

STATE OF MICHIGAN

DEPARTMENT OF CONSERVATION
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1961

SUMMARY OF OPERATIONS
OIL AND GAS FIELDS

AS COMPILED BY
THE STAFF OF THE OIL AND GAS SECTION

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GENERAL ACTIVITIES

(Comparative Statistics 1960-61)

General oil and gas drilling statistics for 1961 reviewed a small decrease from the previous year. Permits for oil and gas tests were down 6.7% with 769 permits being issued. Service wells accounted for an additional 81 permits. In 1960, there were 824 oil and gas tests and 80 service well permits issued.

As with permits, completions excluding service wells, reworks and deepening also declined from the previous year. This decline, 11.1%, occurred in development well drilling with exploratory well completions showing an 18.3% increase. Table I is a comparative summary of the exploration and development well completions for the two years in question:

TABLE I
EXPLORATORY DEVELOPMENT WELL
COMPLETION SUMMARY FOR 1960 and 1961

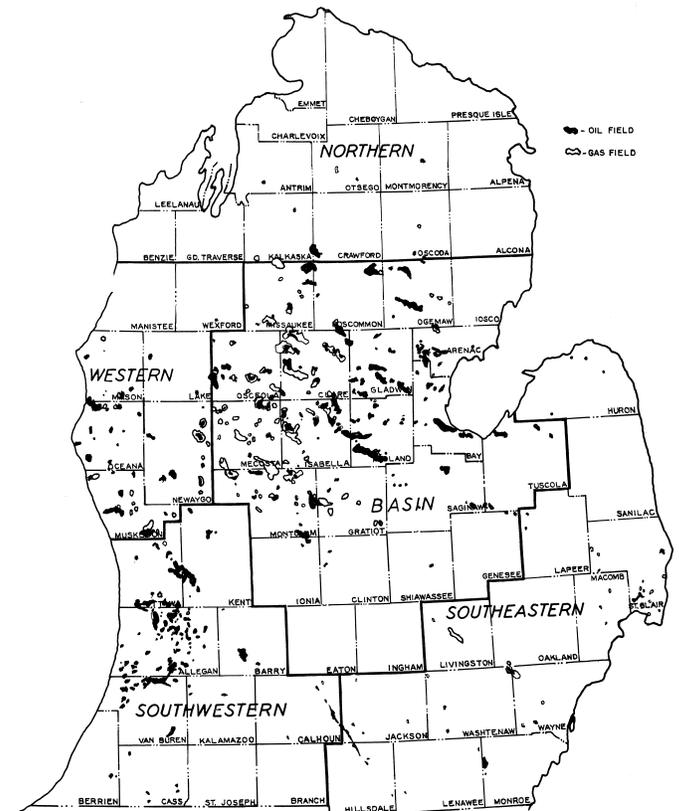
	1960				Per- cent Success	1961				Per- cent Success
	Oil	Gas	Dry	Total		Oil	Gas	Dry	Total	
Exploratory Wells ¹	11	4	253	268	5.6	15	11	291	317	8.2
Development Wells ²	361	15	188	564	66.7	182	46	195	423	53.9
Totals	372	19	441	832	47.0	197	57	486	740	34.3

1. Does not include deepening or wells which were not directly connected with exploratory activity for 1961,
2. Does not include wells drilled in connection with underground storage, water injection and reworks.

Field and wildcat footage totaled 2,309,437 feet with 1,002,389 feet being attributed to wildcat wells and 1,307,048 feet to development wells. An additional 170,273 feet was drilled relative to storage projects.

Production figures released by the Michigan Department of Revenue showed substantial gains in both oil and gas from the previous year. In 1961, 18,900,948 barrels of oil and 25,044,786 MGF of gas were produced. Much of the increase in gas and oil can be attributed to the Albion-Pulaski-Scipio fracture trend in the south-central part of the state.

OIL AND GAS FIELDS
SOUTHERN PENINSULA OF MICHIGAN
BY DISTRICTS



EXPLORATION

The Silurian and older sediments played a very important part in the 1961 exploratory program. In ascending order, a breakdown of the wildcats by system is as follows: Precambrian 2, Cambrian 9, Ordovician 85, Silurian 98, Devonian and younger 123. The discoveries by system were: Ordovician 1, Silurian 14, Devonian and younger 11.

The reported geophysical activity was down considerably from the previous year with only two seismic and four gravity crews being active in the state for most of the year. One resistivity crew was reported. As in the past, most of the surveys were conducted in the outer districts as defined inside the front cover.

The undeveloped acreage under lease for 1961 appeared comparative with the 1960 tabulation with an indication of a slight drop. Twenty-six companies reported 3,802,679 acres under lease. In 1960, the 18 companies who released acreage figures had 3,617,993 acres under lease. The State of Michigan had 438,530 acres under lease at the end of the year.

FORECAST

Exploration activity should be up somewhat from the 1960 level of 317 completions. However, development well activity will probably be down. This is due to the fact that most of the major new finds are fairly well drilled up. On the other hand, any new discoveries of a significant nature found in the 1962 drilling programs will affect the development program for that year.

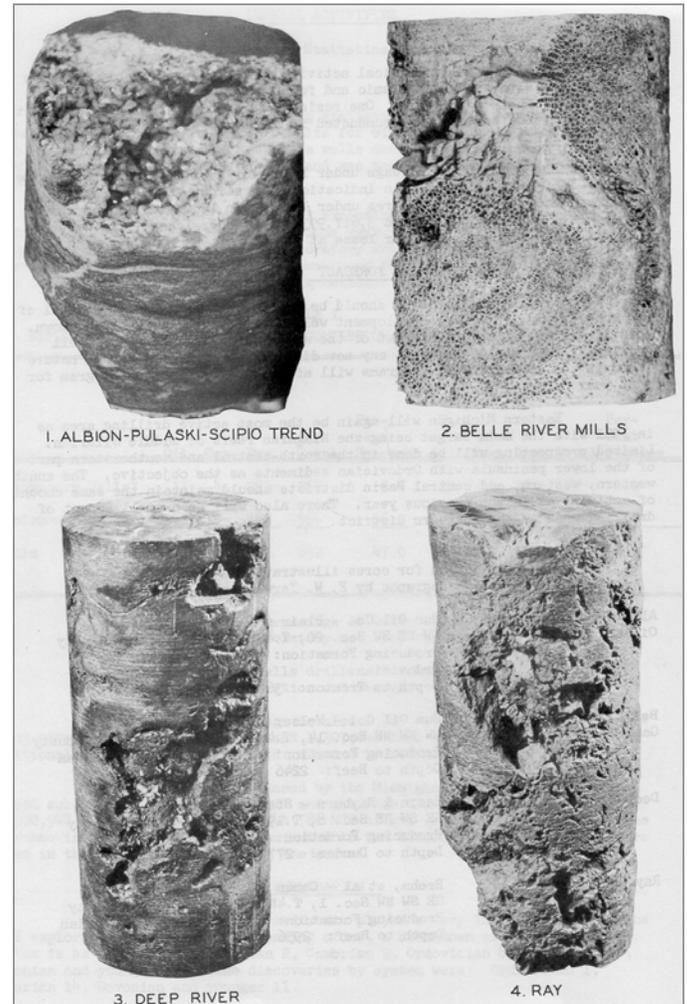
Eastern Michigan will again be the most active drilling area as in 1961 with the main target being the Niagaran reefs of middle Silurian. Limited prospecting will be done in the south-central and southeastern part of the lower peninsula with Ordovician sediments as the objective. The southwestern, western, and central Basin districts should maintain the same amount of activity as in the previous year. There also will be a small amount of drilling done in the northern district.

Explanation for cores illustrated on page 4.

Photographs by F. W. Terwilliger

Albion-Pulaski-Scipio Oil and Gas Field	Sun Oil Co. - Blair #1, NW NE SW Sec. 20, T.4S., R.3W., Jackson County Producing Formation: Trenton-Black River - Ordovician. Depth to Trenton: 3696
Belle River Mills Gas Field	Sun Oil Co. - Welser & Straub #1, NW NW NW Sec. 14, T.4N., R.16E., St. Clair County Producing Formation: Niagaran Reef - Silurian Depth to Reef: 2246
Deep River Oil Field	Basin & Rayburn - Sterling Bank #1, SE SW NE Sec. 8, T.19N., R.4E., Arenac County Producing Formation: Dundee - Devonian Depth to Dundee: 2777
Ray Gas Field	Brehm, et al - Ohman #1, SE SW NW Sec. 1, T.4N., R.13E., Macomb County Producing Formation: Niagaran Reef - Silurian Depth to Reef: 2956

[Core Illustrations]



OIL FIELD BRINE

Michigan oil fields were producing a total of 157,855 barrels of brine per day at the end of 1961. This is a decrease of 13,142 barrels per day as compared with a total of 170,997 barrels per day at the end of 1960.

Table V is a record of 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 V

Field	1961	1960	1959	1958	1957	1956
Coldwater	29,725	30,965	28,592	29,344	33,704	33,256
Reed City	16,060	19,248	19,984	21,785	22,385	23,822
Porter	10,643	9,235	10,749	11,719	11,963	12,292
Deep River	9,486	10,011	9,426	11,321	13,020	11,729
Freeman-Redding	8,414	7,777	7,484	12,247	12,612	11,930
Stony Lake	7,058	10,488	11,983	10,215	8,561	7,062
Albion-Pulaski-Scipio	4,940	2,348	2,177	60	-	-
Pentwater	4,709	8,935	7,060	9,455	8,725	8,129
Kimball Lake	4,270	4,947	4,835	4,405	10,004	10,040
Prosper	4,125	4,125	3,300	3,302	3,513	3,644
Adams, North	3,938	4,888	4,888	5,392	5,759	5,449
Reynolds	3,617	4,326	3,136	2,251	1,139	478
Vernon	3,450	3,706	3,706	2,530	2,910	2,825
Fork	2,590	2,111	5,191	6,481	7,758	12,115
Ewart	2,260	2,700	2,960	3,460	4,685	4,610
Clayton	2,215	2,620	3,035	3,763	4,456	2,477
Total (16 Fields)	117,500	128,430	128,506	137,730	151,194	149,858
State Total	157,855	170,997	172,605	179,231	195,630	195,563
Percent State Total	74.4	75.1	74.5	76.8	77.3	76.6

Of the sixteen fields tabulated, four had an increase in the daily amount of brine produced, eleven a decrease, and one remained the same. The most significant increases were in the Albion-Pulaski-Scipio Trend, Porter and Freeman-Reeding fields. The substantial decrease in brine produced in the Stony Lake, Pentwater, and Reed City fields is due to a large number of shut in or temporarily abandoned wells which may be utilized in active and proposed secondary recovery projects.

Operators of Michigan oil fields were returning 155,885 barrels of brine per day to approved subsurface formations. This was 98.75 per cent of the total brine produced. Of the remaining 1.25 per cent, or 1,970 barrels, 1,060 barrels were being used for commercial purposes, lease operations, and by county road commissions for road maintenance, and 910 barrels were being disposed of in surface pits and released in small widely scattered amounts in accordance with temporary arrangements with 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	
DEVONIAN	BEREA - BEDFORD	SANDSTONE, SHALE	0-325	GAS, OIL
	ELLSWORTH - ANTRIM	SHALE, limestone	100-950	SHALE, GAS
	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
ORDOVICIAN	NIAGARAN (Gaulph-Lockport-Engadine) (Mansfield-Burrill Bluff) (Cataract)	DOLOMITE, Limestone, shale	150-800	LIMESTONE, DOLOMITE, OIL, GAS, FRESH WATER
	CINCINNATIAN (Richmond) (Mayville-Eden)	SHALE, LIMESTONE	250-800	
	TRENTON-BLACK RIVER	LIMESTONE, DOLOMITE	200-1000	OIL, GAS, LIMESTONE, FRESH WATER
OZARKIAN OR CANADIAN	ST PETER	SANDSTONE	0-150	FRESH WATER
	PRAIRIE DU CHIEN	DOLOMITE, Shale	0-410	
CAMBRIAN	HERMANSVILLE	DOLOMITE, SANDY DOLOMITE, sandstone	15-500	
	LAKE SUPERIOR (Munising) (Jacobsville)	SANDSTONE	500-2000	BUILDING STONE, FRESH WATER
ALGONKIAN	KEWENAW (Copper formations)	LAVA FLOWS, conglomerate, shale, sandstone	9800-35000	COPPER, SILVER, ROAD METAL, SEMI-PRECIOUS GEM. STONES
	HILLARNEY GRANITE	GRANITE, GNEISS, diorite, gabbro		
	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