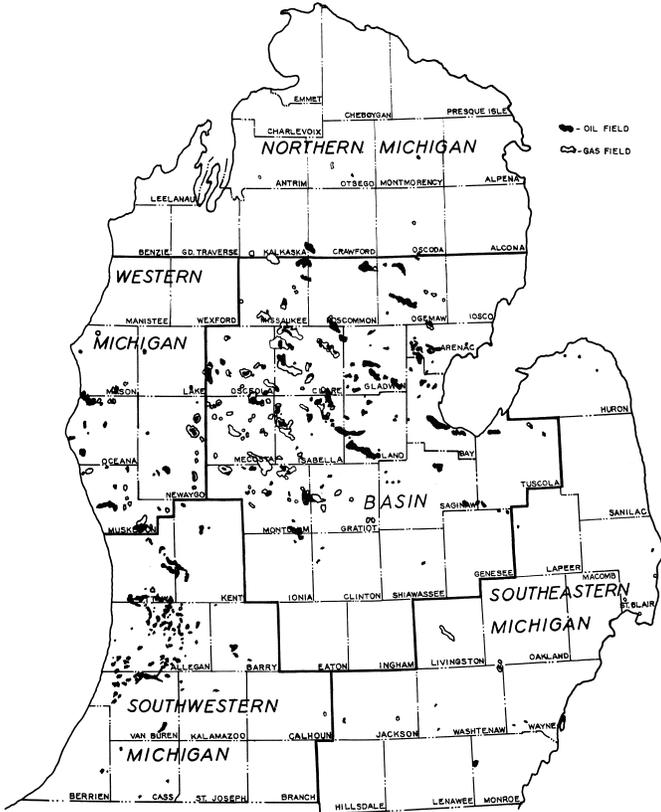


MICHIGAN DEPARTMENT OF CONSERVATION  
GEOLOGICAL SURVEY DIVISION

SUMMARY OF OPERATIONS  
OIL AND GAS FIELDS  
1954

TABLE I

| District     | Oil in Millions of Bbls. Produced thru 12/31/54 |       |     |      |       |       |       |                    |    |       | Prod. in Millions of Barrels | Percent-<br>age of<br>State<br>Total | Proved<br>Acreage<br>in<br>Thousands<br>of Acres | Recovery<br>in<br>Barrels<br>Per Acre |
|--------------|---|-------|-----|------|-------|-------|-------|--------------------|----|-------|------------------------------|--------------------------------------|--|---------------------------------------|
|              | 0-5<br>Less<br>Than                             | 0.5-1 | 1-5 | 5-10 | 10-15 | 15-20 | 20-40 | 40<br>More<br>Than | 40 |       |                              |                                      |  |                                       |
| Basin        | 64  | 10    | 21  | 8    | -     | -     | 3     | 2                  | 2  | 299.6 | 80.1                         | 92.3                                 | 3,248  |                                       |
| Northern     | 5   | -     | 1   | -    | -     | -     | -     | -                  | -  | 4.0   | 1.1                          | 3.9                                  | 1,028  |                                       |
| Southeastern | 5   | 1     | -   | -    | -     | -     | -     | -                  | -  | 6.8   | 0.3                          | 0.6                                  | 1,296  |                                       |
| Southwestern | 46  | 5     | 1   | 2    | 1     | -     | -     | -                  | -  | 42.1  | 11.2                         | 27.3                                 | 1,540  |                                       |
| Western      | 20  | 1     | 1   | 4    | -     | -     | -     | -                  | -  | 27.2  | 7.3                          | 13.1                                 | 2,081  |                                       |
| Totals       | 140   | 17    | 24  | 14   | 1     | 3     | 2     | 2                  | 2  | 373.8 | 100.0                        | 137.2                                |  |                                       |



**1954**

During 1954, permits were issued for 573 oil and gas tests as compared with 824 in 1953. This is an actual decline of 78 permits since only two of the permits issued in 1954 were for service wells in storage reservoirs and 175 such permits were issued during 1953. Of the 571 wells completed, 221 were oil wells, eight were gas wells, four were service wells, and 338 were dry holes. Total footage drilled during 1954 was 1,572,791 as compared with 1,643,612 in 1953. Wildcat footage drilled was 592,777. In 1953, wildcat footage was 682,125. At the end of the year 137,710 acres had been proved productive of oil. The recovery was 2,715 barrels of oil per acre.

There have been 203 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, 1954. The fields have been arranged, by district (see map).

**EXPLORATION**

Of the 241 wildcat wells drilled during the year, 24 were successful - a ratio of one to ten. Results were 13 new oil fields, five new oil pay discoveries, and the extension of six oil fields. Core drilling expanded somewhat with 80 tests, compared with 47 during 1953. Geophysical exploration increased. An average of six gravity and two seismograph crews were operating in the state throughout the year.

Forty-six deep wildcat wells were drilled in 23 counties. One well reached the Cambrian, five the Cambro-Ordovician, 22 the Trenton, three the Silurian, one the Bois Blanc, and 14 reached the Richfield. Results were the discovery of three new Trenton oil pools, the extension of one Trenton oil pool, the discovery of three Richfield oil pools and one Berea oil pool. It is significant that 33 of these deep wildcats were drilled in southeastern Michigan. Four of these 33 wells were successful and all produced from the Trenton-Black River.

**Northville Field:**

The intensive activity in southeastern Michigan was the result of the discovery of the Northville Oil Pool in northeastern Washtenaw County on January 15. The discovery well was W. C. Taggart's LeMaster No. 1, NW SE SE Section 1, T.1S., R.7E., which flowed 50 barrels of 46° gravity crude the first fifteen minutes (natural) from the Trenton-Black River (Ordovician) Formation at a depth of 4,395 feet. The well has been produced throughout the year on a restricted choke. During the year, the discovery well made 129,214 barrels of oil. Fifteen additional producing wells were completed, seven of which were shut in at year's end because of high gas-oil ratios. A gravity survey was made in the area but the well was drilled on a known anticlinal structure. Northville promises to be a major oil field. Ordovician rocks have produced oil in Michigan since 1920 but Northville is by far the best field yet found in this formation. In most of southeastern Michigan the Trenton occurs within the depth range of 2,000 to 5,000 feet. Both geophysical and subsurface methods may be used in searching for Ordovician fields.

**Reed City Field:**

A new Richfield zone oil discovery was made January 1 in the Reed City Field. The new pay is approximately

1,000 feet below the prolific Reed City Zone. The discovery well was Pure Oil Company's Gingrich No. 1, SE SE SW Section 30, T.18N., R.10W., which flowed 100 barrels of oil from a sand zone at a depth of 4,665 feet. This is the same well which discovered the Reed City Zone in 1940. The deepening of the Gingrich and discovery of a deeper pay has stimulated deepening of other wells in the field. At the end of the year, nine wells were producing from the Richfield Zone. Deepening of other wells in the field is projected for 1955. It is expected that this deeper zone (the fourth pay in the field) will add materially to the reserves of the field. The Reed City Field has already produced almost 40,000,000 barrels of oil.

## OIL FIELD BRINE

Michigan oil fields were producing a total of 194,078 barrels of brine per day at the end of 1954. This was an increase of 3,261 barrels per day as compared with a total of 190,817 barrels per day at the end of 1953.

Table I 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                | 1949    | 1950    | 1951    | 1952    | 1953    | 1954    |
|----------------------|---------|---------|---------|---------|---------|---------|
| Reed City            | 33,636  | 32,114  | 32,214  | 34,859  | 30,498  | 28,105  |
| Coldwater            | 12,109  | 14,776  | 17,551  | 21,287  | 22,601  | 26,751  |
| Fork                 | 21,224  | 23,398  | 20,494  | 20,695  | 19,109  | 18,632  |
| Freeman-Redding      | 17,947  | 17,706  | 17,942  | 18,885  | 17,405  | 14,501  |
| Kimball Lake         | 11,642  | 15,194  | 15,819  | 16,532  | 11,543  | 12,859  |
| Porter               | 13,382  | 9,058   | 12,005  | 11,606  | 11,966  | 12,528  |
| Pentwater            | 2,005   | 5,459   | 7,201   | 7,233   | 7,473   | 6,997   |
| Evart                | 612     | 7,653   | 8,502   | 9,000   | 6,692   | 6,035   |
| Adams, North         | 6,083   | 5,654   | 5,599   | 5,476   | 4,972   | 5,278   |
| Deep River           | 135     | 596     | 953     | 3,898   | 4,368   | 5,174   |
| Stony Lake           | 1,457   | 2,796   | 4,514   | 4,814   | 4,466   | 5,142   |
| Sylvan               | 633     | 1,820   | 2,670   | 3,250   | 3,780   | 3,960   |
| Winterfield          | 5,110   | 4,504   | 4,456   | 4,641   | 4,416   | 3,205   |
| Prosper              | 3,213   | 2,917   | 3,363   | 3,060   | 3,060   | 3,012   |
| Headquarters         | 4,930   | 4,216   | 4,470   | 3,085   | 3,042   | 2,579   |
| Clayton              | 1,861   | 2,276   | 2,420   | 2,268   | 2,453   | 2,517   |
| Vernon               | 3,530   | 3,390   | 2,360   | 2,335   | 2,335   | 2,300   |
| Bloomington          | 3,689   | 2,933   | 2,233   | 2,384   | 2,159   | 2,064   |
| Cato                 | 2,815   | 2,526   | 2,728   | 2,760   | 2,320   | 2,025   |
| Total (19 fields)    | 146,013 | 158,986 | 167,494 | 178,068 | 164,738 | 163,664 |
| State total          | 172,781 | 188,179 | 199,327 | 207,288 | 190,817 | 194,078 |
| Per cent state total | 84.5    | 84.5    | 84.0    | 85.9    | 86.3    | 84.3    |

Of the fields tabulated, nine had an increase in daily brine produced. The Coldwater and Deep River fields were the most significant with a continued increase over a five-year period. The appreciable decreases were the result of abandonment or reworking of wells previously producing large volumes of brine.

Operators in Michigan oil fields were returning 192,584\* barrels of brine per day to approved subsurface formations. This was 99.23 per cent of the total brine produced. The less than one per cent remaining on the surface was released in small, widely scattered amounts in accordance with temporary or permanent arrangements with the operators.

\*Includes 614 barrels per day taken by Dow Chemical Company.

## GENERALIZED COLUMNAR SECTION OF MICHIGAN MICHIGAN GEOLOGICAL SURVEY DIVISION

| SYSTEM. SERIES       | FORMATION. GROUP   | LITHOLOGY  | THICKNESS  | ECONOMIC PRODUCTS                                       |
|----------------------|--|--|------------|---|
| <b>RECENT</b>        |  |  |            |   |
| 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                               |            |   |
|                      | GRAND RIVER  | SANDSTONE, sandy shale   | 80-95      | BUILDING STONE, FRESH WATER                             |
| PENNSYLVANIAN        | SAGINAW  | SHALE, SANDSTONE, limestone, coal                              | 20-535     | SHALE, COAL, FRESH WATER, BRINE, GAS                    |
|                      | BAY PORT   | LIMESTONE, SANDY OR CHERTY LIMESTONE, SANDSTONE                | 2-100      | LIMESTONE, FRESH WATER                                  |
|                      | MICHIGAN   | SHALE, gypsum, anhydrite, sandstone                            | 0-500      | GYPSSUM   |
|                      | "MICHIGAN STRAY"   | SANDSTONE  | 0-80       | GAS   |
| MISSISSIPPIAN        | 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   | 100-850    | 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                        |
| DEVONIAN             | 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     |   |
|                      | BASS ISLAND  | DOLOMITE   | 50-570     | DOLOMITE, FRESH WATER                                   |
|                      | SALINA   | SALT, DOLOMITE, Shale, anhydrite                               | 50-4000    | SALT, GAS, OIL  |
| SILURIAN             | NAGARAN (Guelph-Lothrop-Engadine) (Mansfield-Buff Bluff) (Calders) | 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      |   |
|                      | HERMANVILLE  | DOLOMITE, SANDY DOLOMITE, sandstone                            | 15-500     |   |
| CAMBRIAN             | LAKE SUPERIOR (Manistig) (Jacobsville)                             | SANDSTONE  | 500-2000   | BUILDING STONE, FRESH WATER                             |
| ALGONKIAN            | REWENAW (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  |