MONTCALM COUNTY

MONTCALM COUNTY AT A GLANCE

<table>
<thead>
<tr>
<th>Description</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total wells drilled through 1982</td>
<td>1,513</td>
</tr>
<tr>
<td>Total oil wells drilled through 1982</td>
<td>400</td>
</tr>
<tr>
<td>Total gas/facility wells drilled through 1982</td>
<td>282</td>
</tr>
<tr>
<td>Well density – approximately two wells per square mile</td>
<td>(720 square miles in county)</td>
</tr>
<tr>
<td>Total cumulative oil and lease condensate production through</td>
<td>19,420,507 bbls.*</td>
</tr>
<tr>
<td>December 31, 1982</td>
<td></td>
</tr>
<tr>
<td>Total cumulative natural gas production through</td>
<td>68,657,957 Mcf*</td>
</tr>
<tr>
<td>December 31, 1982</td>
<td></td>
</tr>
</tbody>
</table>

*Latest cumulative figures available by county.

SIX LAKES — In the more than 50 years since discovery of the first commercial petroleum production from Montcalm County, oil from three Devonian-age horizons and gas from the late Mississippian Michigan Stray have been produced in sufficient quantities to rank the west-central Michigan county 18th overall in oil output and eighth in extraction and sale of natural gas, based on cumulative production totals through the end of 1982.

While the story of Montcalm County’s hydrocarbon exploration and production history to date was largely written within the first 20 years of its life as an oil and gas producing area, likely expansion of the Central Basin’s rapidly growing deep play into Montcalm could add important new chapters in the near future.

The existence of numerous well defined and productive shallow structures seem to make Montcalm an ideal hunting ground for deep gas, should the current exploration trend of concentrating deep efforts in and around the shallower reservoirs continue. The county’s first deep test, a 1986 probe of the Reynolds structure was plugged and abandoned at a total depth of 8,420 feet in the Trempealeau. A second Reynolds D.P.T has been permitted and deep tests of both the Entrican and Stanton Fields are thought to be in the planning stages at this writing.

A deep gas play in Montcalm County may be inevitable, but it was a very shallow play, begun in 1934, that put the area on Michigan’s gas producing "map," before eventually being converted into the largest gas storage field in the state.

Natural gas pay was found at 1,270 feet in the Michigan Stray Sandstone in Section 11 of Bellevue Township (T12N, R7W), opening the Six Lakes Field as what proved to be the second-most prolific natural gas reservoir in Michigan history, behind only all-time oil and gas production leader Albion-Scipio-Pulaski. Though Six Lakes production ended in 1953 with the reservoir’s conversion to gas storage by Michigan Consolidated Gas Company, the cumulative gas production total of more than 52 billion cubic feet presently seems challenged by that of only one field, the still active Grant 13-25N-12W Niagaran reef reservoir, which has produced more than 44 billion cubic feet gas through

MONTCALM COUNTY OIL & GAS FIELDS

<table>
<thead>
<tr>
<th>Location of Discovery</th>
<th>Field Name (Classification)</th>
<th>Year Discovered</th>
<th>Producing Formation</th>
<th>Cumulative Oil Production-bbls thru 1984</th>
<th>Cumulative Gas Production-Mcf thru 1984</th>
<th>Total Wells Drilled</th>
<th>Total Wells Active-1984</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belly Achers</td>
<td>(12N-6W-14) (OIL)</td>
<td>1944</td>
<td>Dundee</td>
<td>361,510</td>
<td>7</td>
<td>3</td>
<td>3,479</td>
</tr>
<tr>
<td>Bloomer</td>
<td>(9N-5W-32) (OIL)</td>
<td>1944</td>
<td>Traverse</td>
<td>1,978,224</td>
<td>29</td>
<td>3</td>
<td>2,840</td>
</tr>
<tr>
<td>Bloomer, Sec. 18</td>
<td>(6N-5W-18) (AOF)</td>
<td>1936</td>
<td>Traverse</td>
<td>814</td>
<td>1</td>
<td>Abnd. 1936</td>
<td>2,717</td>
</tr>
<tr>
<td>Bushnell</td>
<td>(9N-6W-11) (AOF)</td>
<td>1935</td>
<td>Dundee</td>
<td>4,635</td>
<td>1</td>
<td>Abnd. 1939</td>
<td>3,105</td>
</tr>
<tr>
<td>Cato</td>
<td>(12N-5W-6) (OIL)</td>
<td>1944</td>
<td>Reed City</td>
<td>1,219,018</td>
<td>22</td>
<td>9</td>
<td>3,542</td>
</tr>
<tr>
<td>Crystal</td>
<td>(12N-5W-3) (OIL)</td>
<td>1954</td>
<td>Traverse</td>
<td>7,916,442</td>
<td>7</td>
<td>7</td>
<td>3,187</td>
</tr>
<tr>
<td>Crystal</td>
<td>(10N-5W-2) (OIL)</td>
<td>1935</td>
<td>Mi. Stray</td>
<td>0</td>
<td>8</td>
<td>2</td>
<td>Abnd. 1944</td>
</tr>
<tr>
<td>Day</td>
<td>(11N-6W-1) (AGF)</td>
<td>1934</td>
<td>Traverse</td>
<td>3,095</td>
<td>1†</td>
<td>Abnd. 1967</td>
<td>2,900</td>
</tr>
<tr>
<td>Day</td>
<td>(11N-6W-23) (AGF)</td>
<td>1946</td>
<td>Traverse</td>
<td>16,239</td>
<td>2</td>
<td>Abnd. 1954</td>
<td>3,377</td>
</tr>
<tr>
<td>Day</td>
<td>(11N-5W-13) (AGF)</td>
<td>1971</td>
<td>Dundee</td>
<td>29,722</td>
<td>1</td>
<td>1</td>
<td>3,414</td>
</tr>
<tr>
<td>Douglass</td>
<td>(11N-7W-28) (AGF)</td>
<td>1943</td>
<td>Mi. Stray</td>
<td>0</td>
<td>188,502</td>
<td>4</td>
<td>Abnd. 1951</td>
</tr>
<tr>
<td>Douglass</td>
<td>(11N-7W-1) (OIL)</td>
<td>1945</td>
<td>Dundee</td>
<td>260,276</td>
<td>6</td>
<td>2</td>
<td>3,400</td>
</tr>
<tr>
<td>Douglass, Sec. 3</td>
<td>(11N-7W-3) (AGF)</td>
<td>1954</td>
<td>Traverse</td>
<td>3,155</td>
<td>1</td>
<td>Abnd. 1956</td>
<td>3,025</td>
</tr>
<tr>
<td>Edmore</td>
<td>(12N-6W-10) (OIL)</td>
<td>1932</td>
<td>Traverse</td>
<td>1,478,263</td>
<td>25</td>
<td>7</td>
<td>3,162</td>
</tr>
<tr>
<td>Edmore-Richland</td>
<td>(12N-5W-17) (GAS)</td>
<td>1936</td>
<td>Traverse (Combined w/Edmore)</td>
<td>9,135,821</td>
<td>7</td>
<td>1</td>
<td>3,300</td>
</tr>
<tr>
<td>Entrican</td>
<td>(11N-7W-21) (OIL)</td>
<td>1966</td>
<td>Traverse (Combined w/Entrican)</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>2,870</td>
</tr>
<tr>
<td>Entrican</td>
<td>(11N-7W-21) (OIL)</td>
<td>1967</td>
<td>Dundee</td>
<td>159,096</td>
<td>6</td>
<td>5</td>
<td>3,312</td>
</tr>
<tr>
<td>Home, Sec. 26</td>
<td>(12N-6W-26) (OIL)</td>
<td>1964</td>
<td>Traverse (Combined w/Home Dundee)</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3,096</td>
</tr>
<tr>
<td>Home, Sec. 26</td>
<td>(12N-6W-27) (OIL)</td>
<td>1970</td>
<td>Dundee</td>
<td>115,982</td>
<td>4</td>
<td>4</td>
<td>3,513</td>
</tr>
<tr>
<td>Lakeview</td>
<td>(12N-8W-22) (OIL)</td>
<td>1961</td>
<td>Traverse</td>
<td>12,415</td>
<td>2</td>
<td>1</td>
<td>2,941</td>
</tr>
<tr>
<td>Maple Valley, Sec. 16</td>
<td>(11N-9W-16) (GAS)</td>
<td>1958</td>
<td>Mi. Stray</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1,129</td>
</tr>
<tr>
<td>Pine</td>
<td>(11N-6W-29) (AGF)</td>
<td>1938</td>
<td>Traverse</td>
<td>105,006</td>
<td>2</td>
<td>Abnd. 1963</td>
<td>2,836</td>
</tr>
<tr>
<td>Pine, Secs. 9 &amp; 17</td>
<td>(11N-6W-5) (GAS)</td>
<td>1951</td>
<td>Mi. Stray</td>
<td>38,017</td>
<td>2</td>
<td>2</td>
<td>1,251</td>
</tr>
<tr>
<td>Reynolds</td>
<td>(12N-10W-1) (OIL)</td>
<td>1955</td>
<td>Traverse (Combined w/Reynolds Reed City)</td>
<td>15</td>
<td>5</td>
<td>2</td>
<td>2,787</td>
</tr>
<tr>
<td>Reynolds</td>
<td>(12N-10W-1) (OIL)</td>
<td>1954</td>
<td>Reed City</td>
<td>4,843,327</td>
<td>53</td>
<td>8</td>
<td>3,343</td>
</tr>
<tr>
<td>Richland, Sec. 27</td>
<td>(12N-5W-27) (AGF)</td>
<td>1963</td>
<td>Traverse</td>
<td>0</td>
<td>1</td>
<td>Abnd. 1964</td>
<td>1,247</td>
</tr>
<tr>
<td>Stanton</td>
<td>(11N-7W-26) (OIL)</td>
<td>1951</td>
<td>Traverse</td>
<td>1,025,762</td>
<td>18</td>
<td>6</td>
<td>2,915</td>
</tr>
<tr>
<td>Turk Lake</td>
<td>(10N-8W-9) (GAS)</td>
<td>1947</td>
<td>Mi. Stray</td>
<td>0</td>
<td>221,936</td>
<td>4</td>
<td>1,081</td>
</tr>
<tr>
<td>Wintfield</td>
<td>(12N-5W-20) (OIL)</td>
<td>1936</td>
<td>Dundee</td>
<td>119,412</td>
<td>8</td>
<td>Abnd. 1980</td>
<td>3,349</td>
</tr>
</tbody>
</table>

†Two additional wells were added to the field in 1995. Manitou Exploration Company’s Waldron 1-30 and Waldron 2-30 (Sec 30-T11N-5W, Ferris Township) were drilled as Dundee wildcats and completed for oil in the Traverse.

GAS STORAGE RESERVOIRS

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Six Lakes</td>
<td>1934</td>
<td>1953</td>
<td>Mi. Stray</td>
<td>0</td>
<td>52,636,813</td>
<td>404</td>
<td>194</td>
<td>54</td>
<td>1.270</td>
</tr>
</tbody>
</table>
Montcalm

the end of 1986.

Through 1981 a total of 404 producing and
gas storage facility wells had been drilled in
Six Lakes, approximately one-half of them
across the Montcalm-Mecosta County line
in Millbrook (T13N, R7W) and Hinton
(T13N, R8W) Townships. At the end of
1981, 194 of the wells were in active use in
the storage reservoir.

A year before the Six Lakes find and five
miles to the east, the actual beginning of
Montcalm County’s petroleum history was
marked by completion of the first commer-
cial oil producer in Section 10 of Home
Township (T12N, R6W). The Edmore Field’s
discovery well drilled four feet of limestone
pay in the Traverse Formation at a depth of
3,102 feet, opening a reservoir that was to
become the county’s fourth largest oil
producer.

The discoveries at Six Lakes and Edmore in
‘33 and ‘34 were to be only a prelude to the
excitement that would be generated by
Montcalm’s first (and as history now shows,
only) major Dundee strike. The Crystal Field
came on like a lion, as was common for
Dundee oil finds of the day, with J.W.
Leonard, Jr.’s Durbin #1 (NW NW NE, Sec
11, T10N, R5W, Crystal Township) blowing
off a control head and shooting 44° gravity
 crude oil high into the air March 28, 1935.

Production rates extrapolated from flow
tests of short duration after the well had been
brought under control indicated it was
possible of producing nearly 4,000 barrels
per day, according to the April 4, 1935 issue
of the Michigan Oil and Gas News.

Under the banner headline, BOOM
SWEEPS FIELD, the forerunner of today’s
Michigan Oil & Gas News described how
quickly a big gusher could attract oilmen
from near and far. Following with rapier
swiftness in the wake of Montcalm County’s
sensational new Crystal well, came reports
of five new locations either started or
scheduled to start momentarily within striking
distance of the Durbin discovery. Keep
in mind that this report was published only
seven days after first word of the strike.

Local excitement over the new oil field
was anything but subdued after then State
Geologist R.A. Smith told a gathering of
1,000 area residents “I think Carson City
will be the center of oil operations for a good
many years.” Predictions made during
Crystal’s early development that the field would
rival or beat a contemporary, Midland
County’s Porter Field, in both size and oil
output would be shown by time to be false
(Porter eventually encompassed more than
6,700 acres, with production topping 50
million barrels by the 1980s compared to
2,000 acres and nearly eight million barrels
for Crystal).

The Crystal Refining Company was built
soon after the field was opened in Carson
City, following the refining trend of the day
which saw small refinery operations spring
up near almost every significant oil strike.
Of a maximum of 28 refineries in operation
during the 1930s and 40s, the Crystal plant
remains as the only one of the small plants
(6,200 barrel per day capacity) to survive,
and one of only three refineries still in
operation in Michigan by late 1986.

The 1930s would see two more discoveries
in Montcalm County, a small Dundee and
Reed City pool in Winfield Township (first
Reed City production in the county) and the
swirling Edmore-Richland Stray gas pool,
whose 47 wells are scattered over nearly
7,000 acres. Edmore-Richland became
Montcalm’s second largest gas producer with
cumulative production of more than nine
billion cubic feet.

The United States was at war in Europe
before new finds would be recorded in
Montcalm County, the biggest of the late-
war openers were (T9N, R5W) in Bloomer
and Cato Townships (T12N, R8W). The
Cato Field’s Reed City play developed in the
immediate vicinity of discovery well in
Section 9, Cato Township, while the Bloomer
Field was extended south into North Plains
Township (T8N, R5W) of Ionia County.
Also discovered in 1944 was a Dundee pool
which stepped out from the Edmore Traverse
structure, and was given one of the more
colorful names in Michigan’s petroleum
past, Belly Acher.

Nearly ten years passed without significant
new discoveries in Montcalm, but early 1954
drilling in Section 1 of Reynolds Township
(T12N, R10W) set the stage for what was to
become the county’s second largest oil
producing field. McClure Oil, operating with
partners Swan-King Oil Company and Basin
Oil Company, keying off evidence of a
Traverse reef and good porosity in the Reed
City horizon in a 1937 step-out from the
Winfield Field to the southeast.

The 1937 wildcat had been drilled four
years before the Reed City zone would first
yield commercial oil pay in the Reed City
Field, but the clues it provided in Montcalm
County were invaluable. The Reed City pay
zone in the Reynolds Field discovery was
encountered only 93 feet below the top of the
Dundee Limestone and was described in an
Oil & Gas News story as a “brown
 crystaline, highly porous dolomite.” In
reference to the production potential of the
McClure Kohn #1 (SE SE NW, Sec 1)
discovery, the same news account somewhat
boldly stated that “It appears, at the present
time, that the well would produce at just
about any rate that might be desired.” Flow
rates of five barrels per hour oil through a
“highly restricted choke” and good casing
and tubing pressures prompted the optimistic
appraisal.

Outside of the Reynolds Field development,
exploration in the 1950s and 1960s was most
successful in Montcalm County’s
sparsely-drilled interior, where the Stanton
Field (Traverse oil) was found in 1951 and
the nearby Entranic Field (Traverse and
Dundee oil) was first tapped 15 years later.
Stanton proved the more productive of the
two structures, with its 18 wells surpassing
one million barrels produced in 1980.

The two most recent pool discoveries
recognized by the Geological Survey Division
have been the four-well Home, Sec. 26
Dundee pool in 1970 and Day, Sec. 13
(Dundee) a year later, whose lone well has
not been successfully offset.

Two 1985 wells in Section 30 of Ferris
Township (T11N, R5W) stepped out more
than a mile from Traverse production in the
small Day Field, discovered in 1934, but
have been officially classified as part of that
pool.