

STATE OF MICHIGAN
 DEPARTMENT OF CONSERVATION
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1956
 SUMMARY OF OPERATIONS
 OIL AND GAS FIELDS

BY
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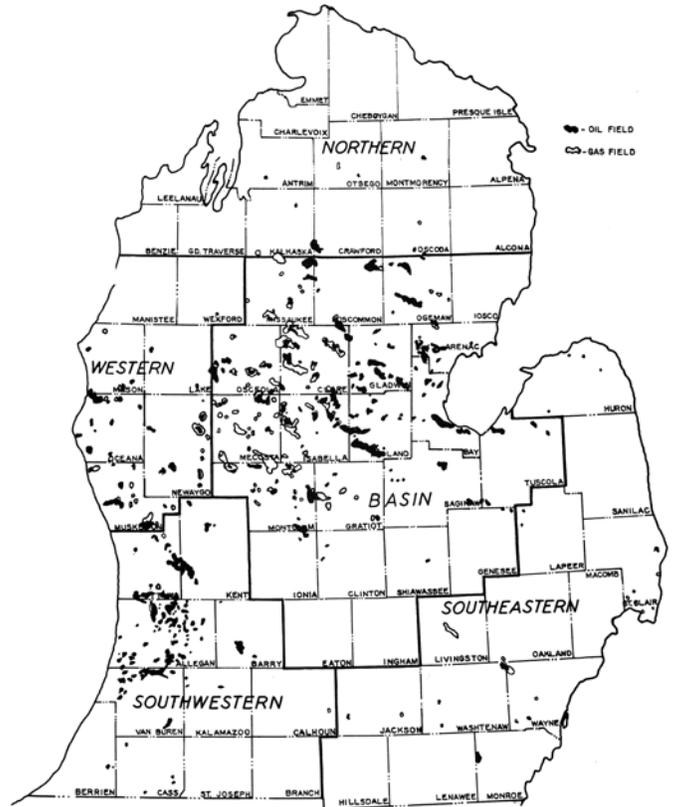
GENERAL ACTIVITIES

(Comparative Statistics 1955-56)

There were 476 drilling permits issued during 1956. Of this number, 448 were for exploratory and development wells and 28 were for service wells. In 1955, permits were issued for 483 exploratory and development wells and one service well. These figures represent a 7.2% decline in exploratory and development well permits from 1955.

In comparison with the permits, completions also registered a noticeable drop from 1955 with a total of 510 for that year as against 463 for 1956. There is, in reality, a difference of 14.5% in the exploratory and development well completions for the two years as 28 were service wells in 1956 and only one was a service well in 1955. Table I is a comparative tabulation of the exploratory and development wells for the two years.

**OIL AND GAS FIELDS
 SOUTHERN PENINSULA OF MICHIGAN
 BY DISTRICTS**



**TABLE I
 COMPARATIVE COMPLETION SUMMARY,
 MICHIGAN, 1955 - 1956 (Inc.)¹**

	1955					1956				
	Oil	Gas	Dry	Total	Percent Success	Oil	Gas	Dry	Total	Percent Success
Exploratory Wells	11	2	190	203	6.8	12	1	152	165	7.9
Development Wells	193	11	102	306	66.6	184	11	75	270	68.1
Totals	204	13	292	509	42.6	196	12	227	435	47.8

¹Figures do not include one liquid petroleum, gas storage well drilled in 1955 and 28 gas storage wells drilled in 1956, all of which are referred to as service wells in the text.

Footage drilled as with completions and permits declined proportionately. In 1956 the exploratory and development footage totaled 1,281,675 feet or 236,276 feet less than last year. Of the 1956 footage drilled, 461,359 feet were attributed to exploratory wells and 820,298 feet to development wells. The average exploratory effort penetrated 2,796 feet and the average development well effort 3,038 feet. In 1955 the exploratory footage totaled 594,405 feet and development well footage 923,546 feet or 2,928 feet per exploratory effort and 3,018 feet per development well.

The production of oil declined 4.7% in 1956 and gas increased 23.2%. Production totaled 10,739,697 barrels of oil and 8,840,933 MCF of gas in 1956. The

production for 1955 was 11,265,842 barrels of oil and 6,787,697 MCF of gas.

Undeveloped acreage under lease at the end of the year as reported by 11 major oil companies was 752,051 acres. These same companies had 817,361 undeveloped acres under lease on December 31, 1955. State undeveloped acreage under lease also declined with 225,000 acres under lease on December 31, 1956 as compared to 264,725 acres under lease on December 31, 1955.

EXPLORATION

The 165 exploratory wells drilled during the year resulted in five new oil fields, four extensions and four deeper pool discoveries. This is a 7.9 percent success ratio. Additional encouragement was provided by the discovery of five new pays due to the reworking of older wells and encountering of shallower pays in field development wells.

Core tests dropped off considerably during the year with only 13 permits being issued. Of those issued only 8 were drilled. In 1955 the core permits numbered 114, all of which were drilled.

Very little geophysical exploration was done in 1956. A seismic crew was reported in Concord Township, Jackson County. Their work was very limited and consisted of rechecking gravity anomalies. A combination gravity and radiation survey was made in Allegan County. The work was of a semi-technical nature and over limited areas.

Thirty important deep tests were drilled in 19 counties. Of these tests 2 reached the Cambrian, 3 the Trenton, 6 the Cataract, 3 the Clinton, 1 the Niagaran, 4 the Salina, 1 the Sylvania, 8 the Detroit River - Richfield Zone, and 2 the Detroit River. The tests resulted in the discovery of 1 new Richfield oil field in Roscommon County, 1 deeper Richfield pool in Gladwin County, 2 deeper Salina pools and 1 Salina pool extension in Allegan County. As in the past the majority of the deeper formation tests were concentrated in the southern part of Michigan and on the flanks of the Basin where the older formations are at a shallower depth. The 16.7% success ratio of these tests is encouraging and should lead to more extensive drilling of the older formations.

Subsurface geology continued to be the most efficient tool of exploration in Michigan. Only two discoveries were reported as being from geophysical surveys. The McClure's Koopman No. 1 Salina gas discovery in Allegan County was reported as being the result of a combination gravity and radiation survey and the O'Neill's Larsen No. 1 in Mecosta County was reported as being the result of a radiation survey. The latter discovery was plugged in 1956 and no oil runs were reported.

PROSPECTS FOR 1957

Oil and gas activity in 1957 is expected to maintain about the same level as in 1956. The Basin District will as in the past have the largest number of completions. However, the recent deeper formation discoveries in Allegan County will undoubtedly increase the activity in the Southwestern area. Also, a drilling well not yet completed reported good shows of gas and oil for the Trenton formation in Scipio Township, Hillsdale County. Although the Trenton exploratory tests have been somewhat disappointing to date, this potential discovery should stimulate interest in the Southern District.

OIL FIELD BRINE

Michigan oil fields were producing a total of 196,563 barrels of brine per day at the end of 1956. This was a decrease of 5,798 barrels per day as compared with a total of 202,361 barrels per day at the end of 1955.

Table II is a record of all Michigan oil fields which were producing in excess of 2,000 barrels of brine per day and the percentage factor of the total produced from these fields in relation to the total daily brine produced in the state.

TABLE II

Field	1951	1952	1953	1954	1955	1956
Coldwater	17,551	21,287	22,601	26,751	29,799	33,256
Reed City	32,214	34,859	30,498	28,105	24,907	23,822
Porter	12,005	11,606	11,966	12,528	12,604	12,292
Fork	20,494	20,695	19,109	18,632	16,475	12,115
Freeman-Redding	17,942	18,885	17,485	14,501	12,734	11,930
Deep River	953	3,898	4,368	5,174	10,538	11,729
Kimball Lake	15,819	16,532	11,543	12,859	12,276	10,040
Pentwater	7,201	7,233	7,473	6,997	8,196	8,129
Story Lake	4,514	4,814	4,466	5,142	7,139	7,062
Sylvan	2,670	3,250	3,780	3,960	4,830	6,407
Adams North	5,599	5,476	4,972	5,278	5,387	5,449
Winterfield	4,456	4,641	4,416	3,205	3,624	4,612
Ewart	8,502	9,000	6,692	6,035	5,590	4,610
Prosper	3,363	3,060	3,060	3,012	3,544	3,644
Vernon	2,360	2,335	2,335	2,300	2,825	2,825
Headquarters (Trv.)	4,470	3,085	3,042	2,579	3,027	2,580
Clayton	2,420	2,268	2,453	2,517	2,390	2,477
Total (17 fields)	162,533	172,924	160,259	159,575	165,885	162,979
State total	199,327	207,288	190,817	194,078	202,361	196,563
Percent state total	81.5	83.4	84.	82.2	82.	82.9

Of the seventeen fields tabulated, seven had an increase in daily brine produced, nine a decrease and one remained the same. The most significant increases were in the Coldwater, Deep River and Sylvan fields with a continued rise over a six year period. The Winterfield field also had a noticeable increase over the previous year. The substantial decrease in brine produced in the Fork, Ewart and Kimball Lake fields was due to abandonment of wells previously producing large volumes of brine.

Operators in Michigan oil fields were returning 194,475 barrels of brine per day to approved subsurface formations. This was 98.94 percent of the total brine produced. Of the remaining 1.06 percent, one-third was used in drilling operations, lease maintenance and by county road commissions and two-thirds was disposed

of on the surface and released in small widely scattered amounts in accordance with temporary arrangements with the operators.

GENERALIZED COLUMNAR SECTION OF MICHIGAN
MICHIGAN GEOLOGICAL SURVEY DIVISION

SYSTEM, SERIES	FORMATION, GROUP	LITHOLOGY	THICKNESS	ECONOMIC PRODUCTS
RECENT				
PLEISTOCENE	GLACIAL DRIFT	SAND, GRAVEL, CLAY, boulders, marl	0-1000	SAND, GRAVEL, PEAT, MARL, FRESH WATER
"PERMO-CARBONIFEROUS"	"RED-BEDS"	SHALE, CLAY, SANDY SHALE, gypsum		
PENNSYLVANIAN	GRAND RIVER	SANDSTONE, sandy shale	80-95	BUILDING STONE, FRESH WATER
	SAGINAW	SHALE, SANDSTONE, limestone, coal	20-535	SHALE, COAL, FRESH WATER, BRINE, GAS
MISSISSIPPIAN	BAY PORT	LIMESTONE, SANDY OR CHERTY LIMESTONE, SANDSTONE	2-100	LIMESTONE, FRESH WATER
	MICHIGAN	SHALE, gypsum, anhydrite, sandstone	0-500	GYPSUM
	"MICHIGAN STRAY"	SANDSTONE	0-80	GAS
	MARSHALL	SANDSTONE, sandy shale	100-400	FRESH WATER, BRINE BUILDING STONE
	COLDWATER	SHALE, sandstone, limestone	500-1100	SHALE, FRESH WATER
	SUNBURY	SHALE	0-140	
	BEREA - BEDFORD	SANDSTONE, SHALE	0-325	GAS, OIL
	ELLSWORTH - ANTRIM	SHALE, limestone	100-950	SHALE, GAS
DEVONIAN	TRAVERSE	LIMESTONE, SHALE	100-800	LIMESTONE, OIL, GAS, FRESH WATER
	BELL	SHALE, Limestone	0-80	SHALE
	ROGERS CITY - DUNDEE	LIMESTONE	0-475	LIMESTONE, OIL, GAS, FRESH WATER
	DETROIT RIVER	DOLOMITE, limestone, salt anhydrite	150-1400	LIMESTONE, DOLOMITE, OIL, GAS, SALT, BRINE, FRESH WATER
	SYLVANIA	SANDSTONE, SANDY DOLOMITE	0-550	GLASS SAND, FRESH WATER
	BOIS BLANC	DOLOMITE, CHERTY DOLOMITE	0-1000	
SILURIAN	BASS ISLAND	DOLOMITE	50-570	DOLOMITE, FRESH WATER
	SALINA	SALT, DOLOMITE, Shale, anhydrite	50-4000	SALT, GAS, OIL
	NIAGARAN (Guelph - Lockport - Engadine) (Manistique - Burnt Bluff) (Cataract)	DOLOMITE, Limestone, shale	150-800	LIMESTONE, DOLOMITE, OIL, GAS, FRESH WATER
ORDOVICIAN	CINCINNATIAN (Richmond) (Maysville - Eden)	SHALE, LIMESTONE	250-800	
	TRENTON - BLACK RIVER	LIMESTONE, DOLOMITE	200-1000	OIL, GAS, LIMESTONE, FRESH WATER
	ST PETER	SANDSTONE	0-150	FRESH WATER
OZARKIAN OR CANADIAN	PRAIRIE DU CHIEN	DOLOMITE, Shale	0-410	
	HERMANSVILLE	DOLOMITE, SANDY DOLOMITE, sandstone	15-500	
CAMBRIAN	LAKE SUPERIOR (Munising) (Jacobsville)	SANDSTONE	500-2000	BUILDING STONE FRESH WATER
ALGONKIAN	KEWEENAW (Copper formations)	LAVA FLOWS, conglomerate, shale, sandstone	9800-35000	COPPER, SILVER, ROAD METAL, SEMI-PRECIOUS GEM STONES
	KILLARNEY GRANITE	GRANITE, GNEISS, diorite, syenite		
	HURONIAN (Iron formations)	SLATES, HEMATITE, SCHIST, QUARTZITE, GRANITE, marble, dolomite	2000+	IRON ORE, ROOFING SLATE, ROAD METAL, GRAPHITE MARBLE
ARCHEAN	LAURENTIAN	SCHIST, GNEISS, GRANITE		ROAD METAL, BUILDING STONE, VERDE ANTIQUE, TALC, GOLD
	KEEWATIN	SCHIST, GREENSTONE, SLATE		ROAD METAL