STATE OF MICHIGAN

DEPARTMENT OF CONSERVATION
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GEOLOGICAL SURVEY DIVISION
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1955
SUMMARY OF OPERATIONS
OIL AND GAS FIELDS

BY
THE STAFF OF THE OIL AND GAS SECTION
AS COMPILED BY

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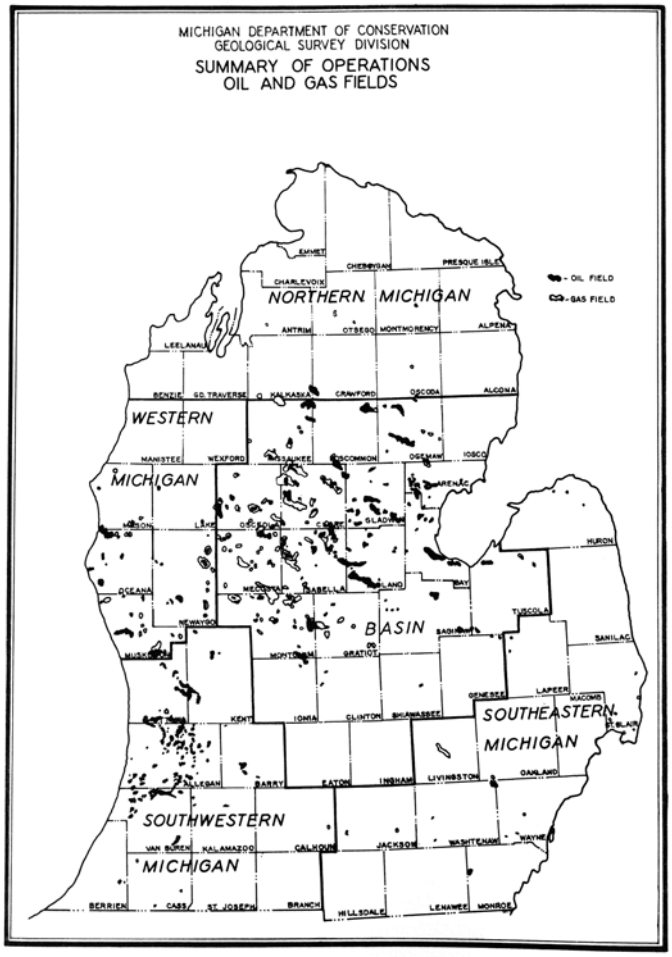
GENERAL ACTIVITIES

During 1955, permits were issued for 484 oil and gas tests as compared with 573 in 1954. This is an actual decline of 88 permits from 1954 since only one of the permits issued in 1955 was for a service well in a storage reservoir and two such permits were issued in 1954. Of the 510 wells completed, 204 were oil wells 13 were gas wells, one was for a service well, and 292 were dry holes. Total footage drilled during 1955 was 1,536,441 as compared with 1,643,612 for 1954. Wildcat footage drilled was 594,405. In 1954, wildcat footage was 592,777. At the end of the year 142,500 acres had been proved productive of oil. The recovery was 2,703 barrels of oil per acre.

There have been 195 oil fields in Michigan which have produced more than 100 barrels of oil per drilled acre. These fields have been grouped in Table I according to their cumulative production through December 31, 1955. The fields have been arranged by district (see inside cover map).

[Map - Oil and Gas Fields by Districts]



1955

TABLE I
ACCUMULATIVE PRODUCTION BY DISTRICT

District	Number of Fields Per District Accumulated Production in Millions of Bbls. 0-0.5	0.5-1	1-5	5-10	10-15	15-20	20-40	40+	Prod. in Millions of Barrels	Percentage of State Total	Proved Acreage Thousands of Acres	Recovery in Bbls. Per Acre
Basin	58	14	22	7	0	3	2	2	306.4	79.4	95.6	3205
Northern	3	0	1	0	0	0	0	0	4.3	1.1	3.9	1026
Southeastern	7	1	0	0	0	0	0	0	.9	.2	.8	1125
Southwestern	39	4	1	2	1	0	0	0	42.7	11.2	27.9	1530
Western	22	0	2	4	0	0	0	0	30.8	8.08	13.6	2265
Totals	129	19	26	13	1	3	2	2	385.1	100.00	141.8	

EXPLORATION

There were 203 wildcat wells drilled during the year resulting in five new oil fields, two new gas fields, and one new pay. However, additional encouragement was provided by the discovery of six new pays due either to reworking of older wells or the encountering of shallower pays during development drilling. Core drilling activities continued to increase with 114 core tests reported for the year as compared to 80 for 1954 and 47 for 1953. There were from one to three gravity crews active in Michigan throughout the year but no seismic crews were reported.

Fifty-six important deep tests were drilled in 29 counties. Three wells reached the Cambrian, three the St, Peter, 19 the Trenton-Black River, one the Cincinnatian. three the Cataract, seven the Clinton, two the Niagaran, one the Salina. one the Bass Island one the Bois Blanc, two the Sylvania, twelve the Detroit River-Richfield Zone, and one the Detroit River. Results were the discovery of two Basal Salina gas fields and one Basal Salina oil field in southeastern Michigan, and one Detroit River "new pay" in southwestern Michigan. As in the past, the older formational tests were concentrated in the southern and southeastern parts of the state due to their relatively shallower depths. The geological information gathered from these tests may lead to more deep formational drilling basinward.

Huber Oil Field:

One of the highlights of the year was the discovery of the Huber Traverse Formation Oil Pool in Denver Township, Newaygo County on September 29. The discovery well was Klondike Petroleum Company's Hoge #1, NE SE SE, Section 5, T.14N, R.14W. It flowed 35 barrels of oil an hour through 2-inch tubing after acid from a depth of 2,111 feet. The API gravity of the crude is 41.3°. As much as 18 feet of dolomite pay was recorded in one well with 6 to 10 feet being recorded on most of the wells that have penetrated through the section. In addition, there is about 20 feet of closure on the structure, and the pool appears to have an effective water drive: A 20-acre spacing pattern and a 100-barrel a day proration order were established on November 21. At the end of the year there were five producing wells which had produced a total of 16,461 barrels of oil. The discovery well was drilled on a known anticlinal structure. This field promises to be of major importance in western Michigan and should stimulate exploratory drilling in the area.

Reynolds Oil Field:

Additional development wells in this 1954 Dundee-Reed City Zone Oil Pool discovery and a new Traverse pay recorded in 1955 has focused the attention of the oil industry on the Reynolds Field in Montcalm County. The fact that development has been slow, led to very little publicity in the early stages of the field. However, at the end of the year there were 8 Reed City Zone wells and one Traverse well which have produced a total of 161,167 barrels of oil. The Dundee-Reed City Formation is producing oil from a dolomite pay at a depth of 3343 feet. The discovery well, McClure and Associates', Kuhn #1, SE SE NW Section 1, T.12N., R.10W., was completed on March 10, 1954. It flowed natural 120 barrels of 42.6° API gravity crude per day. As much as six feet of porosity has been recorded although the average penetration of the pay zone is only one to two feet. Reservoir studies indicate a combination limited water and solution gas drive. Producing companies have voluntarily restricted the production to 85 barrels of oil a day per well and have established a 40-acre drilling unit. The new Traverse pay discovery was the McClure and Associates' Williams #1, SE NW SE Section 1, T.12N., R.10W., completed August 13, 1955. It pumped 15 barrels of oil per day after acid from a depth of 2,787 feet. The pay is about four feet thick and principally limestone. In view of past and current successes, it would be safe to predict a bright future for the Reynolds Field.

OIL FIELD BRINE

Michigan oil fields were producing a total of 202,361 barrels of brine per day at the end of 1955. This was an increase of 8,283 barrels per day as compared with a total of 190,817 barrels per day at the end of 1954.

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	1950	1951	1952	1953	1954	1955
Coldwater	14,776	17,551	21,287	22,601	26,751	29,799
Reed City	32,114	32,214	34,859	30,498	28,105	24,907
Fork	23,398	20,494	20,695	19,109	18,632	16,475
Freeman-Redding	17,706	17,942	18,885	17,485	14,501	12,734
Porter	9,058	12,005	11,606	11,966	12,528	12,604
Kimball Lake	15,194	15,819	16,532	11,543	12,859	12,276
Deep River	596	953	3,898	4,368	5,174	10,538
Pentwater	5,459	7,201	7,233	7,473	6,997	8,196
Stony Lake	2,796	4,514	4,814	4,466	5,142	7,139
Evart	7,653	8,502	9,000	6,692	6,035	5,590
Adams North	5,654	5,599	5,476	4,972	5,278	5,387
Sylvan	1,820	2,670	3,250	3,780	3,960	4,830
Winterfield	4,504	4,456	4,641	4,416	3,205	3,624
Prosper	2,917	3,363	3,060	3,060	3,012	3,544
Headquarters	4,216	4,470	3,085	3,042	2,579	3,027
Vernon	3,390	2,360	2,335	2,335	2,300	2,825
Bloomer	1,533	2,198	1,845	2,179	1,860	2,820
Clayton	2,276	2,420	2,268	2,453	2,517	2,390
Cato	2,526	2,728	2,760	2,320	2,025	2,250
Total (19 fields)	157,586	167,459	177,529	164,758	163,460	170,955
State total	188,179	199,327	207,288	190,817	194,078	202,361
Percent state total	83.7	84.01	85.6	86.3	84.2	84.4

Of the fields tabulated, thirteen had an increase in daily brine produced and six a decrease. The Coldwater and Deep River fields were again the most significant with a continued increase over a five-year period. The substantial decrease in the Reed City Field was the result of deepening and re-completion of wells in new pay horizons in the Detroit River Formation. Other

appreciable decreases were due to abandonment or reworking of wells previously producing large volumes of brine.

Operators in Michigan oil fields were returning 200,031 barrels of brine per day to approved subsurface formations. This was 98.8 per cent of the total brine produced. Of the remaining 1.2 per cent, one third was taken by the Dow Chemical Company or used for other purposes and two thirds or less than one per cent was disposed of on the surface and released in small widely scattered amounts in accordance with temporary or permanent 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