

Questions
and
Answers

OIL AND GAS IN WISCONSIN

by

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The following questions and answers have been prepared to cover some of the general requests received by the Geological and Natural History Survey for information regarding recent oil and gas exploration interest in Wisconsin. Other requests for information and assistance may be directed to Thomas J. Evans, Mineral Resources Section.

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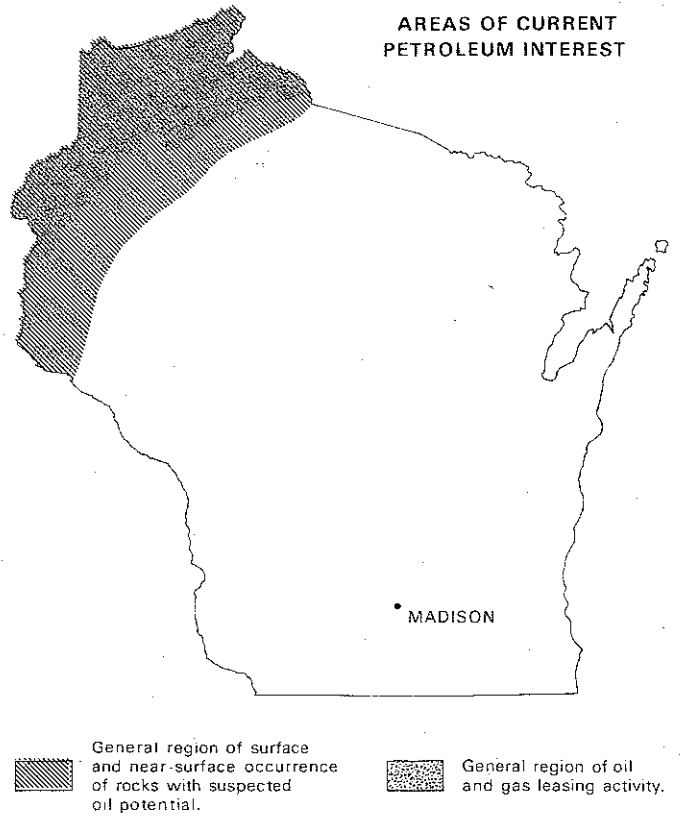
Why is there interest in oil and gas exploration in Wisconsin now?

The United States uses over 15 million barrels of oil per day, of which one-third is imported. In addition, about 60 billion cubic feet of natural gas are used each day. Because of this continuing demand for oil and gas, exploration for these resources in the U.S. has increased markedly over the last decade or so. Today, there are about twice as many drilling rigs in operation, crews engaged in seismic exploration, and line-miles of seismic exploration completed than in 1973.

In past times Wisconsin's potential for oil and gas has been considered unfavorable. However, the short supply of these resources and new ideas concerning their occurrence in nature have stimulated the petroleum industry to look at new areas, such as Wisconsin.

Where does oil and gas occur in Wisconsin?

Because no one has found oil and gas in any significant quantities in Wisconsin, one can only speculate on where such resources might be located. It will require extensive exploration programs to determine just where it occurs, if it occurs at all.



Some potential areas in Wisconsin might include north-west Wisconsin where rocks known as the Keweenaw Series are present. This area, underlain by shale rich in organic material that is in turn overlain by sandstone and siltstone, has been the object of recent oil and gas leasing activity. Another area might be offshore in Lake Michigan where rocks similar to those in the oil-producing parts of Michigan occur. Still another area might be in southwest Wisconsin where rock known to be petroliferous has been observed.

Wisconsin does not have any known deposits of oil and only small amounts of methane or natural gas. Methane, produced by decay of plant remains, is occasionally encountered in drilling unconsolidated surficial and glacial deposits. Also, methane is produced in certain landfills as the buried waste material decays. However, though such methane occurrences might be used on a very local basis, there are no commercial quantities of natural gas known in the state.

Has oil and gas exploration occurred before in Wisconsin? Was it successful?

Since the 1860s over fifty test holes have been drilled for oil and gas in Wisconsin. None of these produced any oil or gas. Marsh gas, containing methane or natural gas, has been found accidentally while drilling water wells in small pockets of decayed plant remains (peat) in glacial deposits. Such occurrences are too small to be of any commercial interest.

Although some test holes have been drilled specifically for oil and gas, more than 300,000 water wells have been drilled in the state. A large number of these are deeper than 100 feet and penetrate the deepest rock formations in Wisconsin. In none of these wells have commercial amounts of oil or gas been found.

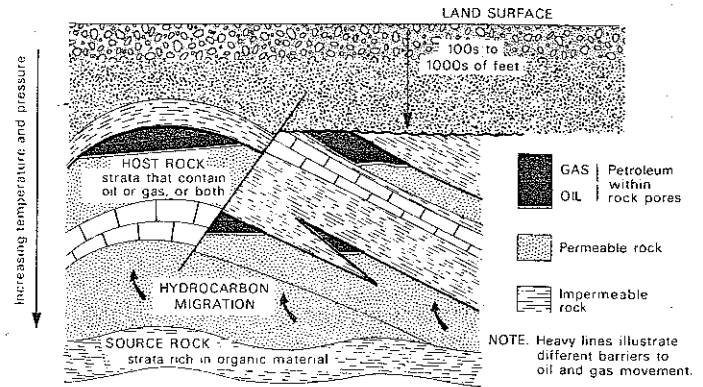
What is so important about oil and gas?

Oil and gas are vitally important energy resources. Oil and gas are in short supply given the current rate at which they are being produced and used. In addition, the role of these resources within the economy of the United States is fundamental. Crude oil is the source of gasoline, heating oil, and products such as asphalt, kerosene, lubricants, waxes, and a variety of plastics. Natural gas is used to heat houses, industrial plants and factories, commercial establishments, and to generate electricity. In 1983 over 60 percent of the energy produced in the United States came from crude oil, natural gas, and related products. In 1983, 67 percent of the energy consumed came from oil and gas. The difference between what was produced and what was consumed came from imported oil and gas.

How do oil and gas form? Where do these resources occur?

Oil and gas often occur together under ground in "pools" or "reservoirs," which are areas of porous rock containing pe-

roleum in the pores of the rock strata. The process of formation of oil and gas is complex, but can be understood if broken down into its basic elements.



Schematic illustration of oil and gas generation, movement, and accumulation in "traps". Several types of oil and gas traps are shown, but not all are present in any one particular area. (No scale implied)

Petroleum geologists have identified four basic elements necessary for the formation and accumulation of oil and gas: a source, sufficient heat and pressure, a host, and a trap. A source of organic compounds that can eventually be transformed into petroleum is commonly found in rock and sediment in which the remains of animals and plants are included. The source rocks must have been subjected to the proper temperatures and pressures to transform the plant and animal remains into the hydrocarbons (carbon-hydrogen-oxygen compounds) known as petroleum. Both crude oil and natural gas are made up of hydrocarbons. Near to this source there must be a *host* (porous rock strata) permeable enough to allow the oil and gas produced from the source material to migrate into it. A *trap*, often a fault or break in the rock strata or just a change to low permeability strata, is necessary to force the pooling or concentration of the oil and gas within the host rock.

These four basic elements need to be present in the right relationship through time to provide for petroleum production, migration, and trapping. The only way to know if these basic elements are present in the right order is to investigate the subsurface rocks in the area of interest.

How do companies explore for oil and gas?

Exploration for oil and gas generally involves four stages.

(1) General background information on subsurface geology is gathered, reviewed, and evaluated for indications of potential source rock, host rock, adequate geologic traps, and similar features necessary for the formation and accumulation of oil and gas in the subsurface.

(2) Leasing is initiated for eventual geophysical testing and exploratory drilling. Oil and gas companies commonly lease a large amount of land and then, as the evaluation proceeds, drop some leases that prove to have little oil and gas potential.

(3) Geophysical investigations are next used to determine sites for eventual drilling. Typically geophysics involves seismic investigations where vibrations or shock waves are passed into the earth and then return to sensitive recording instruments. The nature of these returning shock waves indicates the type and geometry of rocks deep within the ground. These shock waves are mild and generally can only be felt by very sensitive recording instruments. They are created by thumping the ground, or more rarely by detonations of small explosive charges.

(4) Once specific areas have been identified for further evaluation, drill rigs will be used to bring up samples of the rock and test for oil and gas. Though it is unlikely that any particular drill hole will produce oil and gas, the information obtained is used to select other areas for test drilling and to improve the chances to discover oil and gas.

How much acreage would be devoted to petroleum exploration?

Commonly, thousands of acres may be leased by an oil company. Until more precise geologic information is available, the potential for oil and gas is obscure, so large areas of land are leased.

A drill hole, however, involves only a small amount of land. An oil and gas exploration company needs access to a drill site for the drill rig, support equipment such as drilling pipe and mud tanks, and vehicles for the rig workers. No more than two to three acres are necessary for each drill site.

Will oil and gas production harm the environment?

The environmental impact of oil and gas development is typically insignificant, but precautions in the form of specific regulations are needed should oil and gas development become a reality.

Drilling is a well understood activity that has been regulated by the Department of Natural Resources for water wells and metallic-mineral exploration for many years. Oil and gas in the ground are typically under pressure which helps to force them to the surface. The use of heavy drilling muds and mechanical devices during actual exploration drilling helps prevent the uncontrolled release of oil and gas into the environment. Oil and gas production also involves on-site storage, pipeline transportation, and so forth and this poses some potential for environmental harm in the form of spills. However, careful regulation and monitored performance will minimize any threat to the environment.

At present, what controls are there governing oil and gas exploration and development in Wisconsin?

The Department of Natural Resources is charged with protecting the Wisconsin environment by regulating a wide variety of industrial activity. In response to its charge to protect the waters of the state, including surface water and groundwater, the DNR is drafting specific administrative rules for the regulation of oil and gas exploration. The DNR currently focuses its efforts on exploration aspects of oil and gas. If oil and gas are discovered, the State of Wisconsin will quickly establish the regulatory framework necessary to deal with oil and gas development.

I have been approached by a "broker" to sign a lease — who does this person represent?

Brokers are individuals or companies that acquire mineral rights to land, usually by obtaining signed leases from mineral owners, for eventual exploration and development by another company or individual. Brokers are trained in understanding land titles and dealing with public agencies and private individuals. Many oil companies use land brokerage firms to assist in acquiring leases. The brokers eventually assign the leases to the oil company for whom they are working.

How do I know if the oil and gas explorer is reputable?

If the actual explorer is a major oil company, you can be reasonably certain that their interest is legitimate and sincere. But small, independent petroleum companies are also legitimate participants in the search for oil and gas, so you can't always tell by the name alone.

If you question the sincerity of an explorer or if you want to check out the company, ask the explorer for references and examples of where they've worked before. Also, ask for written documentation of any statements or representations about which you are uncertain. Check with your local law enforcement people to learn about any questionable history with the local authorities. You can contact the Secretary of State's office to confirm if the firm is eligible to do business in Wisconsin. By contacting the nearest university geology department, local Department of Natural Resources office, or the Wisconsin Geological and Natural History Survey, you can find out who else knows about the company or individual interested in oil and gas on your property.

Some people in Wisconsin have been approached to invest in nearby oil and gas exploration efforts. Generally, legitimate exploration companies set aside money to finance their land acquisition and drilling programs. The involvement of local investors is almost never necessary. Solicitations for investments in Wisconsin oil and gas exploration should be evaluated carefully.

I don't understand this lease. Where can I get help?

Mineral leases can be complicated legal documents and you should understand all of the parts of the lease before signing.

Never sign any legal document, such as a lease, that affects your ownership of your property before consulting an attorney.

There are three sources for help on leases. First, the individual or company offering the lease for your consideration should be able to answer many of your questions. Typically they are happy to do so because they want you to be satisfied with the lease, too. In Wisconsin, it is not to a company's advantage to keep landowners in the dark, and, in our experience, the established mineral companies are usually excellent sources of accurate information.

Second, individuals here at the Survey will be glad to review the lease with you in order to help you understand the basic parts of the lease and some of the terms used. The Survey does not provide legal advice, but can provide assistance with the technical aspects of the lease.

Third, attorneys knowledgeable about mineral leases or similar legal documents are the best source of legal information concerning leases offered for your signature. With a document that may be very complicated, your best bet is to work with a knowledgeable lawyer. Together, you and your attorney can assure that your interests are represented as you consider whether or not to sign a mineral lease.

Do I have to sign an oil and gas lease that has been offered to me?

No, you do not have to sign a lease. A lease is a mutually negotiated legal document — both parties to a lease must be satisfied with it before signing. You should never feel pressured into signing and should always seek legal counsel before signing any document such as a mineral lease. The petroleum company or its broker clearly wants you to sign the lease, but you can not be compelled to sign a lease at any time.

How can I determine if there is oil and gas on my property?

The best way is to have someone explore on your property. There is no way except actual drilling to confirm the presence or absence of oil and gas on your property. Even the most competent oil and gas exploration companies have to eventually drill into the rocks to see if oil or gas (or both) are present. The success ratio for petroleum exploration is typically very low and varies widely depending on the geologic setting, the amount of information available, the degree of previous exploration, and other similar factors. For example, in areas with rock units similar to those in northwestern Wisconsin success ratios for petroleum exploration are typically two to three percent or less.

How can I find out if I own the mineral rights on my land?

Check your abstract of title with a real-estate attorney. Mineral rights may have been separated from the rest of the rights on your parcel of land, but that previous separation should be noted in your abstract. You can check with the registrar of deeds in the county where the land occurs and

using the tract index, you can trace the history of ownership on the land in question to determine if the mineral rights have ever been severed from the surface rights.

Obviously real-estate law is a complicated area but an attorney should be able to help you. Beyond the reviews of your title outlined above, you need to consult an attorney for his expert advice.

What rights do I have if I own only the surface (and not the minerals) on my land?

As the owner of surface-rights-only, you cannot lease the minerals. The mineral-rights-owner has the right to develop his property through exploration and production, but you too have the right to be fairly compensated for any damage done to your property. Further, you do have the right not to be unreasonably disturbed by the oil and gas explorer.

Clearly, the legal situation you face is not cut-and-dried. Consult a knowledgeable attorney with any questions about your rights as owner of surface-rights-only. Though you may not own the minerals, you do own the surface and you do have a right to the enjoyment of your property, too.

Are there any maps available that show where oil and gas occur?

Maps of oil and gas are not available, but the basic information for companies and individuals knowledgeable in these resources may well be available here at the Survey. Geologic maps, geophysical maps, and records of field studies together provide an important base of information upon which to investigate the potential for oil and gas occurrences.

Maps showing the basic geology of the state are available in a variety of sizes from the Survey. Bedrock geologic mapping continues to be an important activity at the Survey and more maps are being compiled and published regularly. In addition to geologic maps, the Survey maintains files with extensive records of past field studies which for specific land parcels may be another source of information.

Geophysical maps showing variations in the Earth's gravity and magnetic field are available for certain areas in northern Wisconsin. These maps are used in combination with geologic studies to determine rock type, structure, and resource potential of the Wisconsin bedrock.

What state agency can advise me on information relative to oil and gas on my property?

The Wisconsin Geological and Natural History Survey has many geologic and mineralogic records and data concerning land in the state. Send the legal description (location) of the land you are interested in, and the Survey will inform you of what information is available.

The Department of Natural Resources can help you determine who is drilling where in Wisconsin. As they develop the rules governing oil and gas exploration, the DNR is in regular contact with petroleum exploration companies and will have information on their activities.