20	1,634
Squaw					1	147	2	1,435	1	147	2	1,435
<u>Totals</u>					<u>2</u>	<u>397</u>	<u>22</u>	<u>3,069</u>	<u>2</u>	<u>397</u>	<u>22</u>	<u>3,069</u>

MONROE COUNTY - continued

Sand	First Half				Last Half				Total			
	Wells	MCF	Bbls	Feet	Wells	MCF	Bbls	Feet	Wells	MCF	Bbls	Feet
<u>Dry Holes</u>												
Cow Run	2			1,106					2			1,106
Germantown	1			1,205					1			1,205
Stray	1			1,232					1			1,232
Lime Sand					1			914	1			914
Keener					2			2,447	2			2,447
Injun	1			1,300	3			4,595	4			5,895
Squaw	1			1,468	1			1,811	2			3,279
Berea	5			9,665	2			3,811	7			13,476
Shale	1			3,141					1			3,141
<u>Totals</u>	<u>12</u>			<u>19,117</u>	<u>9</u>			<u>13,578</u>	<u>21</u>			<u>32,695</u>
<u>Total Wells</u>		22				37				59		
<u>Total MCF</u>		579				1,148				1,727		
<u>Total Bbls</u>		18				142				160		
<u>Total Feet</u>		37,467				51,368				88,835		
<u>Per Cent Dry</u> - 35.6												
<u>Drilled Deeper</u> - 1 Lime Sand to Injun, 1 Bbl., Total Feet: 271												
2 Keener to Berea, 10 Bbl., Total Feet: 1,097												
1 Injun to Berea, Dry, Total Feet: 385												
<u>Core Test Wells</u> - 2 Keener, Total Feet: 3,117												

MORGAN COUNTY

<u>Gas Wells</u>												
Cow Run					1	110		510	1	110		510
Berea					1	107		1,295	1	107		1,295
<u>Totals</u>					<u>2</u>	<u>217</u>		<u>1,805</u>	<u>2</u>	<u>217</u>		<u>1,805</u>
<u>Oil Wells</u>												
Peeker	4		39	1,247					4		39	1,247
Cow Run	1		1	258	7		21	2,545	8		22	2,803
Stray	2		2	435					2		2	435
<u>Totals</u>	<u>7</u>		<u>42</u>	<u>1,940</u>	<u>7</u>		<u>21</u>	<u>2,545</u>	<u>14</u>		<u>63</u>	<u>4,485</u>
<u>Dry Holes</u>												
Peeker	7			1,914	1			486	8			2,400
Cow Run	5			2,998	2			813	7			3,811
Stray	1			198					1			198
Berea	3			4,387					3			4,387
Oriskany					1			3,757	1			3,757
<u>Totals</u>	<u>16</u>			<u>9,497</u>	<u>4</u>			<u>5,056</u>	<u>20</u>			<u>14,553</u>
<u>Total Wells</u>		23				13				36		
<u>Total MCF</u>						217				217		
<u>Total Bbls</u>		42				21				63		
<u>Total Feet</u>		11,437				9,406				20,843		
<u>Per Cent Dry</u> - 55.5												
<u>Air Repressuring Wells</u> - 1 Cow Run, Input, Total Feet: 124												

MUSKINGUM COUNTY

<u>Gas Wells</u>												
Clinton	5	7,748		17,516	1	585		4,293	6	8,333		21,809

MUSKINGUM COUNTY - continued

Sand	First Half				Last Half				Total			
	Wells	MCF	Bbls	Feet	Wells	MCF	Bbls	Feet	Wells	MCF	Bbls	Feet
<u>Oil Wells</u>												
Berea					1		5	1,139	1		5	1,139
Oriskany	1		10	3,330	1		15	3,028	2		25	6,358
Clinton	<u>1</u>		<u>40</u>	<u>3,423</u>					<u>1</u>		<u>40</u>	<u>3,423</u>
Totals	<u>2</u>		<u>50</u>	<u>6,753</u>	<u>2</u>		<u>20</u>	<u>4,167</u>	<u>4</u>		<u>70</u>	<u>10,920</u>
<u>Combination Wells</u>												
Oriskany					1	150	25	3,126	1	150	25	3,126
Clinton	1	150	250	3,123					1	150	250	3,123
Medina	1	250	50	4,377					1	250	50	4,377
Totals	<u>2</u>	<u>400</u>	<u>300</u>	<u>7,500</u>	<u>1</u>	<u>150</u>	<u>25</u>	<u>3,126</u>	<u>3</u>	<u>550</u>	<u>325</u>	<u>10,626</u>
<u>Dry Holes</u>												
Cow Run					4			691	4			691
Oriskany	3			9,341					3			9,341
Clinton	5			18,195					5			18,195
Medina	2			7,733	3			10,890	5			18,623
Totals	<u>10</u>			<u>35,269</u>	<u>7</u>			<u>11,581</u>	<u>17</u>			<u>46,850</u>
Total Wells		19				11				30		
Total MCF		8,148				735				8,883		
Total Bbls		350				45				395		
Total Feet		67,038				23,167				90,205		
Per Cent Dry	- 56.6											

NOBLE COUNTY

<u>Gas Wells</u>												
Berea	1	24		1,434	3	650		3,329	4	674		4,763
Shale					1	325		5,080	1	325		5,080
Totals	<u>1</u>	<u>24</u>		<u>1,434</u>	<u>4</u>	<u>975</u>		<u>8,409</u>	<u>5</u>	<u>999</u>		<u>9,843</u>
<u>Oil Wells</u>												
Peeker					1	1		626	1		1	626
Stray	1		2	242	3		14	1,277	4		16	1,519
Macksburg	1		2	860					1		2	860
Germantown	4		22	4,216	1		3	928	5		25	5,144
Salt Sand					1			830	1		1	830
Berea					2			3,534	2		5	3,534
Totals	<u>6</u>		<u>26</u>	<u>5,318</u>	<u>8</u>		<u>24</u>	<u>7,195</u>	<u>14</u>		<u>50</u>	<u>12,513</u>
<u>Dry Holes</u>												
Buell	3			1,603	1			195	4			1,798
Macksburg	3			3,498					3			3,498
Germantown	1			922	2			1,936	3			2,858
Maxton					1			1,270	1			1,270
Berea	1			1,595	6			9,248	7			10,843
Shale	1			4,096					1			4,096
Totals	<u>9</u>			<u>11,714</u>	<u>10</u>			<u>12,649</u>	<u>19</u>			<u>24,363</u>
Total Wells		16				22				38		
Total MCF		24				975				999		
Total Bbls		26				24				50		
Total Feet		18,466				28,253				46,719		
Per Cent Dry	- 50.0											

PERRY COUNTY

Sand	First Half				Last Half				Total			
	Wells	MCF	Bbls	Feet	Wells	MCF	Bbls	Feet	Wells	MCF	Bbls	Feet
<u>Gas Wells</u>												
Newburg					1	1,420		2,297	1	1,420		2,297
Clinton	1	1,700		3,856	3	2,170		10,366	4	3,870		14,222
<u>Totals</u>	1	1,700		3,856	4	3,590		12,663	5	5,290		16,519
<u>Oil Wells</u>												
Berea	2		19	2,166	3		7	3,198	5		26	5,364
Clinton	3		200	9,206	5		235	16,566	8		435	25,772
<u>Totals</u>	5		219	11,372	8		242	19,764	13		461	31,136
<u>Combination Wells</u>												
Clinton	2	367	45	6,125	6	1,287	789	18,769	8	1,654	834	24,894
<u>Dry Holes</u>												
Berea					1			1,090	1			1,090
Clinton	1			2,817	4			12,482	5			15,299
Medina	2			7,612					2			7,612
<u>Totals</u>	3			10,429	5			13,572	8			24,001
<u>Total Wells</u>		11				23				34		
<u>Total MCF</u>		2,067				4,877				6,944		
<u>Total Bbls</u>		264				1,031				1,295		
<u>Total Feet</u>		31,782				64,768				96,550		
<u>Per Cent Dry</u>	- 23.9											

PIKE COUNTY

<u>Gas Wells</u>												
Hamden					1	30		391	1	30		391
Berea					1	20		398	1	20		398
Shale	1	50		793	1	50		416	2	100		1,209
<u>Totals</u>	1	50		793	3	100		1,205	4	150		1,998
<u>Dry Holes</u>												
Berea					1			675	1			675
<u>Total Wells</u>		1				4				5		
<u>Total MCF</u>		50				100				150		
<u>Total Feet</u>		793				1,880				2,673		
<u>Per Cent Dry</u>	- 20.0											

PORTAGE COUNTY

<u>Dry Holes</u>												
Clinton	1			4,437					1			4,437

PUTNAM COUNTY

<u>Oil Wells</u>												
Trenton	1		5	1,356					1		5	1,356
<u>Dry Holes</u>												
Trenton					1			1,401	1			1,401

PORTAGE COUNTY - continued

<u>Sand</u>	<u>First Half</u>				<u>Last Half</u>				<u>Total</u>			
	<u>Wells</u>	<u>MCF</u>	<u>Bbls</u>	<u>Feet</u>	<u>Wells</u>	<u>MCF</u>	<u>Bbls</u>	<u>Feet</u>	<u>Wells</u>	<u>MCF</u>	<u>Bbls</u>	<u>Feet</u>
<u>Total Wells</u>		1				1				2		
<u>Total Bbls</u>										5		
<u>Total Feet</u>			1,356				1,401				2,757	
<u>Per Cent Dry</u>	-	33.3										

SANDUSKY COUNTY

<u>Dry Holes</u>												
Trenton	1			1,480	1			1,427	2			2,907

SCIOTO COUNTY

<u>Gas Wells</u>												
Berea					3	30		1,090	3	30		1,090
<u>Dry Holes</u>												
Berea	1			400					1			400
<u>Total Wells</u>		1				3				4		
<u>Total MCF</u>						30				30		
<u>Total Feet</u>			400				1,090			1,490		
<u>Per Cent Dry</u>	-	25.0										
<u>Brine Test Wells</u>	-	2	Niagara, Total Feet: 3,658									

SENECA COUNTY

<u>Oil Wells</u>												
Trenton					1		5	1,329	1		5	1,329
<u>Dry Holes</u>												
Trenton	1			2,072					1			2,072
St. Peter					1			2,650	1			2,650
<u>Totals</u>	1			2,072	1			2,650	2			4,722
<u>Total Wells</u>		1				2				3		
<u>Total Bbls</u>						5				5		
<u>Total Feet</u>			2,072				3,979			6,051		
<u>Per Cent Dry</u>	-	66.6										

STARK COUNTY

<u>Gas Wells</u>												
Clinton	2	2,360		9,417	3	713		14,141	5	3,073		23,558
<u>Oil Wells</u>												
Clinton	2		41	9,838	3		75	14,752	5		116	24,590
<u>Dry Wells</u>												
Berea	1			836	2			1,780	3			2,616
Clinton	3			14,475	3			15,501	6			29,976
<u>Totals</u>	4			15,311	5			17,281	9			32,592

WASHINGTON COUNTY

Sand	First Half				Last Half				Total			
	Wells	MCF	Bbls	Feet	Wells	MCF	Bbls	Feet	Wells	MCF	Bbls	Feet
<u>Gas Wells</u>												
Cow Run					1	15		1,330	1	15		1,330
Salt Sand	1	91		1,200					1	91		1,200
Maxton	1	100		1,933					1	100		1,933
Keener					1	40		1,310	1	40		1,310
Injun					2	190		3,133	2	190		3,133
Squaw	1	603		1,502	2	300		3,122	3	903		4,624
Berea	3	450		5,565	3	632		5,689	6	1,082		11,254
Oriskany	3	7,325		12,419					3	7,325		12,419
<u>Totals</u>	<u>9</u>	<u>8,569</u>		<u>22,619</u>	<u>9</u>	<u>1,177</u>		<u>14,584</u>	<u>18</u>	<u>9,746</u>		<u>37,203</u>

Oil Wells

Goose Run	1		2	186					1		2	186
Buell	2		7	1,138	1		1	1,500	3		8	2,638
Peeker	9		34	6,535	18		69	14,924	27		103	21,459
Cow Run	8		14	5,340	1		15	3,240	9		29	8,580
Germantown					1		3	990	1		3	990
Stray	1		2	1,204	1		1	1,107	2		3	2,311
Keener	2		26	2,693	2		7	2,912	4		33	5,605
Injun	3		29	4,466	2		60	2,894	5		89	7,360
Squaw					1		4	1,575	1		4	1,575
<u>Totals</u>	<u>26</u>		<u>114</u>	<u>21,562</u>	<u>27</u>		<u>160</u>	<u>29,142</u>	<u>53</u>		<u>274</u>	<u>50,704</u>

Combination Wells

Keener	1	100	2	1,415					1	100	2	1,415
Squaw	1	75	1	1,496					1	75	1	1,496
<u>Totals</u>	<u>2</u>	<u>175</u>	<u>3</u>	<u>2,911</u>					<u>2</u>	<u>175</u>	<u>3</u>	<u>2,911</u>

Dry Holes

Goose Run	1			186					1			186
Peeker					4			2,600	4			2,600
Cow Run	5			2,914	8			4,975	13			7,889
Stray	5			4,691	1			517	6			5,208
Keener	1			1,464					1			1,464
Injun	1			1,663					1			1,663
Squaw	2			3,337	4			6,119	6			9,456
Berea	4			7,448	1			1,929	5			9,377
Shale	1			2,725	1			3,035	2			5,760
Oriskany	1			4,369	1			4,430	2			8,799
<u>Totals</u>	<u>21</u>			<u>28,797</u>	<u>20</u>			<u>23,605</u>	<u>41</u>			<u>52,402</u>

<u>Total Wells</u>		58				56				114		
<u>Total MCF</u>		8,744				1,177				9,921		
<u>Total Bbls</u>		117				160				277		
<u>Total Feet</u>		75,889				67,331				143,220		

Per Cent Dry - 35.8

Drilled Deeper - 1 Lime to Buell, 2 Bbls., Total Feet: 377
 1 Buell to Cow Run, 1 Bbl., Total Feet: 164
 1 Cow Run to Injun, 25 MCF, Total Feet: 633
 1 Germantown to Berea, 4 Bbls., Total Feet: 280

Water Flood Wells - 5 Input, Total Feet: 1,827
 2 Producers, Total Feet: 777

WAYNE COUNTY

Gas Wells

Oriskany	1	1,000		2,746					1	1,000		2,746
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WAYNE COUNTY - Continued

Sand	<u>First Half</u>				<u>Last Half</u>				<u>Total</u>			
	<u>Wells</u>	<u>MCF</u>	<u>Bbls</u>	<u>Feet</u>	<u>Wells</u>	<u>MCF</u>	<u>Bbls</u>	<u>Feet</u>	<u>Wells</u>	<u>MCF</u>	<u>Bbls</u>	<u>Feet</u>
<u>Oil Wells</u>												
Clinton					2		49	6,531	2		49	6,531
<u>Dry Holes</u>												
Berea	1			434					1			434
Clinton	$\frac{1}{2}$			<u>3,001</u>					$\frac{1}{2}$			<u>3,001</u>
<u>Totals</u>	$\frac{2}{2}$			<u>3,435</u>					$\frac{2}{2}$			<u>3,435</u>
<u>Total Wells</u>		3				2				5		
<u>Total MCF</u>		1,000								1,000		
<u>Total Bbls</u>						49				49		
<u>Total Feet</u>		6,181				6,531				12,712		
<u>Per Cent Dry</u>	- 40.0											
<u>Gas Storage Wells</u>	- 12 Clinton, Total Feet: 36,835											

WOOD COUNTY

<u>Oil Wells</u>												
Trenton					1		3	1,212	1		3	1,212
<u>Combination Wells</u>												
Trenton	1	100	2	1,210					1	100	2	1,210
<u>Total Wells</u>		1				1				2		
<u>Total MCF</u>		100								100		
<u>Total Bbls</u>		2				3				5		
<u>Total Feet</u>		1,210				1,212				2,422		
<u>Per Cent Dry</u>	- 0.0											

WYANDOT COUNTY

<u>Oil Wells</u>												
Trenton	3		90	4,255					3		90	4,255
<u>Dry Holes</u>												
Trenton	1			1,375	1		1,380		2			2,755
St. Peter	$\frac{1}{2}$			<u>1,982</u>					$\frac{1}{3}$			<u>1,982</u>
<u>Totals</u>	$\frac{2}{2}$			<u>3,357</u>	$\frac{1}{1}$		<u>1,380</u>		$\frac{3}{3}$			<u>4,737</u>
<u>Total Wells</u>		5				1				6		
<u>Total Bbls</u>		90								90		
<u>Total Feet</u>		7,612				1,380				8,992		
<u>Per Cent Dry</u>	- 50.0											

GRAND TOTALS

<u>Wells</u>	515	582	1,097
<u>MCF</u>	84,824	52,492	137,316
<u>Bbls</u>	10,402	17,745	28,147
<u>Footage</u>	1,020,843	1,082,107	2,102,950

**ANNUAL WELL COMPLETIONS; OIL AND GAS PRODUCTION,
RESERVES; AND GAS CONSUMPTION DATA,
AND 1953 CRUDE OIL PRICES**

TABLE VIII
 NUMBER AND PERCENTAGE OF WELL COMPLETIONS IN OHIO*
 1944 - 1953

YEAR	GAS WELLS		OIL WELLS		COMBINATION ^a		DRY HOLES		TOTAL
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	
1944	478	45.96	169	16.25			393	37.79	1,040
1945	429	41.49	220	21.28			385	37.23	1,034
1946	547	42.30	338	26.14			408	31.56	1,293
1947	582	42.08	317	22.92			484	35.00	1,383
1948	428	29.42	493	33.88			534	36.70	1,455
1949	292	27.76	254	24.14	80	7.60	426	40.50	1,052
1950	284	24.87	282	24.69	100	8.76	476	41.68	1,142
1951	240	22.62	315	29.69	71	6.69	435	41.00	1,061
1952	218	19.12	392	34.39	60	5.26	470	41.23	1,140
1953	181	16.50	466	42.48	64	5.83	386	35.19	1,097
Total or Wts. Average	3,679	31.44	3,246	27.75	375	6.83	4,397	37.59	11,697

* Wells drilled deeper, for gas storage or secondary oil recovery not included.

a Included in oil or gas prior to 1949.

b Percentage for years reported.

TABLE IX
ANNUAL NATURAL GAS PRODUCTION, CONSUMPTION
AND RESERVES IN OHIO
1945 - 1953

YEAR	PRODUCTION* Million Cubic Feet	CONSUMPTION** Million Cubic Feet	RESERVES AS OF DEC. 31 ⁺ Million Cubic Feet
1945		172,258	626,800
1946	59,000	188,527	614,000
1947	74,000	221,571	611,200
1948	60,732	236,137	581,108
1949	47,000	246,212	585,597
1950	47,200	324,594	585,048
1951	41,400	375,820	658,439
1952	32,000		697,517
1953	31,280		592,831

* From A. G. A.

** From U. S. Bureau of Mines.

+ Exclusive of underground storage.



TABLE X
ANNUAL CRUDE OIL PRODUCTION IN OHIO*
 1945 - 1953

<u>YEAR</u>	<u>CRUDE OIL PRODUCTION</u> Thousand Bbls.	<u>NUMBER OF OIL WELLS</u>	<u>AVERAGE PRODUCTION PER WELLS - Bbls.</u>	<u>CRUDE OIL RESERVES</u> Thousand Bbls.
1945	3,012			29,681
1946	3,508	22,972	153	29,220
1947	3,618	21,790	166	28,994
1948	3,906	21,439	182	28,542
1949	3,485	20,034	174	27,703
1950	3,314	18,587	178	27,264
1951	3,141	18,211	172	26,436
1952	3,350	16,226	206	27,390
1953	3,695	15,345	241	31,826

* From A. P. I.

TABLE XI
ANNUAL CONDENSATE PRODUCTION IN OHIO*
 1947 - 1953

<u>YEAR</u>	<u>PRODUCTION</u> Thousand Bbls.	<u>DISCOVERIES & REVISIONS</u> Thousand Bbls.	<u>RESERVES</u> Thousand Bbls.
1946	143		1,714
1947	167	189	1,736
1948	151	79	1,664
1949	126	132	1,670
1950	102	120	1,688
1951	22	44	1,710
1952	37	105	1,778
1953	11	408	1,359

* From A. P. I. Includes condensate, natural gasoline, and liquified petroleum gases.

TABLE XII
OIL PRODUCTION IN OHIO - BY GRADES*
Thousand Barrels

<u>YEAR</u>	<u>BUCKEYE- PENNSYLVANIA</u>	<u>ZANESVILLE**</u>	<u>CORNING</u>	<u>LIMA</u>	<u>CLEVELAND- CHATHAM</u>	<u>TOTAL</u>
1944	1,656		810	205	382	3,053
1945	1,507		815	365	325	3,012
1946	2,063		757	396	292	3,508
1947	2,401		724	208	285	3,618
1948	2,625		804	201	276	3,906
1949	1,726	307	966	176	310	3,485
1950	1,574	261	1,029	139	311	3,315
1951	1,332	234	1,163	118	294	3,141
1952	1,181	204	1,513	184	268	3,350
1953	1,104	177	1,937	207	270	3,695

* From A. P. I.

** Included in Buckeye-Pennsylvania or Corning prior to 1949.

TABLE XIII
CRUDE OIL PRICES IN OHIO DURING 1953 -
BY GRADES

<u>DATE OF CHANGE</u>	<u>BUCKEYE- PENNSYLVANIA</u>	<u>ZANESVILLE</u>	<u>CORNING</u>	<u>LIMA</u>	<u>CLEVELAND- CHATHAM</u>
1-1-53	\$ 3.76	\$ 3.10	\$ 2.62	\$ 2.40	\$ 2.60
2-16-53	3.91	3.20			
6-15-53				2.50	2.70
6-16-53			2.72		
8-1-53	4.04				
9-21-53	3.54				
9-22-53		2.90			
1-1-54	3.24	2.75			

P A R T II

THE DEVELOPMENT OF UNDERGROUND STORAGE IN OHIO

by

J. J. Schmidt
K. C. Cottingham

ROTARY VS CABLE TOOL DRILLING IN OHIO

by

Robert L. Alkire

OIL, GAS, AND WATER CUTTINGS RECEIVED DURING 1953

THE DEVELOPMENT OF UNDERGROUND STORAGE IN OHIO

by

J. J. Schmidt
East Ohio Gas Company, Cleveland

K. C. Cottingham
Ohio Fuel Gas Company, Columbus

To anyone connected with the gas industry, the principle of gas storage is well known. If he has been engaged in the industry for any length of time, he will remember the days of gas holders, both the lift and the later waterless or piston type. He will be familiar with the practice, still in use, of "packing" transmission lines during the night in anticipation of a cold day to follow, and he will understand that, even in the old days, facilities such as lines and compressors could not be "overbuilt" in capacity to provide for short-period demands, such as that at breakfast time, to be only partially used during slack hours that followed. He will know that, in order to hold costs within the economy of both customer and supplier, investment in equipment and general plant was kept within reasonable bounds.

In former days, as they are today, systems were designed for anticipated daily requirements. In those briefer periods in morning and evening and on extreme days of winter, when sharp peaks occurred, the increased demand was usually provided by some form of temporary storage. In the past, however, consumer requirements were far less than they are today. Furthermore, sources were not so far distant, the fields were under higher pressure, and they were less depleted. In the Appalachian region, most of those nearby fields in fact have been entirely depleted of gas and are now abandoned.

One consideration usually overlooked by the consumer is the time required to move gas from source to destination. The velocity of gas flowing through a line is governed by a number of factors, the most important of which for a given length of line are the diameter of the pipe and the pressures at points of origin and terminus. It might be said as an approximation that the large lines from the southwest, with compressor stations interspersed every 85 miles or so, move their volumes at about 35 miles per hour. In ramifying transmission lines supplying a more densely populated area, the velocity with which gas is moved is considerably less. From this it is evident that, to transmit gas across Ohio from the Ohio River to Lake Erie through the network of lines supplying Ohio consumers, several hours might be required. So again, in order to expedite the required volumes brought from distant sources, some kind of nearby large storage is essential.

Ohio has always been one of the important gas-consuming States, for many years ranking fifth in point of consumption. Until recent years, Ohio wells supplied a large portion of the demand though never, even in the early days, was Ohio gas sufficient to meet the entire consumer requirement. In 1907, for instance, Ohio wells furnished 63 percent of Ohio's consumer demand, while in 1951 that proportion was only 10 percent. In the period 1906-1951 inclusive, the average proportion supplied by Ohio wells was 37 percent. During the period 1906-1952, the quantity produced from Ohio wells averaged about 53 billion cubic feet per year, the maximum of 80 billion being reached in 1915. Yet in 1952 the production was 41 billion, so that depletion of Ohio production is not as extreme as sometimes assumed. As a producing State, Ohio for many years was in tenth place, though in recent years it has dropped to thirteenth.

Ohio's production, therefore, was and still is important. As a gas-consuming State, on the other hand, Ohio has moved into fourth place, surpassed only by Texas, California, and Louisiana in that order. It is the great increase in Ohio's consumption of natural gas, which

has grown from 83 billion cubic feet in 1907 to 376 billion in 1952, that has dwarfed the importance of Ohio's production in the opinion of the average person.

Because of consumer requirements, then, Ohio always has imported a large portion of its annual supply, most of such gas until recent years coming from West Virginia. Prior to the early Forties, the Appalachian states as a group were self-sufficient because some had a supply far in excess of their individual needs. For the five Appalachian producing States, namely Kentucky, New York, Ohio, Pennsylvania, and West Virginia, aggregate consumption for the 5-year period 1940-1944 averaged 427 billion cubic feet per year, with the gas being supplied almost entirely from the combined resources of those States. However, a rapidly increasing demand began in 1945, climbing from 466 billion in that year to more than 1 trillion cubic feet in 1951, and this was largely supplied by western sources.

For reasons mentioned previously, particularly the widely varying rate of consumption, both daily and seasonal, some provision was necessary to hold reserve supplies in readiness close to the consuming areas. In the distribution of other commodities, it is recognized that somewhere between the point of manufacture and the customer the article must be "warehoused" in order that the routine of production can be geared to the sporadic tendency of the market. Not only does this result in a lower cost of the product, but it also assures the customer of a more convenient and dependable supply. Because of the nature of natural gas as a commodity, and because of the large volumes and consequent high pressures, some form of underground storage seemed to be the solution.

Underground storage of natural gas is not new. Probably the earliest storage was that in Welland County, Ontario, in 1915. In the Zoar field, south of Buffalo, gas was stored in the Onondaga limestone beginning in 1916. Since that time, natural gas has been stored in various rock reservoirs in this country. There is an interesting reference in the literature on oil and gas production to the storage of compressed air in a depleted formation. Near Chanute, Kansas, beginning in the year 1903, air was compressed and injected through a depleted gas well into a sandstone lying at a depth of 800 feet. The air was used to operate, probably as air lift, adjacent oil wells. The reservoir pressure was said to have been raised from 115 to 290 pounds during the 7 years of operation, during which time the rock reservoir was used as a large air receiver.*

In the development of many new practices, it is frequently difficult to differentiate cause from effect or to make a proper separation of the contribution each has made. This is particularly true in the development of underground storage as we know it today. If, in recent years, there had been no large sources of natural gas, of course there could have been no possibility of supplying growing demands. On the other hand, if there had been no latent desire for natural gas on the part of more and more customers, there would have been little incentive to join sources and distant markets. Following the late Twenties, large gas reserves were discovered in the Southwest for which, at the time, there was but a limited market. This was a situation conducive to waste, as had been proved many times in the past. But, to convey gas from those reserves hundreds of miles eastward, it was necessary that entirely new techniques and practices be developed.

These new procedures were varied. Certainly, in constructing long transmission lines, metallurgical advancement, particularly that improving pipe strength, was vital. New and rapid welding processes were important, for without welded lines, leakage and maintenance would both have been excessive. Wrapping and coating of pipe were perfected to save metal from corrosion, and various types of cathodic protection were designed to prevent electrolysis. Ditching and backfilling equipment was built for the particular requirements of long lines, engineering and construction methods were improved, and even the execution of the undertaking—the business of co-ordinating work of various contractors in separate "spreads"—was a contribution. New compressors, working at much higher pressures and improved efficiencies,

*Transactions A. I. M. M. E., Vol. LXI, 1920, pp. 621-623, I. N. Knapp. Recently, some additional information concerning the location of this undertaking was obtained from Mr. Arthur Knapp, the son of Mr. I. N. Knapp.

was a further important development without which distant transmission would have been difficult or impossible.

On the other hand, many developments affected the situation from the standpoint of the consumer. Among these was the trend toward more compact housing, the use of effective building insulation, heating equipment improved not only in space required and in efficiency, but adapted to installation in any part of the dwelling, and the convenience of automatic controls. There were many other factors of consequence, not the least of which was cleanliness, the dependability of service, and finally, the considerable price differential when compared to other fuels.

It is not intended in the present discussion to recount the individual characteristics or detailed operating methods for the various storage projects now in use in Ohio. The average reader is familiar with the Clinton sand, in which most of Ohio's gas is stored. He knows that western gas is stored during the summer - usually between May 1 and November 1 - and that gas is removed to meet peaks occurring in the opposing winter cycle. A substantial volume, in the form either of native reserves or injected gas, must remain in the reservoir to give sufficient pressure-volume relationship to assure satisfactory daily deliverability. For this reason it may happen, particularly in reservoirs largely depleted of the original gas, that two or three seasons of input must be gone through before the operation reaches effective output.

The rock reservoirs, especially those in the Clinton sandstone, are traps either of the stratigraphic, the variable permeability type, or a combination of both. The stratigraphic traps are sand strata or bodies having pinched out edges of permeable Clinton sandstone, all enveloped in impervious shale. The variable permeability type is usually porous rock surrounded by hard and impermeable sandstone in which the interstices between grains have been cemented or otherwise sealed. Table I shows the number of reservoirs, storage wells, capacities, etc., for the Appalachian states and for the United States as a whole at the end of 1952. Table II shows the annual quantities stored, removed, and the balance in storage at the end of each year since storage began for all underground storage in Ohio.

In any discussion of the future of natural gas, one of the questions most frequently asked refers to the remaining reserves and life of production. Even the uninformed know that natural gas is not generated in the rocks rapidly enough to have any significance with respect to current production. On the other hand, there is always a possibility of discovering petroleum or natural gas in sedimentary rocks, particularly if certain conditions are fulfilled and some beds are above average in porosity. In the matter of future life in years, a frequent error is to divide the reserves of a given year by the production for that year, with a resulting quotient of "equivalent years" which is mistakenly regarded as remaining life.

The fallacy of this reasoning is well demonstrated in Table III, which shows the annual proved reserves and production for the 7-year period 1946 to 1952 inclusive. Referring to the Appalachian states as an example, the "equivalent years" quotient gives, in 1946, approximately 10 years future. Continuing across to the year 1952, however, we see that, after 6 years of production, the reserves indicate an "equivalent year" ratio of about 11. For the 7 years shown, 46 trillion cubic feet has been produced in the United States, but 98 trillion was added by new discoveries. In other words, additions by new discoveries will for many years offset, and in some states more than compensate, the quantity produced. Even in Ohio, where admittedly both difficulty of success and exploration costs have greatly increased, there will be discoveries from time to time. While Ohio is not shown separately in Table III, the total production for 1946-1952 inclusive was 362 billion cubic feet, while the reserves added in that period were 363 billion. The Ohio proved reserves at the end of 1952, exclusive of volumes held in underground storage, were 593 billion cubic feet.

In brief, then, though large quantities of gas are available in the Southwest as underground reserves, they cannot be transported coincidentally at a daily rate sufficient for Ohio's winter demand. The western lines entering Ohio are large, ranging in diameters from 16 to 30 inches; nevertheless, despite their sizes, they have far too little capacity to supply Ohio and the other Appalachian states on a direct daily basis. The construction of lines, compressor stations, and

other facilities of sufficient capacity to supply Ohio consumers directly from western sources would result in such huge investment that the cost of gas to the customer would necessarily be extremely high. In effect, underground storage brings the remote sources of supply to the vicinity of the consumer, and summertime day-by-day transportation of distant gas makes possible the storage of large volumes for use in the winter. The advantage to the customer, from the standpoint of the reduced cost of gas he uses, is readily apparent.

Underground storage improves Ohio's general economy. Rental from leases and wells is a dependable part of the income to those landowners having property over the storage reservoirs. But most particularly, the consumer, not only he who heats with gas, who is most directly benefited, but also the industrial user, should realize the tremendous importance to him of underground storage, for without such storage, supplying the customer in Ohio during the winter would be an impossibility.

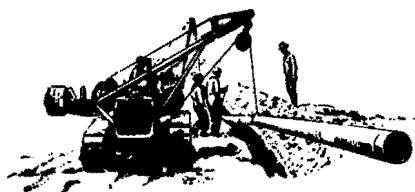


TABLE I
UNDERGROUND STORAGE IN APPALACHIAN STATES
YEAR 1952*

State	Number of Pools	Number of Wells	Maximum Volume In Storage (MCF)	Estimated Daily Deliverability Year Ending 10-31-52 (MCF)	Ultimate Reservoir Capacity (MCF)
Kentucky	4	202	17,755,325	97,786	24,748,000
New York	14	276	23,438,315	125,063	29,066,587
Ohio	10	1,392	144,586,701	698,896	215,483,699
Pennsylvania	55	1,281	181,837,208	875,658	300,251,043
West Virginia	24	388	129,388,930	921,341	165,477,953
Total Appalachian States	107	3,539	497,006,479	2,718,744	735,027,282
Total All Other States	44	1,401	279,996,917	1,382,463	557,293,738
Total United States	151	4,940	777,003,396	4,101,207	1,292,321,020

* Adapted from "Underground Storage of Gas in U. S.," Second Annual Report on Statistics, Committee On Underground Storage, American Gas Association.

TABLE II
STATE OF OHIO
UNDERGROUND STORAGE
Volumes Injected, Withdrawn, and Year-End Balances
(All Quantities In MCF)

<u>Year</u>	<u>Input During Year</u>	<u>Output During Year</u>	<u>Total Volume In Storage On December 31</u>
1936	1,320,732	14,364	1,306,368
1937	6,203,404	1,193,274	6,316,498
1938	6,188,319	2,655,893	9,848,924
1939	5,563,285	4,893,136	10,519,073
1940	7,624,129	3,918,090	14,225,112
1941	8,466,842	4,465,964	18,225,990
1942	9,897,538	7,165,547	20,957,981
1943	10,677,672	10,360,304	21,275,349
1944	13,372,319	10,177,109	24,470,559
1945	14,004,138	9,475,533	28,999,164
1946	14,381,974	10,437,529	32,943,609
1947	17,858,548	15,781,748	35,020,409
1948	27,369,390	14,043,905	48,345,894
1949	34,289,866	15,660,986	66,974,774
1950	43,506,553	36,666,750	73,814,577
1951	64,120,470	33,516,996	104,418,051
1952	68,551,066	34,585,223	138,383,894
1953	64,366,948	41,446,849	161,303,993

TABLE III

**PROVED NATURAL GAS RESERVES IN UNITED STATES
(EXCLUDING UNDERGROUND STORAGE)**

Summarized from Annual Reports, American Gas Association, Committee Natural Gas Reserves
(Volumes Million Cubic Feet)

<u>District</u>	<u>Changes in Reserves</u>	<u>1946</u>	<u>1947</u>	<u>1948</u>	<u>1949</u>	<u>1950</u>	<u>1951</u>	<u>1952</u>	<u>Total</u>
Appalachian States	Reserves January 1	4,587,900	4,412,900	4,319,378	4,389,560	4,307,075	4,213,522	4,141,984	
	Reserves Added During Year	269,000	380,478	503,962	308,215	312,247	350,262	359,398	2,483,562
	Volume Produced	444,000	474,000	433,780	390,700	405,800	421,800	372,600	2,942,680
	Reserves December 31	4,412,900	4,319,378	4,389,560	4,307,075	4,213,522	4,141,984	4,128,782	
Southwestern States	Reserves January 1	123,494,471	135,562,173	141,867,340	147,929,757	154,095,992	158,866,047	162,330,365	
	Reserves Added During Year	15,656,500	10,414,059	10,538,610	10,955,243	10,213,402	9,920,648	10,203,361	77,901,823
	Volume Produced	3,588,798	4,108,892	4,476,193	4,789,008	5,443,347	6,456,330	7,071,915	35,934,483
	Reserves December 31	135,562,173	141,867,340	147,929,757	154,095,992	158,866,047	162,330,365	165,461,811	
Balance United States	Reserves January 1	19,706,995	20,600,828	19,740,196	21,498,541	21,844,049	22,324,601	27,017,871	
	Reserves Added During Year	1,803,652	186,287	2,856,000	1,410,841	1,524,083	5,782,081	3,782,754	17,345,698
	Volume Produced	909,819	1,046,919	1,097,655	1,065,333	1,043,531	1,088,811	1,195,123	7,447,191
	Reserves December 31	20,600,828	19,740,196	21,498,541	21,844,049	22,324,601	27,017,871	29,605,502	
Entire United States	Reserves January 1	147,789,366	160,575,901	165,926,914	173,817,858	180,247,116	185,404,170	193,490,220	
	Reserves Added During Year	17,729,152	10,980,824	13,898,572	12,674,299	12,049,732	16,052,991	14,345,513	97,731,083
	Volume Produced	4,942,617	5,629,811	6,007,628	6,245,041	6,892,678	7,966,941	8,639,638	46,324,354
	Reserves December 31	160,575,901	165,926,914	173,817,858	180,247,116	185,404,170	193,490,220	199,196,095	

Appalachian States - Kentucky, New York, Ohio, Pennsylvania, West Virginia.

Southwestern States - Kansas, Louisiana, Mississippi, Oklahoma, Texas.

Balance U. S. - For year 1952 includes Arkansas, California, Colorado, Illinois, Indiana, Michigan, Montana, Nebraska, New Mexico, Utah, Wyoming, and minor volumes for Alabama, Florida, Maryland, Missouri, North Dakota, and Virginia.

ROTARY VS CABLE TOOL DRILLING IN OHIO

by

Robert L. Alkire

The first deep well drilled in Ohio by the rotary method was completed in 1945, to a total depth of 7,455 feet through the Medina sand, by The Texas Company, on the Lillie Gillespie farm in Section 4, Union Township, Belmont County. In 1947 the Ohio Oil Company completed a test to the basement complex, 3,361 feet, on the Virgil Johns farm in Tract 9930, McArthur Township, Logan County. Neither of these wells offered sufficient evidence whereby a just comparison could be made between rotary and cable tool drilling costs.

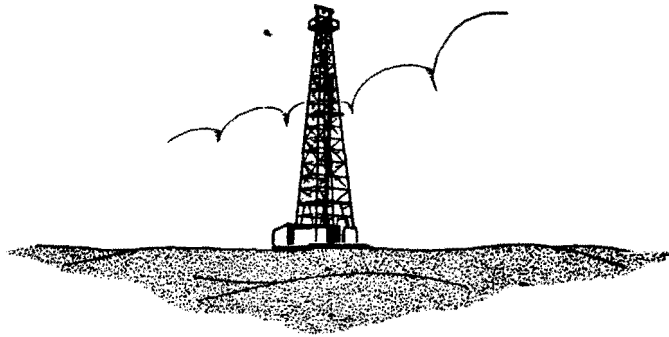
The initial attempt to establish rotary in competition with cable tool in Ohio occurred during the rapid development of the Canton gas pool in Stark County in 1947. High initial volumes and close well spacing induced several operators to bring in rotary rigs in the hope of lessening the 60 to 80 days drilling time required by cable tool to reach the Clinton sand. The drilling time, to a depth of approximately 4,500 feet, was reduced to 30 to 40 days, but increased costs were evident. In completing these wells, the rotary machine was moved off when the top of the Clinton was reached and a cable tool spudder moved in to drill through the sand. This was done so that the sand could be drilled clean and any oil or gas show readily recognized. A suitable shot of nitro-glycerine was then used to increase natural production. In reviewing his experiences as a rotary contractor in the Canton pool, Noah Andrews, Union Drilling and Producing Company, Mt. Pleasant, Michigan, stated in a paper given at the meeting of the Eastern District API Division of Production in 1947, that "in order to operate profitably it will be necessary to get \$4.25 per foot drilled, and until such time as this is forth-coming, the cable tool contractors need have no concern about rotaries in Ohio."

During 1953, six Clinton sand rotary wells were completed in Coshocton and Knox counties, at an average depth of 3,100 feet. Normal drilling time was found to be 8 days, an average of 6 bits were needed, as much as 900 feet of shale or 200 feet of limestone could be penetrated a day with one bit, 10 to 15 drill collars were advisable in drilling the "Big Lime," and there were no mud difficulties or serious losses of circulation. The drilling program allowed for 50 feet of 10 inch, a possible 900 feet of 6-5/8 inch, and 3,100 feet of 5-3/16-inch casing. In completion, after electric or gamma ray logging, the 5-3/16-inch casing was set on bottom and cemented a suitable distance above the Clinton sand. The lower pay section was gun-perforated and subjected to hydraulic fracture. A plug was then set below the upper pay and the perforation and fracture procedure repeated.

Comparing Mr. Andrews' experience with the recent operations, there appears to be considerable improvement in drilling time, especially in the "Big Lime" section, and a sizable reduction in the number of bits required. The increase in drilling speed and the extended bit life are probably due to additional drill collars and to recent improvements in hard-rock bits. Both would have considerable effect on the cost per foot drilled and thereby improve the competitive position of rotary drilling. The general acceptance of hydraulic fracturing may also affect rotary operations favorably. The present practice in cable tool completions is to cement the casing in the top of the sand and expose the entire sand section, which usually contains some shale, to the fracture treatment. Whether or not the fracture occurs in the pay zone is not known. A number of processes are being used in an effort to more definitely confine the zone of fracture, but they have met with numerous difficulties and variable success. In rotary operations, an electric or gamma ray log defines the pay zones and the fracture treatments are directed into them through the perforations.

Whether or not rotary operations are now competitive with cable tool in Ohio can best be determined by additional drilling. It is generally recognized that the cost per foot drilled by rotary will probably remain above cable tool. But this difference may be overcome by the

considerable decrease in drilling time, the reduced casing program, and the improved completion practice which rotary has to offer. In addition, the widespread application of electric or gamma ray logs will furnish a new and valuable source of information for studies toward a better understanding of oil and gas accumulations in the Clinton sand, as well as other productive horizons in Ohio.



OIL, GAS, AND WATER WELL CUTTINGS
RECEIVED DURING 1953

Athens County

Canaan Twp., Sec. 18, Sample No. 590
Carpenter & Glazier #18 Phillips
Date Completed: 10-20-52, Total Depth: 245
Sample Range: 75-245 - 50 Samples
Samples Missing: None
Geologic Sample Range: Surface-Cow Run
Division of Mines No.: 1,049

Troy Twp., Sec. 3, Sample No. 579
B. H. Putnam #1 W. C. Wilson
Date Completed: 9-3-51, Total Depth: 4,231
Sample Range: 240-1,707 - 173 Samples
Samples Missing: 1,530-1,567, 1,576-1,707
Geologic Sample Range: Pennsylvanian-Cuyahoga
Division of Mines No.: 1,027

Troy Twp., Sec. 3, Sample No. 580
B. H. Putnam #2 W. C. Wilson
Date Completed: 10-28-51, Total Depth: 4,265
Sample Range: 1,530-3,837 - 227 Samples
Samples Missing: 0-1,530, 1,567-1,576,
1,707-1,716, 1,988-1,998, 3,837-4,265
Geologic Sample Range: Cuyahoga-Ohio Shale
Division of Mines No.: 1,033

Clark County

Springfield Twp., Sample No. 574
In Tag Company plant
Date Completed: -- , Total Depth: 240
Sample Range: 29-240 - 61 Samples
Samples Missing: None
Geologic Sample Range: Surface-Cincinnatian
Division of Water No.: None

Coshocton County

Bethlehem Twp., 2nd Qtr., Sample No. 582
J. I. Shearer #1 Charles E. Fox
Date Completed: 11-24-52, Total Depth: 3,424
Sample Range: 3,274-3,424 - 20 Samples
Samples Missing: 3,395-3,405
Geologic Sample Range: Medina Group
Division of Mines No.: 449

Bethlehem Twp., 2nd Qtr., Sample No. 609
National Gas & Oil #2 C. G. Conrad
Date Completed: 8-6-53, Total Depth: 3,382
Sample Range: 0-3,382 - 298 Samples
Samples Missing: 90-120, 147-156, 460-470,
727-736, 1,243-1,254, 1-703-1,714, 1,736-

1,747, 2,126-2,138, 2,719-2,734, 2,863-
2,883, 2,897-2,912, 3,008-3,013, 3,077-
3,086, 3,302-3,319

Geologic Sample Range: Surface-Medina Group
Division of Mines No.: 541

Perry Twp., Sec. 15, Sample No. 589
Leonard Blood #1 Clay Totten
Date Completed: 4-14-53, Total Depth: 3,116
Sample Range: 700-3,116 - 178 Samples
Samples Missing: 820-830, 1,000-1,190,
1,200-1,700, 1,790-1,810, 2,040-2,050,
2,670-2,680, 2,730-2,740, 2,790-2,800,
2,900-2,910, 3,080-3,085
Geologic Sample Range: Cuyahoga-Medina Gr.
Division of Mines No.: 522

Cuyahoga County

Highland Hts. Twp., Sample No. 596
Benedum Trees Oil Co. #1 J. Whitbeck
Date Completed: 7-29-39, Total Depth: 3,929
Sample Range: 2,675-3,870 - 126 Samples
Samples Missing: 3,090-3,097, 3,167-3,177,
3,180-3,190, 3,205-3,210, 3,291-3,297
Geologic Sample Range: Bass Island-Cincinnatian
Division of Mines No.: None

Highland Hts. Twp., Lot 24, Sample No. 599
Benedum Trees Oil Co. #1 W. Wise
Date Completed: 1-2-39, Total Depth: 2,818
Sample Range: 85-2,765 - 283 Samples
Samples Missing: 95-103, 158-170, 1,890-
1,900, 1,993-1,999, 2,120-2,130, 2,235-
2,249, 2,349-2,367, 2,550-2,560, 2,683-
2,690, 2,700-2,710, 2,729-2,735
Geologic Sample Range: Ohio Shale-Niagara
Division of Mines No.: None

Mayfield Hts. Twp., Sample No. 597
Greenwood #1 Benedum-Trees Oil Co.
Date Completed: 3-28-40, Total Depth: 3,886
Sample Range: 2,871-3,886 - 106 Samples
Samples Missing: 3,854-3,867
Geologic Sample Range: Niagara-Cincinnatian
Division of Mines No.: None

Delaware County

Oxford Twp., Sample No. 592
Water well, Village of Ashley
Date Completed: -- , Total Depth: --
Sample Range: 15-210 - 36 Samples
Samples Missing: 0-10, 85-95, 210-238
Geologic Sample Range: Surface-Columbus
Division of Water No.: None

Hancock County

Allen Twp., Sec. 36, Sample No. 570
Ohio Oil Co. #3 J. C. Kagy
Date Completed: 11-14-52, Total Depth: 1,364
Sample Range: 100-1,364 - 165 Samples
Samples Missing: 220-230, 1,300-1,302,
1,309-1,311, 1,344-1,348
Geologic Sample Range: Bass Is. -Black River
Division of Mines No.: 43

Liberty Twp., Sec. 9, Sample No. 571
Ohio Oil Co. #2 Virgil Boyd
Date Completed: 11-6-52, Total Depth: 1,334
Sample Range: 40-1,334 - 133 Samples
Samples Missing: 200-210, 340-350, 620-650,
1,080-1,250, 1,270-1,274
Geologic Sample Range: Bass Is. - Trenton
Division of Mines No.: 44

Liberty Twp., Sec. 8, Sample No. 572
Ohio Oil Co. #1 L. M. Hardy
Date Completed: 10-27-52, Total Depth: 1,392
Sample Range: 72-1,391 - 164 Samples
Samples Missing: 200-210, 240-250, 1,000-
1,010, 1,280-1,285
Geologic Sample Range: Bass Is. - Trenton
Division of Mines No.: 45

Hardin County

Lynn Twp., Lot. 13938, Sample No. 581
Scioto Valley Oil Co. #1 L. & E. Laubie
Date Completed: 8-17-51, Total Depth: 1,907
Sample Range: 1,340-1,907 - 107 Samples
Samples Missing: None
Geologic Sample Range: Cincinnati-Cambrian
Division of Mines No.: 48

Hocking County

Falls Twp., Sec. 20, Sample No. 594
Northern Ordinance, Inc. #1 Roy B. Funk
Date Completed: 3-21-44?, Total Depth: 2,526
Sample Range: 572-2,520 - 230 Samples
Samples Missing: 649-661, 1,036-1,044,
1,698-1,704, 1,766-1,772, 2,106-2,112,
2,132-2,138, 2,170-2,189, 2,267-2,288,
2,442-2,475, 2,490-2,495
Geologic Sample Range: Cuyahoga-Medina Gr.
Division of Mines No.: None

Falls Twp., Sec. 35, Sample No. 606
W. C. Adair & Co. #1 Harry Mount
Date Completed: 9-4-53, Total Depth: 2,826
Sample Range: 0-2,815 - 326 Samples
Samples Missing: 2,356-2,370, 2,418-2,424,
2,815-2,824
Geologic Sample Range: Surface-Medina Gr.
Division of Mines No.: 394

Jackson County

Scioto Twp., Sec. 19, Sample No. 569
C. L. Williams #1 Arby Murray
Date Completed: 11-30-53, Total Depth: 3,800
Sample Range: 0-3,800 - 763 Samples
Samples Missing: 255-260, 430-435, 690-695,
930-935, 1,990-1,995, 2,147-2,150, 2,890-
2,895, 3,003-3,038, 3,662-3,670
Geologic Sample Range: Surface-Prairie Du
Chemin
Division of Mines No.: 48

Scioto Twp., Sec. 36, Sample No. 605
Sidney Frohman #1 C. E. Blair
Date Completed: 8-27-53, Total Depth: 650
Sample Range: 20-580 - 99 Samples
Samples Missing: 330-335, 355-360, 506-512,
517-520, 556-562
Geologic Sample Range: Cuyahoga-Berea
Division of Mines No.: 50

Knox County

Jackson Twp., Sec. 22, Sample No. 588
Leonard Blood #4 E. G. Miller
Date Completed: 3-22-53, Total Depth: 2,921
Sample Range: 100-2,921 - 237 Samples
Samples Missing: 110-130, 190-395, 455-485,
675-685, 865-885, 995-1,005, 1,115-1,120,
1,250-1,270, 1,280-1,290, 1,300-1,320,
1,640-1,650, 1,810-1,830, 2,090-2,120,
2,130-2,140, 2,540-2,550, 2,560-2,570,
2,610-2,620, 2,680-2,690, 2,875-2,900,
2,905-2,921
Geologic Sample Range: Cuyahoga-Medina Gr.
Division of Mines No.: 800

Pleasant Twp., Lot 18, Sample No. 603
Harry Perkins #2 Frank Hall
Date Completed: 8-14-53, Total Depth: 4,617
Sample Range: 3,010-4,600 - 48 Samples
Samples Missing: 3,018-3,060, 3,070-3,175,
3,200-3,400, 3,425-3,475, 3,500-3,780,
3,875-3,935, 3,945-3,965, 3,975-3,993,
4,035-4,062, 4,075-4,122, 4,134-4,150,
4,160-4,232, 4,267-4,282
Geologic Sample Range: Cincinnati-Cambrian
Division of Mines No.: 757

Lake County

Concord Twp., L.15, 4th Qtr., Sample No. 602
East Ohio Gas Co. #1 S. L. Mather
Date Completed: 10-17-40, Total Depth: 3,626
Sample Range: 688-3,626 - 383 Samples
Samples Missing: 1,583-1,662, 1,927-1,934,
2,373-2,394, 2,435-2,450, 2,480-2,485,
2,722-2,735, 2,934-2,944, 3,186-3,191,
3,240-3,245
Geologic Sample Range: Ohio Sh. -Cincinnati
Division of Mines No.: 2

Lawrence County

Elizabeth Twp., Sec. 4, Sample No. 566
 Dow Chemical Co. #4 Dow Chemical Co.
 (Ironton Brine)
 Date Completed: 2-9-53, Total Depth: 2,340
 Sample Range: 72-2,300 - 269 Samples
 Samples Missing: 480-490, 1,470-1,480,
 1,530-1,540, 1,800-1,805, 1,835-1,840,
 1,860-1,865, 2,025-2,030, 2,070-2,075,
 2,125-2,130, 2,300-2,340
 Geologic Sample Range: Surface-Niagara
 Division of Mines No.: 162

Hamilton Twp., Sec. 5, Sample No. 554
 Dow Chemical Co. #2 Dow Chemical Co.
 (Steenbergen Fee)
 Date Completed: 12-3-52, Total Depth: 2,031
 Sample Range: 95-2,031 - 400 Samples
 Samples Missing: 1,265-1,275
 Geologic Sample Range: Pennsylvanian -
 Clinton Group
 Division of Mines No.: 159

Lawrence Twp., Sec. 14, Sample No. 591
 Ashland Oil & Refining Co. #1 Geo. Hartwig
 Date Completed: 3-7-53, Total Depth: 3,451
 Sample Range: 1,694-3,451 - 236 Samples
 Samples Missing: 2,400-2,410, 2,432-2,440,
 2,457-2,475, 3,041-3,046
 Geologic Sample Range: Ohio Sh. -Medina Gr.
 Division of Mines No.: 153

Licking County

Hanover Twp., L. 2, 1st Qtr., Sample No. 610
 Pure Oil Co. #3 S. M. Romine
 Date Completed: 8-22-53, Total Depth: 2,954
 Sample Range: 60-2,954 - 257 Samples
 Samples Missing: 478-488, 1,500-1,508
 Geologic Sample Range: Logan-Medina Group
 Division of Mines No.: 1,020

Marion County

Marion Twp., Sec. 19, Sample No. 585
 Marion Water Works (#43628)
 Date Completed: 6-15-50, Total Depth: 183
 Sample Range: 44-183 - 28 Samples
 Samples Missing: None
 Geologic Sample Range: Bass Island
 Division of Water No.: 317

Marion Twp., Sec. 19, Sample No. 586
 Marion Water Works #28
 Date Completed: - Total Depth: 402
 Sample Range: 41-202 - 33 Samples
 Samples Missing: None
 Geologic Sample Range: Bass Island
 Division of Water No.: None

Pleasant Twp., Sec. 5, Sample No. 584
 George Wood
 Date Completed: 4-20-50, Total Depth: 92
 Sample Range: 50-95 - 9 Samples
 Samples Missing: None
 Geologic Sample Range: Bass Island
 Division of Water No.: 274

Medina County

Spencer Twp., Sec. 6, Sample No. 601
 McCrea & Ditch #2 Clayton Billman
 Date Completed: 12-28-39, Total Depth: 5,071
 Sample Range: 4,115-5,044 - 142 Samples
 Samples Missing: 4,195-4,216, 4,251-4,256,
 4,306-4,311
 Geologic Sample Range: Trenton-Cambrian
 Division of Mines No.: None

Meigs County

Olive Twp., Sec. 7-13, Sample No. 575
 B. H. Putnam #1 A. P. Osborn
 Date Completed: 9-11-51, Total Depth: 4,280
 Sample Range: 312-3,905 - 402 Samples
 Samples Missing: 401-412, 545-550, 1,353-
 1,363, 1,750-1,775, 2,262-2,272, 3,397-
 3,410, 3,839-3,893
 Geologic Sample Range: Pennsylvanian - Ohio
 Shale
 Division of Mines No.: 984

Olive Twp., Sec. 18, Sample No. 578
 B. H. Putnam #1 D. E. Meyers
 Date Completed: 10-2-51, Total Depth: 1,876
 Sample Range: 100-1,865 - 174 Samples
 Samples Missing: 1,620-1,630, 1,720-1,730
 Geologic Sample Range: Pennsylvanian - Ohio
 Shale
 Division of Mines No.: 997

Miami County

Spring Creek Twp., Sample No. 583
 City of Piqua
 Date Completed: - Total Depth: -
 Sample Range: 10-100 - 10 Samples
 Samples Missing: None
 Geologic Sample Range: Medina Group
 Division of Water No.: None

Noble County

Center Twp., Sec. 25, Sample No. 608
 Hope Gas Co. #1 Homer Guiler
 Date Completed: 12-53, Total Depth:
 Sample Range: 30-5,801 - 651 Samples
 Samples Missing: 710-720, 1,240-1,250,
 2,600-2,610, 4,015-4,025, 4,099-4,103,

4,130-4,138, 4,216-4,220, 4,286-4,295
 4,302-4,350, 4,410-4,418, 4,450-4,458
 4,921-4,926, 5,135-5,145, 5,663-5,722
 Geologic Sample Range: Surface-Medina Gr.
 Division of Mines No.: 878

Elk Twp., Sec. 15, Sample No. 607
 Great Lakes Carbon Corp. #1 Herman Pabst
 Date Completed: 10-30-53, Total Depth: 5,080
 Sample Range: 0-5,080 - 547 Samples
 Samples Missing: 745-755, 1,135-1,145,
 3,992-4,011
 Geologic Sample Range: Pennsylvanian-
 Helderberg
 Division of Mines No.: 917

Perry County

Clayton Twp., Sec. 10, Sample No. 595
 Quaker State Oil Ref. Co. #1 James Adrain
 Date Completed: 12-5-46, Total Depth: 3,428
 Sample Range: 170-2,479 - 203 Samples
 Samples Missing: 848-860, 1,022-1,032
 1,793-1,805, 2,479-3,428
 Geologic Sample Range: Pennsylvanian-
 Medina Group
 Division of Mines No.: 896

Pike County

Beaver Twp., Sec. 31, Sample No. 604
 Oxford Oil Co. #1 Frank C. Hines
 Date Completed: 5-9-53, Total Depth: 793
 Sample Range: 310-789 - 98 Samples
 Samples Missing: 370-375, 445-458
 Geologic Sample Range: Ohio Shale
 Division of Mines No.: 2

Scioto County

Bloom Twp., Sec. 35, Sample No. 560
 Dow Chemical Co. #3 Dow Chemical Co.
 (Ironton Brine)
 Date Completed: 1-2-53, Total Depth: 2,027
 Sample Range: 72-2,025 - 218 Samples
 Samples Missing: None
 Geologic Sample Range: Surface to Niagara
 Division of Mines No.: 86

Green Twp., Lot 29, Sample No. 576
 Dow Chemical Co. #5 Dow Chemical Co.
 (Ironton Brine)
 Date Completed: 3-9-53, Total Depth 1,631
 Sample Range: 84-1,629 - 196 Samples
 Samples Missing: 190-200, 1,230-1,235
 1,290-1,300, 1,590-1,595
 Geologic Sample Range: Surface-Niagara
 Division of Mines No.: 87

Stark County

Pike Twp., Sec. 24, Sample No. 593
 M. B. Belden #1 Jennie J. Overly
 Date Completed: 1953, Total Depth:
 Sample Range: 810-6,062 - 347 Samples
 Samples Missing: 1,007-1,012, 1,310-1,332
 1,651-1,685, 1,700-1,735, 1,749-1,759,
 2,000-2,015, 2,031-2,100, 2,140-2,157,
 4,089-4,098
 Geologic Sample Range: Berea-Medina Group
 Division of Mines No.: 937

Washington County

Belpre Twp., Sec. 29, Sample No. 577
 B. H. Putnam #1 J. S. Lamp
 Date Completed: 10-14-51, Total Depth: 4,132
 Sample Range: 111-3,910 - 388 Samples
 Samples Missing: 152-187, 384-506, 1,203-
 1,212, 1,333-1,343, 1,502-1,820, 3,037-
 3,051, 3,148-3,155, 3,865-3,874, 3,910-
 4,122
 Geologic Sample Range: Pennsylvanian-Ohio
 Shale
 Division of Mines No.: 1,311

Wood County

Liberty Twp., Sec. 34, Sample No. 573
 Ohio Oil Co. C. Stockwell (Fee)
 Date Completed: 11-24-52, Total Depth: 1,291
 Sample Range: 20-1,891 - 174 Samples
 Samples Missing: 700-800, 1,182-1,184,
 1,186-1,187, 1,188-1,191, 1,192-1,194,
 1,195-1,197, 1,215-1,217, 1,220-1,222,
 1,251-1,253, 1,255-1,258, 1,291-1,370,
 1,371-1,890
 Geologic Sample Range: Surface-Black River
 Division of Mines No.: 23

Portage Twp., Sec. 36, Sample No. 587
 Eugene Tefft #1 Eugene Tefft
 Date Completed: 1-30-53, Total Depth: 1,210
 Sample Range: 33-1,210 - 153 Samples
 Samples Missing: 180-185, 225-230, 338-344,
 400-415, 499-508
 Geologic Sample Range: Bass Island-Trenton
 Division of Mines No.: 20