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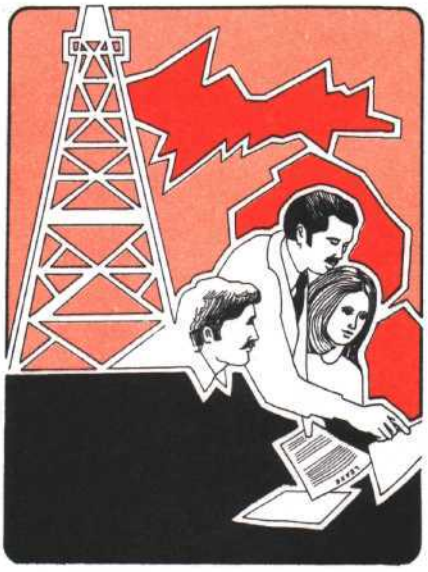

Michigan's Oil and Gas Industry: Past, Present and Future

by: William C. Patric and Peter J. Kakela,
Department of Resource Development

"Gas Fever Hits Michigan."(1) This *Wall Street Journal* headline (Dec. 23, 1980) reflected the excitement initiated in Missaukee County when the Dart Oil and Gas Corporation struck a major gas deposit at a depth of close to 11,000 feet, the deepest such find in Michigan's history. The intense speculation and interest surrounding the Missaukee County Dart-Edwards discovery was justified when production tested at 12.3 million cubic feet of dry natural gas per day, with reserves estimated to be as high as 60 billion cubic feet. When the regional gas pipeline system is extended to the well and commercial production begins, it will repay the substantial drilling costs (over $2.5 million) in less than three months. It will also ". . . provide its owner with an estimated $1.1 million in revenue monthly and produce enough gas annually to heat an estimated 25,000 Michigan homes for a year."(2) Thus, this find became the most dramatic development for the state's oil and gas industry in recent years.

While the total impact of the Missaukee find on the industry as a whole is still uncertain, it has definitely brought oil and gas back into the limelight in Michigan. Many landowners, as well as oil companies, have reaped considerable financial gains from renewed exploration. During a period when economic activities in Michigan have been particularly bleak, the expanding oil and gas industry deserves special attention. This bulletin goes beyond the highly publicized Dart-Edwards success story to assess the industry as a whole, providing a brief overview of its background, its present position in the state's economy, and its potential.

Historic Background

Oil and gas has been produced in Michigan for almost 100 years. Production started in 1887 when crude oil was discovered in the Port Huron area and ". . . refined at a local establishment into very desirable greases for lubricating buggy and wagon axles."(3) It was many years, however, before the fledgling oil technology developed into a significant industry in Michigan. *Oil and Gas News* reports that in many cases

> *"the original wells that showed or actually produced gas were drilled for fresh water. . . . Relatively little use was made of these wells, and more often than not they were regarded at the least as a nuisance and at the most as a hazard."(4)*

The development of the Saginaw field in 1925 marked what insiders considered the beginning of oil and gas production as a significant industry in Michigan. In fact, the amount of oil drilled from the arching anticlines of this field ". . . was of such volume as to make record-keeping desirable."(5) Two years later, the first serious regulatory efforts were initiated and it became mandatory for an operator to secure a state permit prior to drilling. Rules were also adopted relative to certain drilling and plugging procedures.

The Michigan oil and gas industry is said to have "come of age" in the 1930s, with the development of more than 65 field discoveries. "Both production and drilling activity peaked in 1939, just before State controls were applied to both well spacing and oil production."(6) These controls were promulgated under Public Act 61 of 1939, a comprehensive set of regulations that has since become a regulatory model used by other states.

The 1950s saw the opening of the Albion-Scipio trend, while in the 1960s the word was Trenton Dolomite. Up until this time, development efforts remained focused on the Michigan Basin, the state's traditional hydrocarbon source (Figure 1).

Recent History

In the past decade oil production in Michigan has tripled and gas production quadrupled.

> *"The large increases in production over the past 10 years are attributable to the discovery and development of the northern Salina Niagaran*

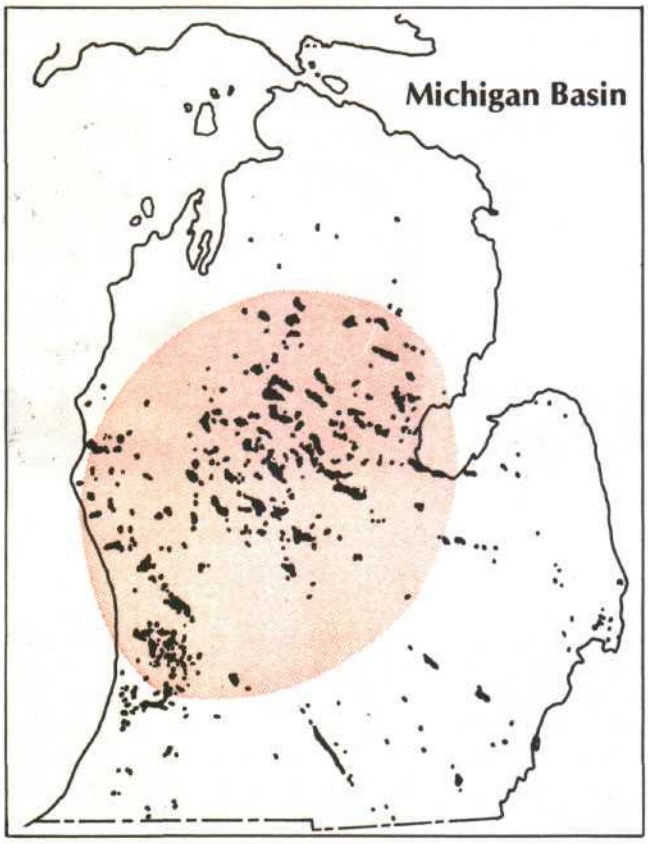

Figure 1. The Michigan Basin, with oil and gas trapped in rather shallow anticlines and faults, was the primary focus during the first phase of development.

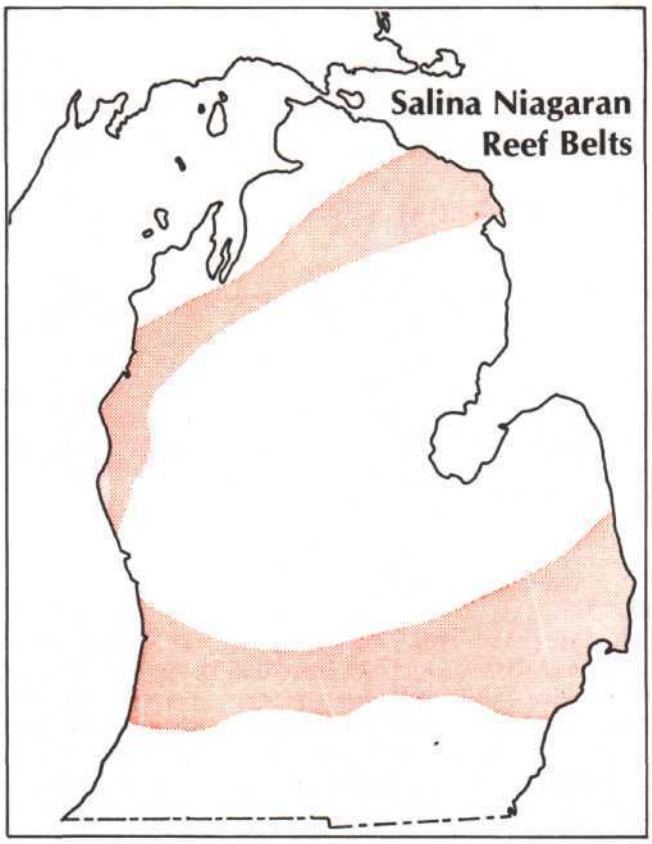

Figure 2. The Salina and Niagaran coral reef belts were formed near the north and south shore of an ancient sea that flooded the central portion of the Michigan Basin. As silt buried the porous corals, oil and gas became trapped, and these deposits were the new targets during Michigan's second phase of development.

reef belt that stretches northeasterly from Mason County to Presque Isle County. From a negligible contribution in 1970, the Salina Niagaran trend yielded an estimated 73 percent of the State's crude oil and 85 percent of the State's natural gas in 1980."(7)

It is believed that production from this belt is now at its peak (Figure 2). Thus, some attention has been shifting to abandoned fields, where the economics of the industry have made renewed efforts profitable.

Before the Dart-Edwards gas find, ". . . Michigan had about 600 natural gas wells and 4,700 oil wells, drilled to depths ranging from 3,000 to 7,200 feet, drawing from relatively small pools of oil and gas trapped in the coral reefs of a 400 million-year-old seabed."(8) Michigan has proven to be one of only a few states where exploration in recent years has added more to proven reserves than production has removed.

Deep Gas Play

To date, the Dart-Edwards well is the only commercially successful deep-drilling effort in the 10,000 to 11,000-foot range. This recent move into what geologists term the Prairie du Chien could prove to be a whole new phase of Michigan oil and gas development (Figures 3 and 4). The Prairie du Chien sediments were layed down a half of a billion years ago, some 50 million to 100 million years before the traditional seabed hydrocarbon structures of the Niagaran reef.

The Dart-Edwards well brought national attention to Michigan. Estimates of the extent of the find remained a matter of great speculation for months while the Dart operators used their full 90-day-confidentiality-status hold on all well-completion test results. "The play, from scattered reports by lease buyers, landowners, and scouts, had much the same effect as a rock dropped into a quiet pond. Ripples were most intense immediately in the Missaukee-Clare-Osceola counties district, then spread out, as far south as the Gratiot-Montcalm counties area. . ."(9) These "ripples" first appeared as "platoons of oil-company lease brokers [began] fanning through Clare, Missaukee, and nearby counties, bidding up the price of oil and gas leases, in some cases to several hundred dollars an acre."(10) On December 23, 1980, the *Wall Street Journal* noted that a year earlier ". . . the same rights probably would have cost between $1 and $3 an acre."(11)

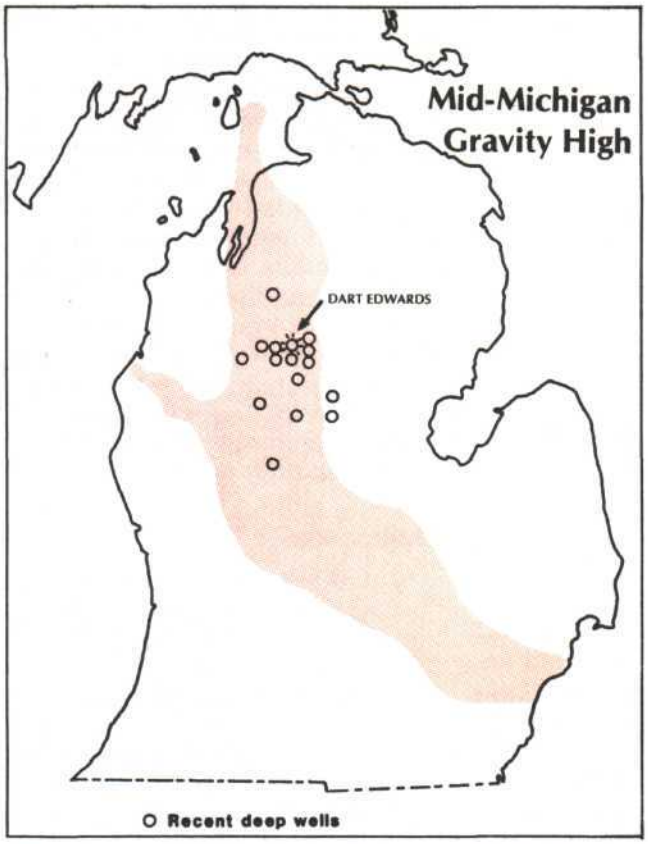

Figure 3. A third phase of oil and gas discovery could be linked to a very deep fault system running across Michigan. Deep, "basement rock" faulting can produce heavier strata that pull just a tiny bit more. Geologists can measure this pull from the surface as a "gravity high." Only drilling, however, will tell how much oil and gas these faults or other deep structures really hold.

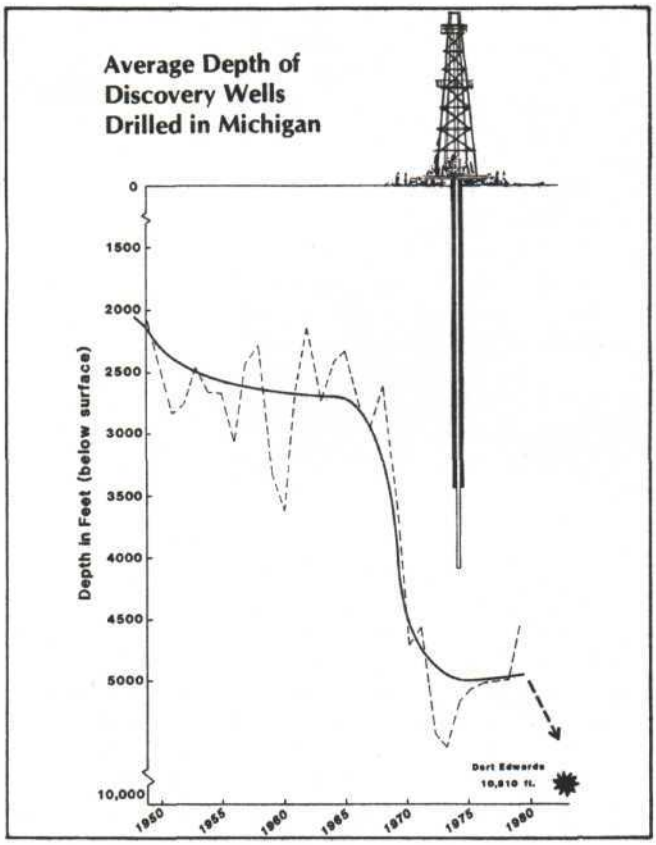

Figure 4. During the first 80 years of drilling, most oil and gas wells in Michigan were quite shallow. In the late 60s, however, average drilling depths dropped to around 5,000 feet as the deeper coral reef targets dominated this second phase of exploration. Now, if the Dart-Edwards well truly signals the start of phase 3, wells would drop down to another platform (solid line represents average).

The Industry In Perspective

In a state that has had very serious economic problems in recent years, the oil and gas industry has been one of Michigan's few success stories. Its growth has been phenomenal. In 1970, for example, oil and gas production contributed only 10 percent to Michigan's total mineral output. Today the figure stands at over 50 percent. In absolute terms, 1981 oil and gas production in Michigan was over $1.5 billion. It might surprise some to see how this compares with other traditional commodities in the state (1980 figures are used to minimize the impact of the current recession which the other sectors experienced in 1981 and 1982).

Commodity	*Approx. 1980 direct value (billions $)*
All crops	1.6
Livestock and dairy	1.4
Forestry	1.0
Oil and gas	1.5
All other minerals	1.0

Michigan ranks 12th in the U.S. in both oil and gas production. However, its daily production of some 90,000 barrels of oil and 350 to 400 million cubic feet of gas supply less than 20 percent of the state's needs. Production has been increasing faster than consumption recently, so that the level of self-sufficiency for Michigan has been gradually increasing. Michigan's hydrocarbon resources are well distributed throughout the state, with 58 of the 68 lower peninsula counties showing varying degrees of production. There are no oil or gas producing wells in the Upper Peninsula.

The big question today surrounds the deep play. Will the "speculative boom" that the state has been experiencing pan out to be a "production boom," or will the spectacular Dart-Edwards gas strike prove a unique geologic discovery? This is the "million dollar question," especially for the more than 250 oil exploration companies currently active in Michigan.

Up until now, the lack of additional successes in the Missaukee County area has had a dampening effect on the "boom." However, as one insider noted, just a few new discoveries are needed and its "off to the races again." Claude Osbourne, of Dart Oil & Gas, suggested that the industry "knows enough to earn a Ph.D. degree on the Niagaran reef, but that it has just walked into kindergarten relative to Michigan's deep play."(12)

The State of the Industry

The number of drilling permits insured for oil and gas exploration is a good indicator of the industry's level of activity in Michigan, and 1981 was certainly a banner year. "For the first time since 1941, more than 1,000 drilling permits were issued by the Michigan Department of Natural Resources Geological Survey Division. Final figures released by the Division . . . show 1,048 permits issued last year, compared to 859 in 1980."(13) Furthermore, for the first quarter of 1982, permit applications were 20 percent ahead of the previous year's pace, although this rate is expected to level off. Division officials predict that permit totals for 1982 will likely end up equal to, or perhaps a bit below the 1981 figure.

Does this leveling in permit applications suggest disappointment in the lack of further deep finds? For that matter, was the Dart-Edwards strike a key factor behind the record 1981 permit activity? To a limited degree, the answers may be yes on both counts, but there are other more important explanations behind the permitting trends.

Permit activity is basically a reflection of the industry's business climate, with a little lag time thrown in to confuse the issue. With this in mind, we notice that oil and gas prices peaked in early 1981, and have since been dropping. Furthermore there have been plenty of investors willing to sink money into oil and gas exploration, and a number of new tax incentives for developing domestic reserves. In the last few months, however, investment monies have tightened up considerably.

Drilling rates may prove a better indicator of oil and gas activity in Michigan. Over the past ten years, the number of wells drilled per year has almost tripled; much of this increase came in just the last two years (Figure 5).

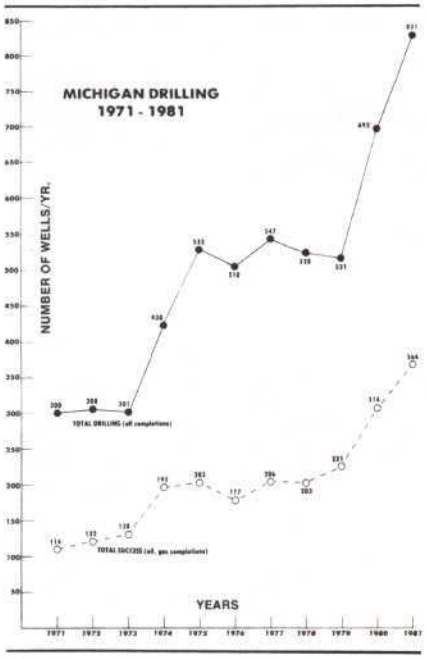

Figure 5. The number of oil and gas wells drilled in Michigan each year nearly doubled between 1973 and 1975, but the last two years (1980-81) have seen an even bigger jump.
Source: *Oil & Gas News*, Vol. 88, No. 21

In retrospect, it appears that the highly publicized deep play may have been "blown out of proportion" relative to its overall impact on Michigan oil and gas developments. The strike simply came about at an opportune time — at the height of drilling activity — and the industry would have been experiencing record business levels anyway, with the current high, but stable, drilling level tied to a number of business indicators. The Missaukee find definitely had an impact on leasing, however. While rumors of the Dart-Edwards strike spread, leasing reached an all time high in Missaukee, Clare, and Kalkaska counties. More recently, leasing in the north has slowed.

Conclusion

Oil and gas is big business in Michigan, probably far more important to the state's economy than most people realize. Michigan is riddled with unemployment and cutbacks in state programs, but the oil and gas industry here is alive and well. The industry's severance taxes alone brought the state almost $90 million last year, while Michigan's 1981 auctions of oil and gas leases on state lands, the first since 1979, brought almost $40 million more to the state. If the deep play pans out, we will experience a real boom, one from which all the citizens of Michigan will profit. But even as things now stand, the industry is prospering.

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