OIL MINING IN PENNSYLVANIA

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THE end of World War II has brought into sharper focus than ever before the importance of petroleum in the dual rôle of industrial progress in peace and adequate defense in time of war. The United States, with six per cent of the world's population, uses nearly 60 per cent of its oil production. There is serious doubt whether or not our present reserves are sufficient, or if they are, whether or not they can be discovered and developed rapidly enough to maintain the prewar oil supply.¹ If enough petroleum is not available, some other material must replace it for lubrication and fuel.

Professional Army and Navy men have long recognized the importance of petroleum in waging war and have continually increased the uses for oil. Today it is a "must" item for successful combat operations.² Any decrease in its availability would tend to jeopardize the future security of the nation.

Pennsylvania grade crude oil is especially important because of its inherent superior lubricating qualities.³ Aircraft, marine engines, and other highly specialized equipment, will continue to create a demand for this premium lubricant which production cannot meet in peace time. From every barrel of crude produced in Pennsylvania, only 24 per cent of it finally becomes lubricating oil. This total represents a miniscule portion of the needs.⁴

From 1891 through 1913, decline in oil production was steady.⁵ World War I boosted the quantity temporarily, due to the huge

¹ The Weekly Derrick, Oil City, Pa., February 14, 1946, p. 9.
² Giddens, Paul H., "Oil in Three Wars." The Orange Disc Magazine. (Published by Gulf Oil Corp.) March-April, 1945. See also; Giddens, Paul H., "When Oil Joined the Navy." The Orange Disc Magazine. September-October, 1945.
⁴ Ibid., II, p. 474.
demand and high price. Additional oil fields will no doubt be discovered in this country but it is significant that Pennsylvania petroleum resources are 80 per cent developed. Hopes for finding any large fields in the State increasing production very much are extremely limited, yet the present yield satisfies less than one per cent of the national oil demand.

The accepted method of drilling wells in the Pennsylvania oil fields is the standard or “cable tool” method. After the erection of the oil derrick and installation of the necessary machinery, a heavy bit suspended from a cable is raised and dropped into the hole and pounds its way down through the rocks. After a predetermined amount of drilling has been done, the bailer is sent down the hole to bring up the water and the crushed materials or “cuttings.” Wells vary in depth from less than 200 feet to about 2,600 feet in the Pennsylvania grade crude region.

In some sections of the Pennsylvania field, exhaustion of the wells has been halted by the use of secondary recovery methods, such as repressuring with natural gas and flooding with water. But only small increases in the per cent recoverable have been made and the wide differences in sand permeability seem to offer the greatest single difficulty in the use of such means.

During the past eighty-six years, mining for oil has been tried several times in Pennsylvania with varied results. All represented attempts to produce a larger volume of crude at a lower cost per barrel, and from locations where the oil-bearing sands were not too deep.

The earliest mines were pits dug along the banks of streams; the Indians “skimmed” the crude oil from the surface of the water by the use of broad paddle-like sticks. They also spread blankets over the fluid in the pits and after the blankets had soaked up the oil, they were wrung out and the petroleum poured into vessels. Remains of these pits are nearly obliterated but a few traces can be found along Oil Creek, stretching seventeen miles between Titusville and Oil City. About two thousand have been counted in this area. Along Hosmer Run, near Garland in Warren County,


Ball, Max W., *This Fascinating Oil Business.* (Bobbs-Merrill Co., New York, 1940.) pp. 98-122.

a few other similar pits have been found but these are not well known, are few in number, and difficult to reach. There is considerable evidence dating the pits early enough in history to preclude the Indians as originators of the method and controversy over the actual builders, the age, and the exact use of the oil secured from these crude mines, still rages among historians.9

Contemporary mining attempts in Pennsylvania have been limited to five with details shown on the chart.

I. In 1856, a salt well on the Humes farm at Tarentum, Pa., was giving five barrels of oil daily as a by-product of the brine. Thomas Donnelly owned the well and he sold it to Peterson & Irwin. Peterson was a well-known business man in the vicinity, and at one time was Mayor of Allegheny City, now Pittsburgh's north side.

Colonel A. C. Ferris of New York was the first man to make a definite effort to introduce refined oil as an illuminant and he was interested in the Tarentum mine.10 Early in 1858, he retired from the coffee and spice trade to devote all his time to oil promotion under the name of A. C. Ferris & Company. The year before, he had brought oil from the Tarentum salt wells to New York where he sold it as "carbon oil." Since the demand increased faster than the supply, he arranged for the digging of the oil mine to secure greater production. Together with Ferris, other Easterners formed The Tarentum Oil, Salt, & Coal Company and they started their mine twenty rods from the Donnelly Well.

This mine was eight feet square at the surface. Expert miners were brought from England to do the work, and for two years they labored in shifts of nine men each. After reaching a depth of 220 feet, gas entered the shaft, and then salt water from the Donnelly well seeped in. Soon the work had to be halted.11 The entire property was sold for $150,000 after the work had been stopped; this figure seems high when compared with prices received for many successful wells.12

II. By the time the Tidioute mine was started in 1864, interest had increased and oil producers were anxious to know more of

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10 The Brooklyn Eagle, November 6, 1881.
12 Derrick's Handbook of Petroleum, I, p. 17.
<table>
<thead>
<tr>
<th>Mine at:</th>
<th>Original farm or oil lease:</th>
<th>Name of operating company:</th>
<th>Final depth of mine:</th>
<th>In charge of operations:</th>
<th>Results:</th>
</tr>
</thead>
<tbody>
<tr>
<td>I Tarentum, Allegheny County.</td>
<td>Humes farm. Donnelly, then Peterson &amp; Irwin property.</td>
<td>Tarentum Oil, Salt &amp; Coal Co.</td>
<td>220'13</td>
<td>A. C. Ferris13</td>
<td>Abandoned due to gas and salt water seepage.14</td>
</tr>
<tr>
<td>II Tidioute, Warren County. Started in 1864.</td>
<td>Shadrach Tipton farm, later Wm. Cohell farm.</td>
<td>Enterprise Mining &amp; Boring Co.</td>
<td>165'15</td>
<td>Hart.17</td>
<td>Halted due to accident in 1865.27</td>
</tr>
<tr>
<td>III Petroleum Centre, Venango County. Started May 1865.</td>
<td>Hayes farm, later Dalzell Petroleum Co.</td>
<td>Petroleum Shaft &amp; Mining Co.</td>
<td>90'19</td>
<td>D. W. Davis.20</td>
<td>Halted due to lack of funds, 1866.29</td>
</tr>
<tr>
<td>IV Franklin, Venango County. Started July 1942.</td>
<td>D. W. Grant lease 3 miles north of Franklin, on Upper Two Mile Run.</td>
<td>Venango Development Corp.</td>
<td>429'21</td>
<td>Leo Ramney.21</td>
<td>Horizontal wells shot Nov. 25, 1943, Still operating.21</td>
</tr>
<tr>
<td>V Pioneer, Venango County. Started in 1944.</td>
<td>On Bull Run, east side of Oil Creek at Pioneer.</td>
<td>Northern Ordinance Co.</td>
<td>82'26</td>
<td>Westmark.24</td>
<td>Halted in 1944.28</td>
</tr>
</tbody>
</table>

15 Shaw, Frederick A., Speech at Tidioute, Pa., May 23, 1942.  
20 Titusville Morning Herald, June 14, 1866.  
22 Oil City Weekly Derrick. October 2, 1943.  
mining possibilities. Two newsmen visited the Tidioute location but were coldly received. Following their call they wrote:

The works were inclosed by a high board fence, intended to shut out inquisitive mortals. Over a small door, apparently the only entrance, was printed in large letters NO ADMITTANCE, a Yankee phrase signifying 'Come In', accordingly we went in, but were soon accosted by a person evidently in authority who requested us 'to go out.' Said we would have to get permission from C——— M———, as he was opposed to give anything of the kind.

We then asked permission to look at and go down into the merits of the thing. . . . He eyed us suspiciously as though he were fearful we would pocket his big hole in the ground, or whisk away his 20 horsepower engine, and was proof against all our entreaties. The two oil reporters who wrote this knew their business and had traveled over the entire region; they either regarded the venture as an outlandish experiment or else wrote as they did because of their poor reception.

Mining at Tidioute ended abruptly when the superintendent, desiring to know if gas had collected in the hole, tossed a piece of lighted waste into the shaft as a test. A terrific explosion followed and Mr. Hart, the foreman, was hurled to the top of the derrick and then his mangled body fell among the supporting beams of the mine. It was impossible to induce men to work following the accident.

III. A year later, another firm leased two acres of the famous Hayes farm at Petroleum Centre to attempt oil mining. The location was near the great Jersey and Maple Shade wells and in most productive territory. An auspicious start was made and a visiting New York journalist took cognizance of the possibilities by writing:

The experiment cannot fail to be highly valuable to the cause of science, and may repay all outlays upon it.

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26 The Jersey Well was struck in the early part of 1863 and yielded 350 barrels a day. The Maple Shade well was struck in August, 1863, and produced 1,000 barrels a day. Both were heavy producers when the oil mine was started nearby.
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one hundred times over. Every company and landowner in Petrolia ought to encourage the attempt.27

But the reporter was wrong. Transportation hardships and long delays increased the costs and in 1866, the stockholders of the Petroleum Shaft & Mining Company revolted against an additional assessment thus stopping the work. This effort demonstrated chiefly that sufficient capital was required for a full test. It was to be seventy-six years before another attempt was made.

IV. Pennsylvania's fourth mine was started in July, 1942, by a group of individual operators and refiners, including some refiners of non-Pennsylvania grade crude.28 The plot selected was the Grant lease near Franklin; petroleum had been produced from it for eighty years and good records were available. Mr. Leo Ranney, whose methods were to be employed, was in charge.29

After sixteen months of labor, the shaft had been lowered 429 feet and at the bottom, a working chamber 55 feet high was built. From this room, horizontal wells were drilled into the oil sands about 2,500 feet and these were "shot" with six tons of high explosives on Thanksgiving Day, 1943. Reports now in the hands of producers indicate the two horizontal wells to be equivalent to two hundred vertical holes and this first complete scientific test of oil mining brightens future prospects.30

The entire project was carried on under the name of the Venango Development Corporation, and the fact that suitable funds were available enabled the work to be completed even after expensive and unexpected delays were encountered. The management of the project is changing hands but operations will continue.31

V. In June, 1944, large blocks of oil acreage in Warren and Crawford Counties passed from individual ownership into possession of the Northern Ordnance Company, a Minneapolis con-

28 Oil City Weekly Derrick, October 2, 1943.
29 Ranney, Leo, "The First Horizontal Well." The Petroleum Engineer. June 1939. Ranney holds at least eighteen patents on various phases of sinking shafts and boring horizontal wells. Early in 1942, he advocated the use of a man-made earthquake against Japan by planting twelve million pounds of explosives in steel drums in submarines off Osaka harbor. The downward thrust thus created would dislocate the land-block on which Osaka rests.
30 Titusville Morning Herald, September 12, 1944.
31 Communication from the Pennsylvania Grade Crude Oil Association, Oil City, Pa. October 11, 1945.
cern.\textsuperscript{32} Extensive “wild catting” was started and additional drilling on proved leases greatly expanded.

The same year, the new owners commenced an oil mine near the old oil town of Pioneer, along Oil Creek. A hole eight feet in diameter, concrete lined, was put down 82 feet. By that time however, the superintendent had a multitude of other projects to handle, help was impossible to secure due to the war, and all costs had mounted excessively. Work was halted and never has been resumed.

Mining for oil in Pennsylvania has just started. Thus far, it is the one means of secondary recovery that seems applicable to the shallow Pennsylvania oil sands. When fully developed, it represents from what we know of it today, the most likely way to obtain a greater yield from our vanishing underground sources.

When the final history of mining for oil can be written, the early Pennsylvania mines will be as important to historians as Edwin Drake’s first well has been to those writing of oil history since 1859.

\textsuperscript{32} \textit{Pittsburgh Post-Gazette}, June 21, 1944.