

OIL AND GAS

IN

VERMONT

A collection of oil and gas articles and information dating from the 1950's to 1989.

Additional information may be obtained through the Office of the State Geologist

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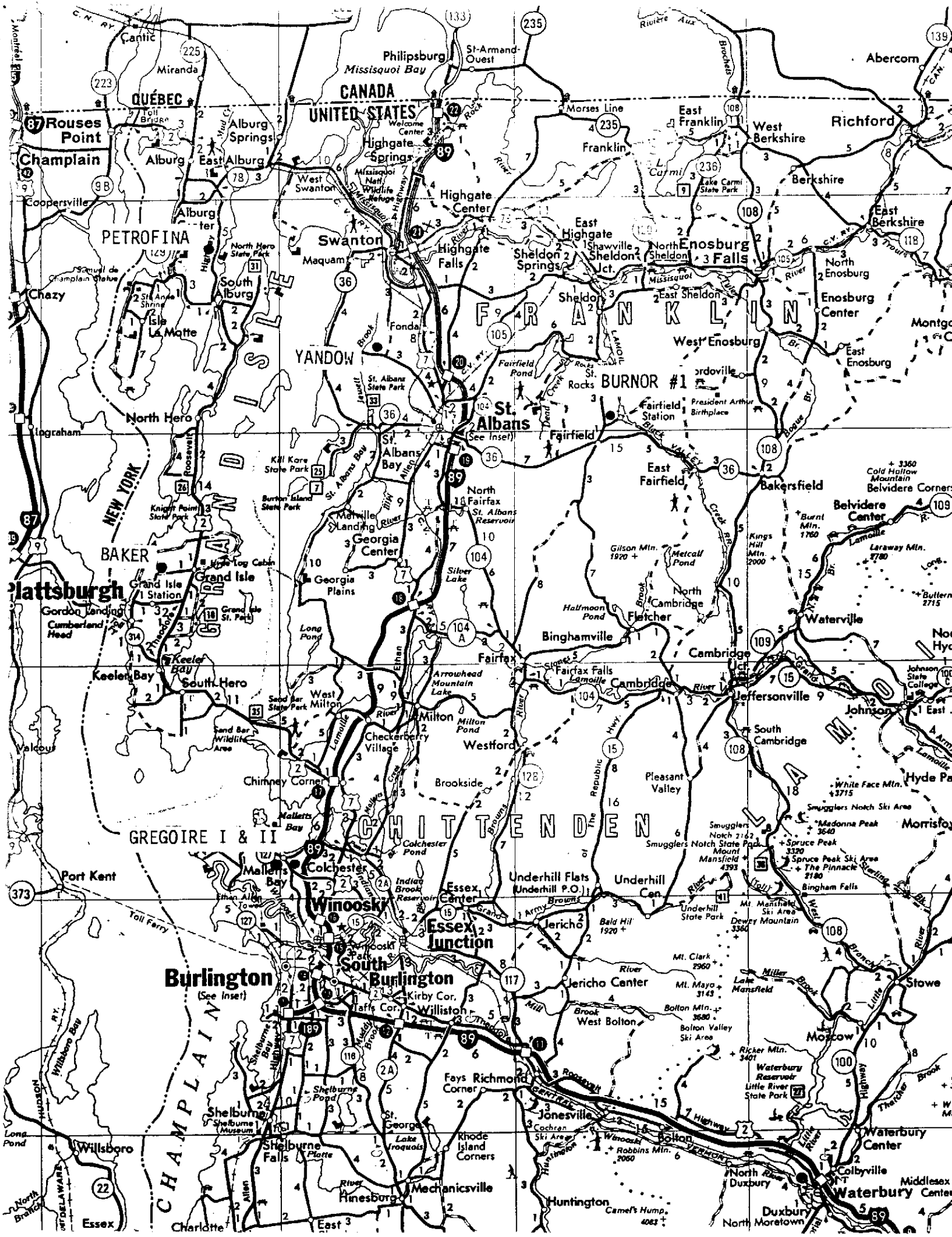
BASIC INFORMATION SHEET ON OIL & GAS WELLS
DRILLED IN VERMONT

WELL NAME	LOCATION	YEAR	DEPTH	SPONSORING & DRILLING Company
Yandow #1	Franklin Co., St. Albans	1957	4500	Maquam Gas & Oil Co. & Peter Henderson Oil Co.
Gregoire #1	Chittenden County Colchester	1959 1960	5075	Vermont Natural Gas & Mineral Corp.
Gregoire #2 (Hazelett #1)	ditto	1960 1961	2306	ditto
Alburg #1	Grand Isle County Alburg	1964	5120	American Petrofina & Falcon Seaboard Drilling Co.
E.S. Baker #1	Grand Isle County Grand Isle	1968	3500	Cambrian Corp.
David and Jean Burnor #1	Franklin Co. Fairfield	1984	6968	Columbia Gas Transmission Co. and Delta Drilling Co

- (1) Yandow #1, Vermont 44 (Maquam Oil & Gas Dev. Corp., Henderson Oil Co.)
Franklin County 011
St. Albans
Latitude 44°51'17"; Longitude 73°07'40"
Vermont State Coordinates N 262,500 m
E 101,000 m
API (American Petroleum Institute) number: 44-011-00001-0000
Date drilled 1956-1957
No additional information
- (2) Gregoire #1, Vermont 44 (Vermont Gas and Mineral Corp.)
Chittenden County 007
Colchester
Latitude 44°32'30"; Longitude 73°13'40"
Vermont State Coordinates N 227,000 m
E 095,500 m
API number 44-007-00001-0000
Date drilled 1959-1960
Feet drilled: 5076; Actual depth: unknown
Rock type: dolostone to 329, shale 329 to 5076
- (3) Hazelett #1, Vermont 44 (Vermont Gas and Mineral Corp.)
Chittenden County 007
Colchester
Latitude 44°32'35"; Longitude 73°13'21"
Vermont State Coordinates N 227,000 m
E 095,550 m
API number 44-007-00002-0000
Date drilled 1960-1961
Feet drilled: 1775; Actual depth: unknown
Rock type: dolostone to 465, black shale 465 to 1775
- (4) Alburg #1, Vermont 44 (American Petrofina Corp.)
Grand Isle County 013
Alburg
Latitude 44°55'07"; Longitude 73°16'48"
Vermont State Coordinates N 268,500 m
E 091,250 m
API number 44-013-00001-0000
Date drilled 1964-1965
Feet drilled: 5120; Actual depth: unknown
Rock type: see attached log
Formation(s): see attached log, Table I
- (5) E. S. Baker #1, Vermont 44 (Cambrian Corp.)
Grand Isle County 013
Grand Isle
Latitude 44°41'15"; Longitude 73°19'05"
Vermont State Coordinates N 246,000 m
E 089,000 m
API number 44-013-00002-0000
Date drilled 1968
Feet drilled: 3500; Actual Depth: unknown
Rock type: see attached material
Formation(s): see attached material

- (6) Burnor #1, Vermont 44 (Columbia Gas Transmission Co., Inc.)
Franklin County Oil
Fairfield
Permit #1
Latitude 44° 48' 50"; Longitude 72° 56' 15"
Vermont State Coordinates N 257,000 m
E 118,000 m
API number 44-011-20001-0000
Date drilled 1984
Drilling in progress 9/17/84
Tight hole status
FeetDrilled 6968

(6) Burnor #1, Vermont 44 (Columbia Gas Transmission Co., Inc.)
Franklin County 011
Fairfield
Permit #1
Latitude 44° 48' 50"; Longitude 72° 56' 15"
Vermont State Coordinates N 257,000 m
E 118,000 m
API number 44-011-20001-0000
Date drilled 1984
Drilling in progress 9/17/84
Tight hole status
Feet Drilled 6968



O I L A N D G A S

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- Bigelow, Tom, 1982, Vermont gas potential lures speculators: Northeast Oil Reporter, v. 2, no. 8, p. 48-51.
- Doll, C. G., Report of the State Geologist for the following years:
- | | | | |
|-----------|-----|-----------|-----|
| 1954-1956 | SGL | 1966-1968 | SGL |
| 1956-1958 | SGL | 1968-1970 | SGL |
| 1960-1962 | SGL | 1970-1972 | SGL |
| 1962-1964 | SGL | 1972-1974 | SGL |
| 1964-1966 | SGL | | |
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- Page, L. R., 1971, Petroleum potential of New England and selected references for region 10: American Association for Petroleum Geologists, Memoir, no. 15, p. 230-231.
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- Taylor, E. F., 1963, Wildcat drilling is coming to Vermont: Oil and Gas Journal, November 18, p. 230-231.
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- Vermont State Natural Gas and Oil Resources Commission, 1959, First Biennial report, p. 1-8, VSL.

SGL--Available at the Office of the State Geologist, Waterbury, VT.
VHL--Available at the Vermont Historical Society Library, Montpelier, VT.
VSL--Available at the Vermont State Library, Montpelier, VT.

Oil and Gas Survey

During the past several years explorations for oil and gas have been going on in the part of the Champlain Valley belonging to Canada. Although nothing more than small oil indications have been found as yet, the prospects for natural gas appear to hold greater promise. A limited number of wells are reported to yield gas in commercial quantities and it is possible that further drilling might encounter new horizons.

The investigations are being energetically pursued with modern scientific methods and equipment and the resulting discoveries should be reasonably accurate and conclusive. As of August 1, 1956, some 28 groups are actively probing in the area of the Champlain Lowlands from near the Vermont border to Quebec City.

It is on the basis of the intensity of explorations and some of the more prominent discoveries in Canada, and the many requests on this side of the border for geological information pertaining to gas and oil possibilities, that the Geological Survey proposes a thorough study of these possibilities in the Vermont portion of the Champlain Lowlands. This study will utilize the mapping results of the basic mapping program in the Champlain Valley.

The Champlain Valley has long been neglected, with regard to exploration for oil and gas. It is nothing new to residents of the Champlain Valley in Vermont that natural gas occurs in certain water wells. This would indicate a gas potential whose size can be revealed only by further investigations. Other important factors favoring explorations for oil and gas in this region are excellent land and water transportation and a new, large market nearby. The basin of sedimentary rocks possesses geologic features that warrant the exploration of this area for oil and gas.

REPORT OF
THE STATE GEOLOGIST
AND
VERMONT GEOLOGICAL SURVEY

for the Biennium

July 1, 1954 - June 30, 1956

Charles G. Doll
State Geologist

In the event of the discovery of oil or gas in Vermont, conservation laws and other regulatory measures should be enacted by the State Legislature and enforced by a State Regulatory Board established for this purpose. One of the requirements of such legislation should be the notification by the person proposing to drill a well to the proper office, of his intentions and to pay a stated fee to this office for each well drilled. A further charge of a small percentage of the gross casinghead value of the oil or gas produced will help to defray expenses connected with the administration of these laws and will also bring additional revenue to the State. Drill records and well samples should be made available to the Geological Survey, preferably through the cooperation of oil companies and drillers. These drill records and core samples would be catalogued and preserved for the future by the Geological Survey, thus making the Geological Survey the authorized repository for all drill records in the state.

REPORT OF
THE STATE GEOLOGIST
AND
VERMONT GEOLOGICAL SURVEY



FOR THE BIENNIUM
July 1, 1956 -- June 30, 1958
CHARLES G. DOLL
State Geologist

Oil and Gas

An attempt to locate oil in the Champlain Valley is being made on the Isadore Yandow farm some four miles northwest of St. Albans by the Peter Henderson Oil Company of New York City, sponsored by the Maquam Oil and Gas Development Corporation of St. Albans. Drilling operations were suspended at a depth of about 4,500 feet, in which some natural gas was encountered. It is reported that more area studies will be made by the Company before drilling is resumed.

Explorations for oil and gas have been going on in recent years in the Champlain Valley in Canada. Although as yet only traces of oil have been encountered, some natural gas wells of commercial extent are reported. Within the past three years oil was discovered in the State of Washington and natural gas in Arizona, thus bringing the oil and gas producing states to 31. The State of Maryland has produced gas for several years.

The discovery of oil depends upon a thorough knowledge of the subsurface rocks, the kinds, their structures, extent, and correlation. The accumulation of data by means of subsurface studies makes possible the construction of structural maps which greatly assist in finding oil. Such maps are the result of geophysical investigations in which precision instruments are employed to determine subsurface conditions of the rocks. This is a necessary prelude to a well planned drilling program and is usually followed.

The Champlain Valley comprises a basin of sedimentary rocks of considerable thickness and possesses geological features that merit exploration for oil and gas. Deep-well drilling should reveal the presence or absence of oil in commercial quantities in the Champlain Valley, as the formations likely to carry it lie at great depths. Economic advantages in the region are excellent land and water transportation and a new, extensive market nearby. Natural gas from this area could become indispensable as a peakload supplier of natural gas lines already established.

Most people are probably aware of the importance of oil and gas production to our economy and that these fuels are increasingly replacing other energy sources. Expansion of petroleum production results in the expansion of other services, thereby broadening the tax base and providing new revenues for the State. Sources of energy and a nation's security are inseparable and adequate supplies of oil must be available.

Regulations requiring operators and drillers to make their drill records and well samples available to the Geological Survey for cataloguing and use in future subsurface studies in the Champlain basin, should be made. The Geological Survey should be the authorized repository for all borehole records in the state.

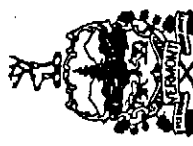

Oil and Gas

An attempt to locate oil in the Champlain Valley was made about five years ago by the Peter Henderson Oil Company of New York City, some three miles northwest of St. Albans. Drilling operations were suspended at about 4500 feet and, although some natural gas was encountered, the well was abandoned. In 1959 and 1960, two wells were drilled near Malletts Bay in the Town of Colchester by the Vermont Natural Gas and Mineral Corporation, the deeper well to a depth of some 5000 feet. Small pockets of gas were penetrated but the wells were abandoned. None of these wells is deep enough to reach the lithologies beneath the great thickness of shales.

The discovery of oil depends upon a thorough knowledge of the subsurface rocks, the kinds, their structures, extent, and correlation. The accumulation of data by means of subsurface studies makes possible the construction of structural maps which greatly assist in locating oil. Such maps are the result of geophysical investigations in which precision instruments are employed to determine subsurface conditions of the rocks. This is a necessary prelude to a well-planned drilling program and is usually followed. A program of study during the drilling stage would include drill core examinations, porosity and permeability determinations, and chemical analyses of the rocks.

Deep Deposits of Ancient Seas

The Champlain Valley comprises a basin of sedimentary rocks of restricted width, but of considerable thickness and variety. They are older Paleozoic in age and relatively untested. These older Paleozoic rocks have been found to be productive in some localities and are now receiving more attention in oil-producing areas. Renewed interest in oil and gas possibilities in the Champlain Valley has been shown within the past year. Three wells cannot be considered to adequately test the oil and gas possibilities of these rocks.



The Report

of

THE STATE GEOLOGIST

FOR THE BIENNIUM

July 1, 1960 - June 30, 1962

Oil and Gas

Drilling for natural gas and/or oil in the Champlain Valley of northwestern Vermont is expected to begin sometime in early fall of 1964. The plans call for two wells to be drilled this year and several more in 1965, depending on the degree of success of the initial wells. Detailed field studies are still in progress.

American Petrofina, Inc., of Dallas, Texas, has taken over leases on approximately 30,000 acres of private properties and 140,000 acres of state-owned land, provided by Cambrian Corporation, a group of Vermont businessmen. The drilling will be done by Falcon Seaboard Drilling Company of Tulsa, Oklahoma, who are participants in the undertaking. Drilling is now in progress in the town of Alburg. Several oil companies are showing an interest in explorations in the Champlain Valley.

Gas has been known to exist in the Champlain Valley for many years. Some gas-producing wells of commercial grade have been located to the north in the St. Lawrence Lowlands of Canada. A few deep wells penetrating the Ordovician and Cambrian formations far below the surface should provide data indicative of whether or not hydrocarbons exist in commercial quantities in Vermont. Needless to say, success in this venture would give a powerful lift to the economy of the state. It is refreshing that explorations on so large a scale are becoming a reality, for, in addition to their commercial aspect, they will reveal much scientific information on the thick sequence of rocks in the Champlain basin. The Survey is keeping an active interest in these explorations.

The Champlain Valley comprises a basin of sedimentary rocks of considerable thickness and variety. They are older Paleozoic in age and relatively untested. These older Paleozoic rocks are found to be productive in some localities and are now receiving more attention in oil-producing areas. Renewed interest in oil and gas possibilities in the Champlain Valley in Vermont is encouraging.

The Report of

THE STATE GEOLOGIST



FOR THE BIENNIIUM

July 1, 1962 - June 30, 1964

EXPLORATIONS FOR HYDROCARBONS

The first attempt to find oil and/or gas in the Champlain Valley in Vermont was made on the Isadore Yandow farm some four miles northwest of St. Albans by the Peter Henderson Oil Company of New York City. This project was sponsored by the Maquam Oil and Gas Development Corporation of St. Albans. Drilling operations were suspended at a depth of about 4,500 feet, in which some natural gas was encountered. In 1959 and 1960, two wells were drilled near Malletts Bay in the Town of Colchester by the Vermont Natural Gas and Mineral Corporation, the deeper well to a depth of some 5,000 feet. Small pockets of gas were penetrated and the wells were abandoned. Neither of these wells appeared to be deep enough to reach the lithologies beneath the great thickness of shales.

The most recent exploration was undertaken in the fall of 1964 by American Petrofina, Inc., of Dallas, Texas. Leases on approximately 30,000 acres of private properties and 140,000 acres of state-owned land were provided by Cambrian Corporation, a group of Vermont businessmen. The drilling was done by Falcon Seaboard Drilling Company of Tulsa, Oklahoma, participants in the project. The well was drilled at Dillenbeck Bay about two and a half miles south of Alburg Center. Although original plans were to drill to more than 6,000 feet, the well was abandoned at about 4,800 feet.

None of these wells appears to have bottomed beyond the great thickness of the Ordovician rocks, which, where drilled, have been found to be greatly restricted in porosity or reservoir space. The thick, underlying sequence of Cambrian formations, with horizons of sandstones and similar types, have not yet been probed. The possibility of petroliferous rocks occurring in the Cambrian formations should not be ruled out. In an address on oil and gas possibilities of the rocks of eastern Canada, including the Champlain Valley, by a senior geologist of a well-known oil company, at the annual meeting of the American Association for the Advancement of Science in Montreal two years ago, the formations of Cambrian age were still considered a possibility. Until the Cambrian rocks have been explored, it cannot be said that the Champlain basin has been adequately tested in Vermont.

The discovery of oil depends upon a thorough knowledge of the subsurface rocks, the kinds, their structures, including porosity and permeability determinations, extent, and correlations. The accumulation of data by means of subsurface studies makes possible the construction of structural maps which greatly assist in locating oil. Such maps are the result of geophysical investigations in which precision instruments are employed to determine subsurface conditions of the rocks. This is a necessary prelude to a well-planned drilling program. It has not been demonstrated that such studies were made prior to the well drillings cited. The above state-

ments are intended to point out merely that the Champlain basin in Vermont has not been completely explored for hydrocarbons, and whether or not they exist in commercial quantities still remains a question.



The Report of THE STATE GEOLOGIST

FOR THE BIENNIAL
July 1, 1964 - June 30, 1966

CHARLES G. DOLL
STATE GEOLOGIST



gas" by the drill operators and, although they indicate the presence of gas, their volumes are as yet noncommercial. So far as the writer has been able to ascertain, none of the drilling to date has penetrated below the great thickness of the tight-fitting shales to possibly more favorable horizons. To the writer's knowledge, the sequence of Cambrian formations with horizons of arenaceous and similar rock types have not yet been probed. Until the Cambrian rocks have been explored, it cannot be said that the Champlain Basin has been adequately tested in Vermont.

The search for natural gas is again underway in the Champlain Valley in Vermont. Drilling was begun in late summer of 1968, on the Everett Baker farm in Grand Isle Township. The writer was informed that the project is sponsored by the Cambrian Corporation and others, and that the driller comes from Ohio. It is hoped that this enterprise will meet with success; it will add significantly to the knowledge of the stratigraphy of the region.

The first known attempt to find gas in the Champlain Valley in Vermont was made in 1956, on the Isadore Yandlow farm some four miles northwest of St. Albans by the Peter Henderson Oil Company of New York City. This project was sponsored by the Maquam Oil and Gas Development Corporation of St. Albans. After some months of drilling, operations were suspended at a depth of about 4,500 feet, in which some shale pockets yielded small amounts of gas. Spectrographic examination of a sample of this gas determined it to be methane without any other fractions.

The next endeavor to locate gas was near Malletts Bay in the town of Colchester, where two wells were drilled in 1959 and 1960 by the Vermont Natural Gas and Mineral Corporation, the deeper well to a reported depth of some 5,000 feet. These wells appear to have ended in the considerable thickness of shales, in which small pockets of gas were penetrated. It is noted that these wells were started in the dolostones of the Dunham Formation which overlies the Champlain Thrust Fault, and more than two miles east of the trace of this fault at Malletts Head.

A more recent exploration for gas was undertaken in the fall of 1964, by American Petrofina, Inc., of Dallas, Texas, and the drilling was done by Falcon Seaboard Drilling Company of Tulsa, Oklahoma. The well was drilled at Dillenbeck Bay about two miles south of Alburg Center. Although original plans were to drill to more than 6,000 feet, the well was abandoned at about 4,800 feet, reportedly because of drilling complications.

The Champlain Valley is a basin of sedimentary rocks of considerable thickness and variety. Studies indicate that these older Paleozoic rocks increase in thickness eastward toward the axial region of the geosynclinal basin. These older Paleozoic rocks have been found to be productive in some localities and are now receiving more attention in

REPORT OF THE STATE GEOLOGIST

FOR THE BIENNIMUM JULY 1, 1966 - JUNE 30, 1968

CHARLES G. DOLL, STATE GEOLOGIST

NATURAL GAS

Natural gas has been known to exist in the Champlain Valley for many years. It has been encountered in the drilling of rock wells and is present in some water supplies. These occurrences are termed "shale

Developments in New York State and New England During 1969 939

VERMONT

E. S. Baker No. 1 Grand Island, Vermont, was drilled by Tagor Exploration Company and completed at a total depth of 3,500 ft. It is reported to be a dry hole.

VERMONT

EARLE F. TAYLOR
Houston, Texas

On January 27, 1965, American Petrofina Exploration Company, as operator, and Falcon Seaward Drilling Company, suspended a test well in northern Vermont that had been spudded October 13, 1964. Total depth of the well, designated the Alburg No. 1, was 5,120 ft., deepest well drilled to date in Vermont. The Alburg No. 1 was drilled on the Harry Hutchins farm in the town of Alburg, Grand Isle County, Vermont, at Dillenbeck Bay near the shore of Lake Champlain.

The location for this test well was based on the surface expression of the East Alburg anticline, about 1/2 mile west of the anticlinal axis. Surface rocks at the well site are black shale of the middle Trenton in Stony Point.

This is the first oil and gas test drilled in Vermont with rotary equipment. Detailed studies of cores and cuttings were made. Final surveys included sonic, gamma ray-neutron, and induction electrical logs, and a continuous dipmeter. The Falcon Seaward-Petrofina group holds about 200,000 acres under lease in this region.

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Natural Gas. The most recent endeavor to find gas in the Champlain Valley was made in 1968 on the Everett Baker farm in Grand Isle Township. After drilling to a depth of about 3,500 feet without success, the drill-site was abandoned.

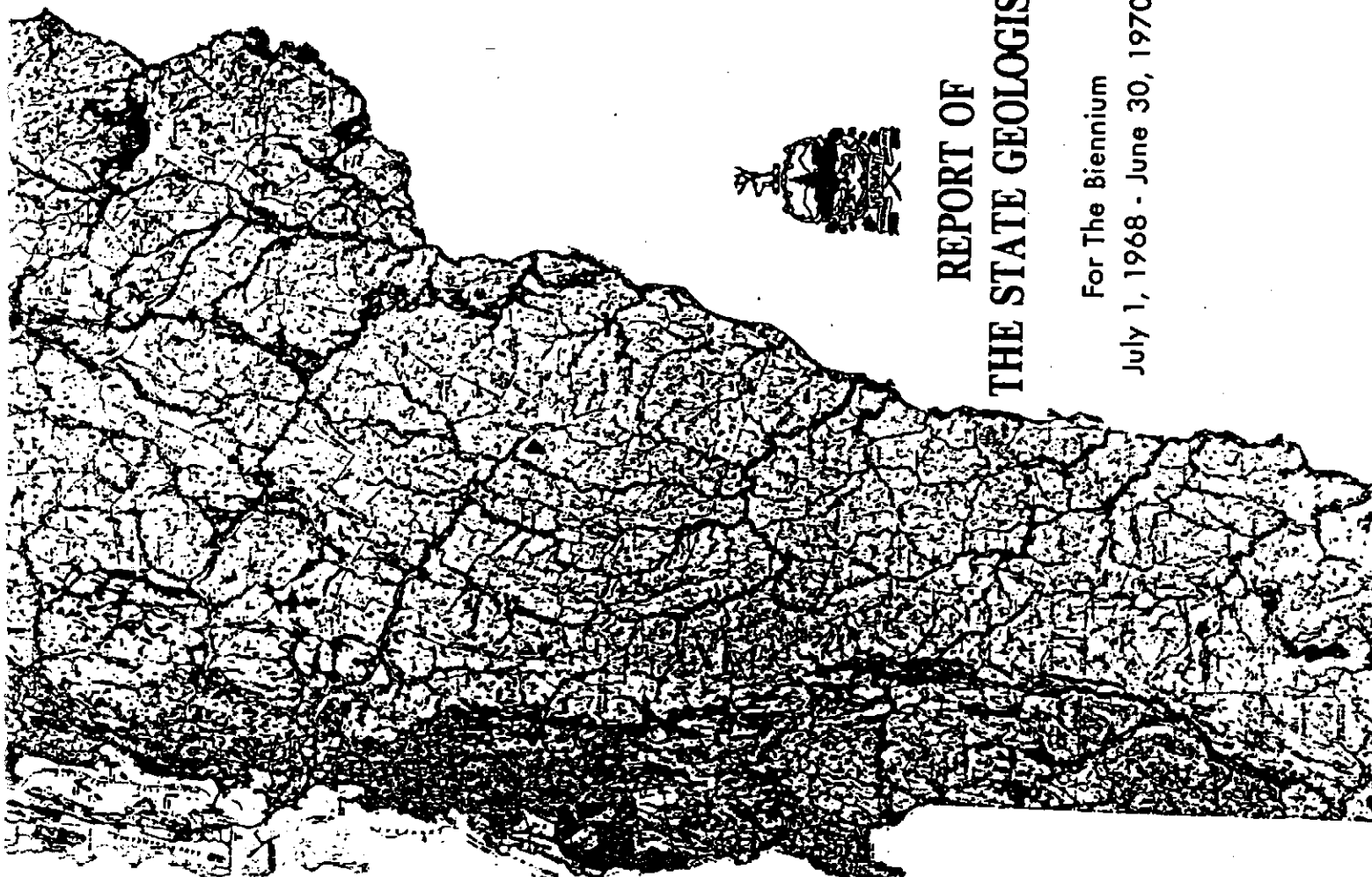
The first attempt to find oil and gas in the Champlain Valley in Vermont was made on the Isadore Yandow farm some four miles west of St. Albans by the Peter Henderson Oil Company of New York City. Drilling operations were suspended at a depth of approximately 4,500 feet, in which several pockets of natural gas were encountered. In 1959 and 1960, two wells were drilled at

Malletts Bay in the Town of Colchester by the Vermont Natural Gas and Mineral Corporation, the deeper well to a depth of some 5,200 feet. Small pockets of gas were penetrated and the wells were abandoned. Neither of these wells appeared to have been drilled deep enough to reach the lithologies beneath the great thickness of shales.

In 1964, American Petrofina, Inc., of Dallas, Texas, undertook explorations at Dillenbeck Bay about two and a half miles south of Alburg Center. The drilling was done by Falcon Seaboard Drilling Company of Tulsa, Oklahoma, participants in the project. Although original plans were to drill more than "6,000 feet," the well was abandoned at about 4,800 feet.

None of the wells cited above appears to have penetrated below the great thickness of the Ordovician rocks, which, where drilled, have been found to be restricted in reservoir space. The thick underlying sequence of Cambrian formations with horizons of sandstones and similar types has not yet been probed. The possibility of petroliferous rocks occurring in the Cambrian formations should not be ruled out. This opinion is held by some oil geologists who have indicated an interest in further studies of the rocks in the area, particularly the complex structures. Studies involving new concepts are now being made relative to future petroleum possibilities in New England. Recent interest is also due to the fact that natural gas occurs well to the east under the Champlain thrust fault. Until the Cambrian rocks have been explored, it cannot be said that the Champlain basin has been adequately tested in Vermont.

The Champlain Valley is a basin of sedimentary rocks of considerable thickness and variety. They are older Paleozoic in age, which have been found to be productive in oil-producing areas and are, therefore, receiving more attention.



REPORT OF THE STATE GEOLOGIST

For The Biennium

July 1, 1968 - June 30, 1970

Natural Gas and Oil

A renewed interest in the Vermont portion of the Champlain Valley as a possible source of natural gas has been shown by inquiries for geological information on the area, particularly during the past year. A recent paper on petroleum potential of New England, reprinted from *Future Petroleum Provinces of the United States (1971)*, which gives most space to a discussion of possibilities in northwestern Vermont, has probably played a part in creating this renewed interest. Also, explorations for oil and gas now going on in the Canadian portion of the Champlain Valley and not far from the international border, may have stimulated a revival of interest in Vermont.

Natural gas has been known to exist in the Champlain Valley for many years. It has been encountered in the drilling of water wells and is present in some water supplies. These occurrences are termed *shale gas* by the drill operators and, although they indicate the presence of gas, their volumes are as yet noncommercial. Thus far, it has not been shown that exploration drilling has penetrated below the great thickness of the relatively impervious shales to possible more favorable lithologies at greater depth.

The Champlain Valley comprises a basin of sedimentary rocks of considerable thickness and variety. These rocks are early Paleozoic in age, 400 to 500 million years old. Rocks of equivalent age are productive in some localities and are receiving more attention elsewhere. At the present rate of consumption of these commodities and the realization that their sources are finite, areas once written off are again being considered.

Brief descriptions of drilling operations for oil and gas in northwestern Vermont occur in previous reports of the State Geologist.

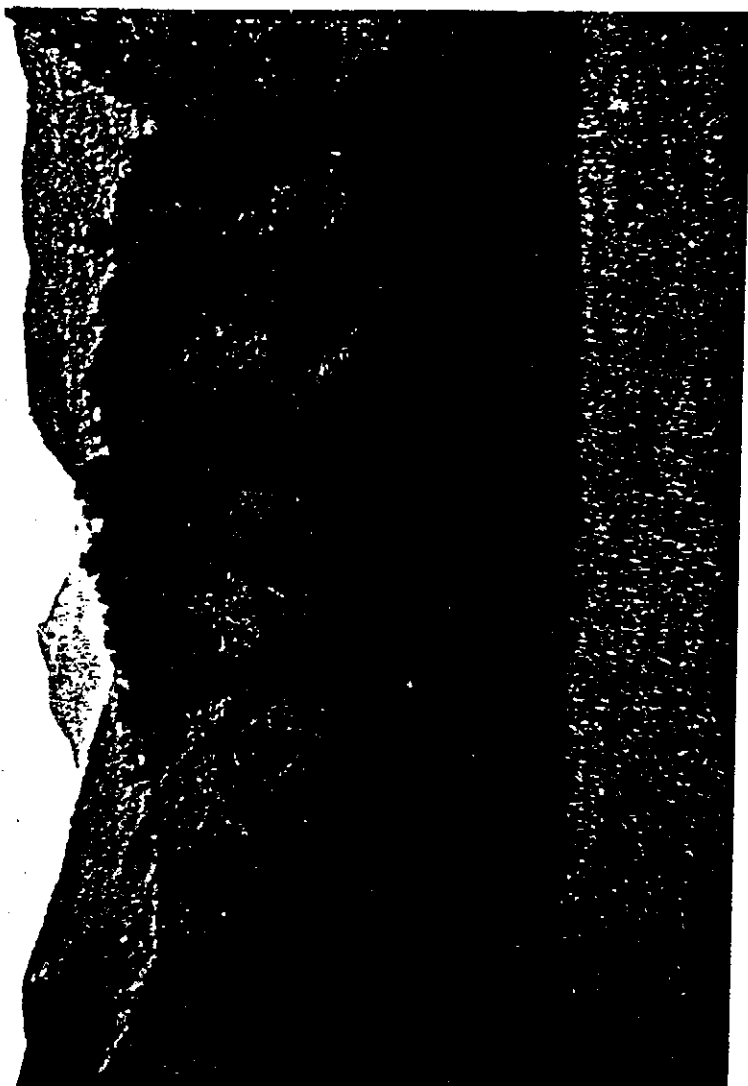
REPORT OF THE STATE GEOLOGIST

For The Biennium

July 1, 1970 - June 30, 1972



Charles G. Doll
State Geologist



Vermont natural gas 'probable'

6/14/73 - Boston Paper.

By RICHARD GAINES
 BOSTON (UPI) — A federal research geologist says his examination of New England's geology has produced the "probability" that extensive, high quality natural gas resources exist far underground in western Vermont.

Geologist Lincoln R. Page of the U.S. Geological Survey reported the surprising results of his study to a recent meeting of the New England Council's Committee on Natural Resources.

In an interview Thursday, Page said his study indicates "high quality" natural gas—methane — probably exists in about 2,000 square miles of Vermont adjacent to Lake Champlain and stretching from

the Canadian border south to roughly Middlebury.

The area of probable existence of the gas is about 60 miles long and a maximum of 15 miles wide, according to maps which accompanied Page's address to the New England Council.

Other Locations

In addition, he said Thursday, more limited, but economically retrievable natural gas resources probably exist in northern Maine, parts of New York State, Connecticut and Massachusetts.

Page said he was told to restudy the mineral resources of New England by the late William T. Pecora, former director of the Geological Survey and later undersecretary of the interior.

"I told him he should have his

head examined," Page said. But Page, who retires the end of the month after 32 years as a research geologist, said he re-examined the geology of the region and concluded that "the existence of significant amounts of natural gas in Vermont is a geological probability at this moment."

He said he was unaware of any previous geological examinations which might have uncovered evidence of natural gas in Vermont. "I don't think anybody thought about it until I had to do it," he said.

Page said without further explorations "there is no way of knowing" how much gas, if any, exists anywhere in New England.

Far Under

The probability of its existence has remained undiscovered until now because the gas, if it exists at all, lies far under ground.

The surface layers of rock and sediment contain no telltale signs, Page said. However, deeper down are found extensive deposits of Cambrian and Ordovician rock (limestone and sandstone), which are strong positive indications that gas deposits lie farther down.

"Someone would have to put very deep drill holes — more than 10,000 feet—to reach the gas," he said.

Page said a natural gas well at Three Rivers, Quebec, Canada, above the same rock deposits present on the east side of Lake

Champlain, is producing 3 million cubic feet of methane a day while another well near Burlington, Vt., at Mallets Bay, has produced 5,000 cubic feet a day.

The Quebec well is economically feasible but the Vermont well is not, Page said. However, both indicate the presence of extensive resources of natural gas under the Champlain fault.

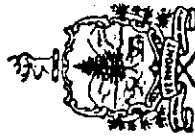
Page said his study also uncovered evidence of significant uranium deposits in the same area of Vermont and other uranium deposits in southern Vermont and New Hampshire.

"Nobody has come to look for it," said Page. "If they had, it's no telling what they would have found."

ANNALS OF THE STATE GEOLOGIST

For the Biennium

July 1, 1972 - June 30, 1974



Charles G. Doll
State Geologist

NATURAL GAS AND OIL

Natural gas has been known to exist in the Champlain Valley of Vermont for many years. It is present in some water wells and has been encountered in drilling for water. Some gas-producing wells with reportedly commercial possibilities have been located to the north in the St. Lawrence Lowlands of Canada.

The first attempt to locate oil in the Champlain Valley in Vermont was made on the Isadore Yandow farm in the mid-1950s, some four miles northwest of St. Albans, by the Peter Henderson Oil Company of New York and sponsored by the Maquam Oil and Gas Development Corporation of St. Albans. Drilling operations, during which some natural gas was encountered, were abandoned at a depth of about 4500 feet.

In 1959 and 1960, two wells were drilled at Malletts Bay in the Town of Colchester by the Vermont Gas and Mineral Corporation of Burlington, the deeper well (Gregoire No. 1) to a depth exceeding 5000 feet. Pockets of gas were penetrated but the wells were abandoned.

In 1964, American Petrofina, Inc., of Dallas, Texas, undertook explorations at Dillenbeck Bay, about two and a half miles south of Alburg Center. The drilling was done by Falcon Seaboard Drilling Company of Tulsa, Oklahoma, participants in the project. The well was abandoned at about 4800 feet.

The most recent endeavor to find gas in the Champlain Valley was made in 1968 on the Everett Baker farm in Grand Isle Township by the Cambrian Corporation. This well (Baker No. 1) was drilled to a reported depth of some 3500 feet and abandoned.

None of the wells cited above appears to have penetrated below the great thickness of Ordovician rocks. The thick underlying sequence of Cambrian formations with arenaceous horizons and related types has not yet been probed in the Champlain Basin, to the writer's knowledge. The possibility of hydrocarbons occurring in the Cambrian formations should not be ruled out. This opinion is held by some oil geologists who have indicated an interest in further studies of the rocks in this area. Studies involving new concepts are now being made relative to future occurrences in New England. A recent paper on petroleum potential of New England by L.R. Page, reprinted from Future Petroleum Provinces of the United States (1971), which gives most space to a discussion of possibilities in

northwestern Vermont, has played a part in creating a renewed interest in the area. Explorations for oil and gas in the portion of the Champlain Valley in adjacent Canada and the energy crisis in the United States, also may have stimulated a revival of interest in Vermont.

The Champlain Basin comprises a geosynclinal prism of rocks of considerable thickness and variety. Because of over-thrusting on the east its true width is not known, nor is the area of greatest thickness which could be somewhere under the upper plate of the Champlain thrust. Gregoire No. 1 well, after passing through some 350 feet of the upper plate of Lower Cambrian dolomites into the Ordovician shales, two and a half miles east of the present trace of the Champlain thrust, penetrated several gas horizons in the shales. The question arises as to how far these Ordovician rocks and the expected underlying Cambrian formations extend east of the probed Gregoire No. 1 well location and their gas-producing potential. Is the source of the shallow, localized gas to be found at greater depth? Four widely spaced wells cannot be considered to adequately test the oil and gas potential of the Champlain Basin.



On Vermont's Great Oil Boom

LANCE KHOURI

AN OIL WELL sits behind Isadore Yandow's St. Albans farmhouse. His holsteins chew their cud, gaze up at the derick, and keep on chewing. The rig is as much a part of their environment as the barnyard fence.

There are at least four other sites scattered throughout the state where drilling once took place. These are now mere holes in the ground, their secrets tightly sealed with rock hard concrete. And there may be more, hidden here and there by a history of enigma. Their existence is elusive, traceable only through memories and inconclusive newspaper clippings, yellowed by age, stashed in files and scrapbooks.

Some have called it the great Vermont oil boom but that is a misnomer at least for now. It was never really "great" in terms of striking it rich. Black gold has yet to gush forth in the Green Mountain State, and maybe it never will. Even the thought is bizarre. But at one time an informal fraternity of adventuresome Vermonters became believers. For a short time they were wildcatters. Wildcatting for oil is a gamble, and there is an aura of adventure about their try and their fail, if indeed what they've done can be termed a failure.

"We got coast to coast publicity when this thing broke. People came here from all over," says Douglas Kelley. "We used to run buses of school children and tourists to the well almost every day."

Kelley is a retired St. Albans resident, the former proprietor of his city's Hotel Kelley, and past president of the now defunct Maquam Oil and Gas Development Corporation.

According to newspaper and magazine articles, the first heavy drilling for oil in New England started on April 19, 1957, at the Isadore Yandow farm. The impetus began with little more than Douglas Kelley's curiosity.

Kelley wanted to know more about the history of his farm. His land contained mineral springs and there was once a resort hotel and spa adjoining the farm. Information from the Library of Congress traced "old coal deposits" and mining operations in the area. Kelley's historical discoveries were interesting if not terribly exciting.

Then things changed — dramatically. The landowner next to Kelley's farm burned over his field and one spot, a crevice in the ground's surface, continued burning after the rest of the fire went out. In fact, the fissure smoldered for months.

This, plus what came to be called "flaming faucets," "fire water," and puzzling explosions caused people living near the shores of Lake Champlain to suspect that *something* lay beneath

their picture postcard acres, something that couldn't be easily explained. The circumstances were similar in every spot drilling occurred, and the signs became commonplace.

Explosions, damage and injury

In Franklin County, Mrs. Lawrence Bellrose of Swanton gives a good definition of "fire water," and one example of an explosion. "We had a new well drilled 650 feet deep and hooked the water into the house. After you drew it from the tap it looked and tasted like alka-seltzer. One day a fuse blew out in the cellar and a strange hissing noise was coming from the water storage tank. My husband went down cellar to see what was wrong. He struck a match and the room lit up with a ball of fire."

The Bellrose family was lucky. There were no injuries — largely due to an open window in the basement. They disconnected the well and dug another only 28 feet deep that lacked gas. Water from the first well bottled and shook would yield a bluish flame when a match was passed over the top of the bottle.

The crew of Highgate Center artesian well driller Lyman Feeley was less fortunate than the Bellroses. Drilling for water in South Alburg one Winter, Feeley reached a depth of 465 feet and hit abundant water at a rate of 60 gallons per minute. He also hit something else. "I had two men working with me that day and they had a small fire going to keep their hands warm. When we hit water there was a big explosion that practically ruined my rig and put it out of commission for four months. The damage easily came to \$100,000. But the two men were badly burnt from the explosion and it pretty near spoiled one of them.

"I got calls from Texas, from all over, and a geologist was sent up from oil country who said what we hit was pure methane. After the explosion the well was filled with water bubbling with gas and floating rock. I've hit gas in that area before but never that bad. From now on when I drill on the islands (Lake Champlain Islands in Grand Isle County), there's no smoking, no fires, no sparks. I'll let the men freeze before I'll let them get blown up."

Stories like these abound in the Champlain Valley. In Alburg Center at Robert Carpenter's sod farm the proprietor explains that the gas has almost run out in his house. Saying this is a reference to his faucets: "A lot of the wells around here have gas in them," mentions Carpenter. "I hooked up a gas burner to the top of my well's pressure tank and lit the burner. You could also get a flame from the faucets inside the house."

Carpenter was instrumental in obtaining lease land for drilling operations. "The reason we never made a commercial strike," he says, "was because of a lack of know-how and not enough funds. But men from Wall Street have expressed interest in drilling once the surtax on gas and oil is lowered or eliminated. Canada's on the verge of shutting off gas coming into this country. It wouldn't surprise me to see some wells brought in here when the price for gas comes up over one dollar a thousand cubic feet. I don't think you'll find anything very big but there'll be a few that will be big enough.

"Another thing you've got to keep in mind is it's going to take more than one well to do it."

Weird incidents involving gas, such as the time a man threw a cigarette butt into a cattle watering trough and caused a barn to catch fire, kept happening. Meanwhile, commercial gas wells drilled by major companies were producing startling results short miles away over the Canadian border.

In the Spring of 1957, after more than a year of planning and negotiations, Kelley and Maquam Corporation vice-president Roger G. Many of Swanton brought the Peter Henderson Oil Company, a New York firm with a Madison Avenue address,

into St. Albans. Kelley and Many had organized a corporation composed of 33 local landowners who, through leases, held rights to approximately 18,000 acres in the Swanton and St. Albans area.

Drilling began at the Yandow farm with high expectations, loads of publicity, and a naivete outgrown only by inexperience. Farmers had visions of mink coats and limousines. Politicians and entrepreneurs dreamed of new industry, prosperity, growth and full employment. Doug Kelley was quoted as saying: "It could mean \$75,000 per day."

The drilling went on for months with a four-man crew working 24 hours a day in 12-hour shifts, seven days a week. According to Kelley, \$250,000 was spent in the process. That amount of money was expected to finance two or three wells instead of one. Methane was hit but so was water, which complicated matters, and drilling stopped at about 4,900 feet. Interest in the well diminished as suddenly as it began and, like swamp gas, funds became evasive.

Today the site of so much past activity is abandoned. The derrick and its platform are covered at ground level with vines of wild grapes, Virginia creeper and the land nearby thick with deadly nightshade, burdock, short scrubby elms and poplar trees. The area is strewn with rusty scrap metal, cable and casing pipe. Huge weathered beams lie haphazardly among battered corrugated roofing. Old lumber scattered through the weeds bears bent nails sticking skyward. Two junked autos from the 1940's complete the landscape, the kind of place spunky youngsters adopt as a fortress or hideout which their parents have probably forbidden as being off limits.

Symbolic of it all is a ladder that stretches from the bottom of the tower to its top but is disconnected in mid-air, requiring the would-be climber to make his own connection. The gas found here was close to 100% pure methane. The well is now capped and the gas unused. There is probably enough there at its present depth to supply all the energy needs of the Yandow farm. By most accounts this was New England's and Vermont's first oil well. It is possibly the only one still standing in Vermont. The 85-foot tower, located in the middle of a cornfield, is now for sale.

What the Maquam Corp. hadn't counted on was the fact that even in oil rich areas in the Southwest, only one out of nine wells becomes a commercial producer. Another underestimated element was money. Most wildcatting relies on financial backing that would dwarf the funds spent in St. Albans. Still, the people involved with the pioneer effort have not entirely given up hope.

It takes a lot of faith

A second major Vermont drilling took place in 1959 and 1960 when two wells were drilled at Malletts Bay in the town of Colchester. This was done through the efforts of the Vermont Gas and Mineral Corporation of Burlington, headed by Rene Berard, a construction contractor. Berard engaged drillers from Pennsylvania who used the same sort of cable-tool rig employed in St. Albans. "They were very slow and couldn't go too deep," he recalls. "We wished we could have gone more than ten thousand feet but we ran out of money. I think we could have found something commercial at 12 or 14 thousand feet.

"We did hit small amounts of gas at six thousand feet with our first well. The second one, one-half mile away, went only two thousand feet but had better shows. There is enough gas there to heat about 20 or 25 homes."

The rigs are gone now and the wells are capped. Like the Maquam company, Berard's firm is now defunct. Says Berard, "it was very exciting and took a lot of faith from the people sup-

porting us. If someone hit I wouldn't hesitate to do it again."

The significance of the small amount of gas found in Vermont came to the attention of world-renowned geologist and Rutland native, Earle Taylor. Natural gas is generally one of the first hydrocarbons noticed before striking petroleum. Taylor contacted Rutland attorney James Abatiell, who formed the Cambrian Corporation along with 24 other Vermonters.

Paying one dollar per acre per day

The Cambrian Corp. still exists. It has approximately 740,000 acres under lease along the Lake Champlain basin and a number of leases in Clinton County, New York. Cambrian is a closed (not public) corporation now numbering 32 of Vermont's more astute businessmen. It brought perhaps the most sophisticated business sense and, without doubt, the most competent oil exploration technique to the state of Vermont. Or so it seemed at the time.

Cambrian began in 1959 by retaining Earle Taylor, now of Houston, Texas, as their geologist. Taylor spent a Summer making a geological survey and a comprehensive photogeological study in Vermont and documenting the results. Abatiell estimates the cost of this work alone was over \$100,000 and maintains that, "the whole industry felt Taylor's expertise was as good as gold." The survey indicated the possibility of natural gas and/or oil strikes in Addison, Chittenden, Franklin and Grand Isle Counties. According to Abatiell the most promising area was Addison County, where no drilling has ever occurred.

Cambrian then organized and structured their corporation by selling enough stock to obtain leases. It spent about two years investigating the Champlain area and securing the leases. This was done by contacting landowners, explaining the details of the subject and making an agreement enabling the corporation to drill on the lessor's land. The Cambrian lease contracts followed relatively standard procedure, used by similar companies throughout the country. The major stipulation allows the landowner 12½% of the value of what comes out of the well before profits. The minimum amount a landowner would receive, if commercial quantities were hit, is one dollar per acre per day of operation. The leases provide for a pool of one square mile under which all lessors within the mile get to split the 12½%.

In the Champlain Valley, Cambrian owns oil rights to all on and off-shore state land. "If we hit," says Abatiell, "the money the state will get from our drilling will make the racetrack funds in Pownal look like a drop in a bucket. But as it stands now we're paying landowners one dollar a year for each lease and the expense runs over three or four thousand dollars annually."

Once the land is leased, corporations such as Cambrian make money contacts with drillers and oil companies. They try to get another organization to foot the bill for drilling. "Once the drilling starts," notes Abatiell, "it's pretty much out of our hands. We expect the wildcatters to come less than clean. If oil is hit the landowners get their cut and the rest is split up between the other parties involved."

Without a word, they up and left

In 1962 and 1963 the Cambrian Corp. persuaded one of the largest worldwide oil concerns, Belgian and American Petrofina Inc., to drill on the Hutchins farm in South Alburg. Petrofina in turn contracted another very large firm, the Falcon Seaboard Drilling Co. of Tulsa, Okla. to do the actual drilling.

"They drilled to a depth just short of a mile," says Harry Hutchins who worked as a "roughneck" during the operation. "We were using an honest-to-goodness oil rig, a rotary drill, with a tower 160 feet high. They were so sure there was going to be something and right up until the end they kept saying: 'It's



The stark oil rig outside a St. Albans farmhouse tells of dreams that used to be. But are there really oil supplies under Vermont's valleys? Time will provide the answer. Photographed by David Wise.

looking good. It's looking good.' And then without a word, they up and left."

Abatiell emphasizes that no one in Vermont really knows why Petrofina stopped drilling. He believes there was something in the Hutchins' well and that Petrofina is the one outfit with the exact answer. "All we got was financial and legal mumbo-jumbo," he says. "The only way to be sure is to have someone make the same analysis from the same samples as the drillers."

Nonetheless, Cambrian didn't give up. In 1968 drilling began once again. This time Cambrian found different companies to subsidize its work. The operation stopped at a depth of 3,500 feet at the Everett Baker farm in Grand Isle. The reason for termination was the stock market: the company funding the operation went bankrupt. "Their consultant told me it was a shame they had to quit," recalls Everett Baker. "He said they had struck Potsdam rock and if they were going to find oil or gas that was where it would be."

The Baker well was the last exploration done by the Cambrian Corp. Both of the companies' wells are now capped with concrete and the rigs vanished. Throughout all of this, Abatiell remains convinced there is gas and oil beneath Vermont ground. His company is actively seeking funds, though so far, an estimated \$6½ million has been spent on Cambrian's wells with scant results.

Still millions of barrels of paraffin in those rocks

The Corporation is not alone in its convictions. Maverick wildcatter E. Tom Dexter of Highgate Springs, the founder of the Dexter Mining Corporation, is responsible for bringing the Federal Energy Resource and Development Administration (ERDA) into Vermont. Subsequently, although specifics were lacking, Dexter told a Barre-Montpelier *Times-Argus* reporter that his exploration in Highgate Springs "will be the most famous drill in the history of New England as far as hydrocarbons are concerned. . . . This will be read about in your history books."

At that time Dexter's firm held the mineral rights to 602 acres in the corner of Vermont formed by Lake Champlain and the Canadian border. In the late Summer and Fall of 1974 Dexter extracted rock with a paraffin yield containing shows of methane, propane, butane, gasoline, kerosene, diesel oil, fuel oil and lubricants, according to newspaper articles.

Dexter was also quoted as saying: "There are millions of barrels of paraffin in those rocks. It's identical to Pennsylvania crude and runs from the border to Bennington." He claims to have two small, drilling rigs now lying dormant. Their location is not yet public knowledge but Dexter believes destiny has picked him to succeed where others have failed. He is certain he has found gas and oil deposits in Vermont. In response to this, Cambrian president James Abatiell replies bluntly, "He's right."

State employees who are qualified experts in the fields of energy and geology retain a measure of skepticism. State Energy Advisor Forrest Orr *hopes* there is fuel under the ground surface. It would solve a lot of the state's problems, he says. State Geologist Dr. Charles Doll sums things up this way: "If you don't look you don't know. The best you can have for the future is a reasonable optimism. We should probably explore sufficiently to attract industry. One way is to bring in federal agencies such as ERDA that have funds and won't cost the state too much money."

Deal the cards, roll the dice, somebody's looking for oil. It's happening in Vermont of all places and if there's a strike, well, that will be a whole new chapter in the state's consistently unorthodox history. ☪

DEPARTMENT of the INTERIOR

news release

GEOLOGICAL SURVEY

Don Kelly (703) 860-7444

For release: October 2, 1979

NEW CONCEPT MAY DOUBLE EXPLORATION AREA FOR NATURAL GAS IN APPALACHIAN MOUNTAINS

The present area for natural-gas exploration from Virginia to Alabama in the Eastern overthrust belt of the Appalachian Mountains can perhaps be doubled in size according to a new concept of Appalachian geology described today (October 2, 1979) by a U.S. Geological Survey, Department of the Interior, geologist.

Leonard Harris, geologist at the USGS National Center, Reston, Va., and a specialist in the petroleum resources of the Appalachian region, told a gathering of petroleum geologists that a growing body of data requires re-evaluation of many long held concepts concerning the possible distribution of oil- and gas-bearing rocks within the Appalachian Mountain chain. He and coauthor Kenneth Bayer presented a paper at a symposium of the Eastern Section of the American Association of Petroleum Geologists being held this week (October 1-4, 1979) in Morgantown, W. Va.

The USGS geologist explained that the Appalachian Mountains form a linear geologic system in the Eastern U.S. that trends southwestward for over 1,000 miles (1,665 kilometers) from New York to Alabama.

"In the past," Harris said, "the Appalachian Mountains have been divided by geologists into two main parallel parts: an eastern part, the Blue Ridge and Piedmont, composed of crystalline rocks (metamorphic and igneous); and a western folded and faulted part, commonly called the Valley and Ridge or the Eastern overthrust belt, composed of sedimentary rocks that today are being actively explored for natural gas.

"Recent seismic surveys, however, using refined geophysical methods for investigating deep in the earth, have revealed that faulting has in the past moved crystalline rocks of the Blue Ridge and Piedmont westward at least 100 miles (165 kilometers), burying a large section of sedimentary rocks of the Eastern overthrust belt," Harris said.

From central Virginia southward, where the data are mainly concentrated, this buried segment of the overthrust belt ranges from 10,000 to more than 20,000 feet thick and extends eastward more than 60 miles hidden beneath the faulted crystalline rocks. The overlying crystalline-rock cover ranges from about 5,000 feet thick along its western edge to more than 10,000 feet thick in the east.

(more)

Of immediate interest to the petroleum geologist is the fact that seismic data show that this buried segment appears to be composed of sedimentary rocks similar to those currently being explored for natural gas in the exposed part of the Eastern overthrust belt. "Like most unexplored frontier areas, data are not sufficient to assess the hydrocarbon potential of the area," Harris emphasized. "Because these sedimentary rocks occur beneath the Blue Ridge and Piedmont, where previous geologic concepts suggested they would be unlikely, future exploration programs for hydrocarbon within the Appalachian region might well include this vast untested and unknown area.

"Perhaps an even more far-reaching effect is that this evolving model would require a major rethinking of how the Appalachian region was formed and what the present geologic structure is," he said, adding that "because previous understanding and models of Appalachian geology have served as the actual starting point and basic 'geologic bible' for petroleum exploration in overthrust belts around the world, changes in our understanding of the Appalachian overthrust belt will have a far-reaching effect on the search for petroleum in other areas with similar structure."

Harris emphasized that this evolving model of the Appalachian region is based on years of research and the collating of seemingly unrelated data through the efforts of many state, federal, university, and oil company scientists. Some of the critical pieces of information, the results from a seismic line through most of the Piedmont of Georgia, were described earlier this year by Fred Cook of Cornell University. A recent seismic profile by the USGS in the Blue Ridge and Piedmont of Tennessee and North Carolina confirmed Cook's data. "As a consequence, within the last few months, the bits and pieces of information have begun to fall into place enabling us to revise our understanding of the regional geology of the Appalachian," he said.

"Although the amount of geophysical data from deep in the earth beneath the Piedmont is presently limited, the initial results suggest that we can no longer look at the Appalachian geologic region in the same manner as before," Harris said.

"There is little doubt that future seismic surveys and deep drilling are going to continue to test long-standing theories, some of which will be discarded, and some of which will be reinforced. Obviously, this is a time of great change and challenge for Appalachian and petroleum geologists. It is also the time of the grand Appalachian revolution in geologic concepts," he concluded.

In summarizing the new "thrust-plate tectonic model for the Appalachians," USGS geologists noted the following highlights:

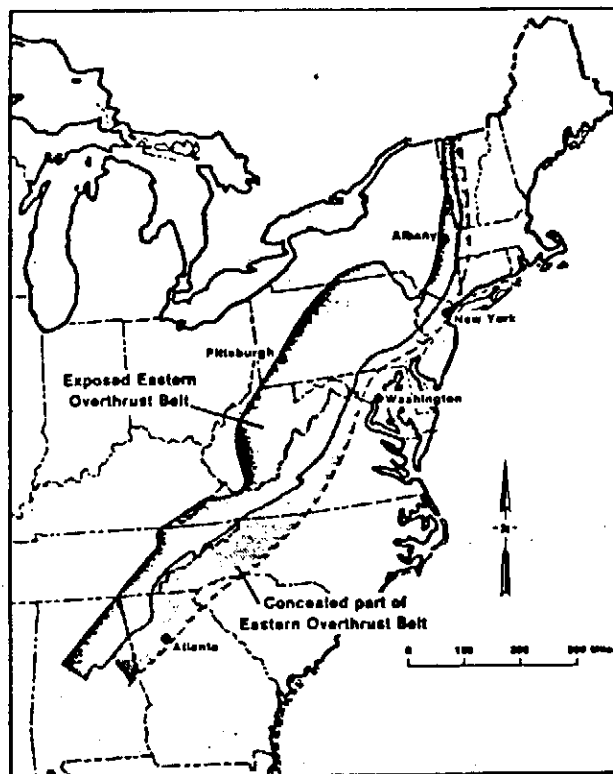
(more)

* One of the main features of the thrust-plate model is that overthrusts are not limited to the exposed Eastern overthrust belt. Instead, these same faults occur within the crystalline rocks of the Blue Ridge and Piedmont. More than a hundred miles of western movement of crystalline rock buried a large segment of the Eastern overthrust belt.

* In the past, the Piedmont has not received much attention from petroleum geologists because its crystalline rocks had been generally discounted as a source of petroleum and were usually considered "basement" rock below which no sedimentary petroleum-source rocks were believed to exist. Limited seismic data in North Carolina and Georgia suggest that thousands of feet of sedimentary rocks similar to rocks currently being explored for natural gas in parts of the Eastern overthrust belt extend eastward beneath thrust plates of the Piedmont rocks for at least 60 miles (100 kilometers).

* If the initial seismic data are representative, then there is a concealed belt of sedimentary rocks that is buried under the Blue Ridge and Piedmont from at least central Virginia to Alabama. Because this buried belt is about as wide as the exposed Eastern overthrust belt, the area for possible natural-gas exploration is about doubled in size.

* For the first time, enough subsurface data from seismic reflection surveys have become available to test older concepts that were based on a study of surface geologic relations. These new data suggest that older concepts failed to fully emphasize the major role that thrust plates play in the process of building continents. This building process in the Eastern United States seems to have been episodic, but the total effect was the progressive movement of great continental plates westward through a period of perhaps 200 million years slowly constructing the present Appalachian Mountain system.



FROM: Ratte', Charles A. 1982. Mineral resource provinces of Vermont.
Office of the State Geologist, Waterbury VT. Open-file Report No. 1982-1.
p. 19.

THE OIL AND GAS PROVINCE

The first attempt to find oil and gas in Vermont was made in the Lake Champlain Basin in the spring of 1957. A wildcat well was drilled to a depth of approximately 4,500 feet on the Isadore Yandow farm four miles northwest of St. Albans. Since that time four additional wells have been drilled in the Champlain sedimentary basin, the Gregoire I and II drilled at Mallet's Bay in Colchester in 1959-60, the Petrofina well drilled on the Harry Hutchins farm in So. Alburg in 1964, and the E. S. Baker #I well drilled in 1968 on the Everett S. Baker farm on Grand Isle. Some gas shows were reported, but all wells were abandoned. The deepest well (Gregoire I) is reported to have penetrated to a depth of 5,075 feet. Although commercial quantities of natural gas have been discovered in the Canadian extension of the Champlain sedimentary basin little interest has been generated in Vermont since the abandonment of E. S. Baker #I at 3,500 feet.

The Cambrian Potsdam formation is believed to be the potentially productive horizon, as well as bioherm and biostrome zones in carbonate rocks. In the Champlain basin Ordovician dolomites and shales thickened by faulting and folding cover the Potsdam. A potential for oil and gas traps in sedimentary horizons beneath the Green Mountain overthrust sheet (northern extension of the Eastern Overthrust Belt) extends the province eastward beyond the Green Mountain Front.

There are occurrences of natural gas in water wells in northwestern Vermont. A report was made by the Federal Energy Research and Development Administration in 1975 on the presence of soil gas in the Milton area. The amount and nature of this gas being comparable to that found above productive gas fields elsewhere. This evidence plus positive finds of commercial quantities of natural gas in Canada encourage continued speculation on the oil and gas potential of the western Vermont sedimentary basin. A proposal submitted to the Federal Energy Research and Development Administration in 1976 by the Vermont State Geologist and the Vermont Energy Office to drill a deep stratigraphic test hole and hydrocarbon probe was not funded.

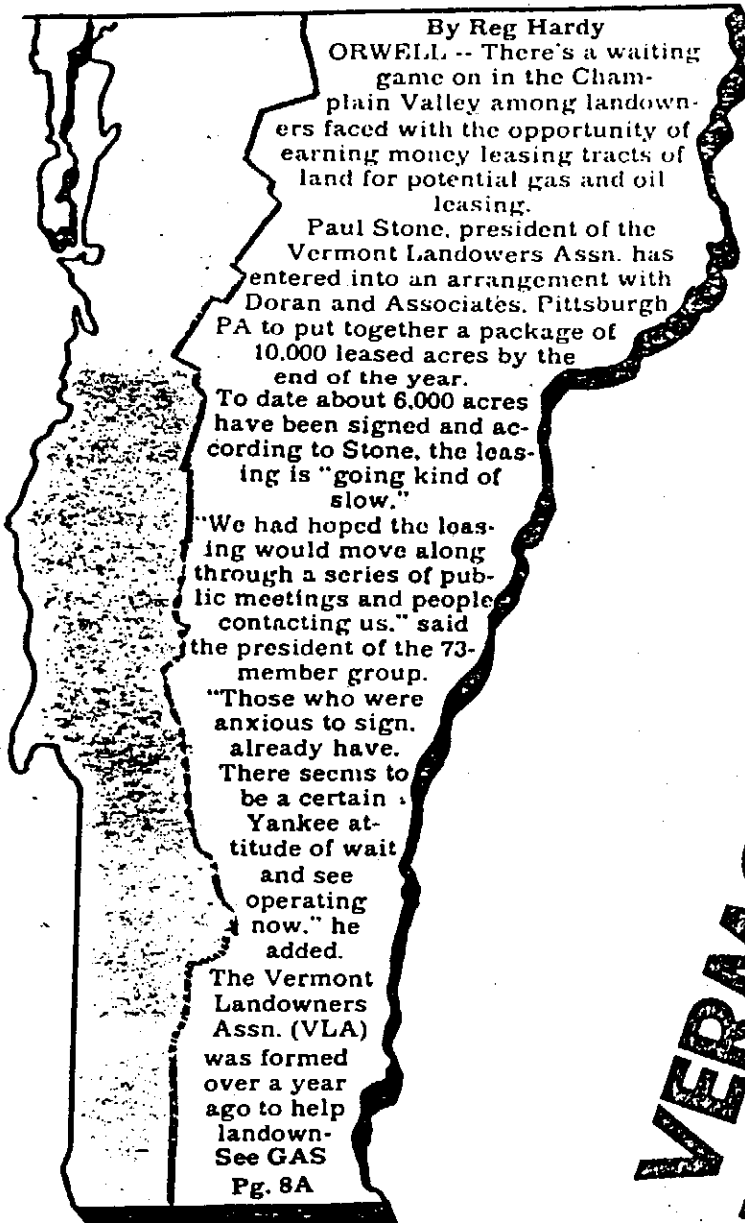
The area west of a line drawn somewhat west of the central spine of the Green Mountains from Richford (north) to Stamford (south) can be considered as Vermont's Oil and Gas Province. The results of future exploration may alter the dimensions of this province.

In 1981 the Ohio Oil and Gas Company, a leasing brokerage from Fowler, Ohio obtained oil and gas leases on over 250,000 acres in western Vermont. In January of 1982 Columbia Gas Transmission Company and Louisiana Land and Exploration Company announced the purchase of these leases from the Ohio Company, and their intent to start seismic exploration in the summer of 1982.

“*VBW means business*”

On the right tract

Vermont Landowners Association lease protects landholder in oil-gas deals



By Reg Hardy

ORWELL -- There's a waiting game on in the Champlain Valley among landowners faced with the opportunity of earning money leasing tracts of land for potential gas and oil leasing.

Paul Stone, president of the Vermont Landowners Assn. has entered into an arrangement with Doran and Associates, Pittsburgh PA to put together a package of 10,000 leased acres by the end of the year.

To date about 6,000 acres have been signed and according to Stone, the leasing is "going kind of slow."

"We had hoped the leasing would move along through a series of public meetings and people contacting us," said the president of the 73-member group.

"Those who were anxious to sign, already have. There seems to be a certain Yankee attitude of wait and see operating now," he added.

The Vermont Landowners Assn. (VLA) was formed over a year ago to help landown-

See GAS
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BUSINESS

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ers approach the leasing of oil and gas rights in a business like manner and to provide members with a lease alternative to documents drawn up by oil and gas companies which serve company interests.

Lease details

Such a lease has been prepared and requires agreements between Doran

year as long as the lease is in effect. The landowner is not required to warrant title to the land and Doran must pay the attorney's fees if a landowner prevails in the settlement of a dispute.

Doran is also responsible for paying damages to land, for the use of land and for losses in crop production through such use.

Since the lease agreement was finalized, VLA has held five county meetings to encourage lease signing, but still needs about 4,000 acres to meet its quota.

UVM holdings

Stone said one of the wait-and-see objectives may be the University of Vermont's decision on whether or not to lease some 15,000 to 25,000 acres for exploration. Another may be some sign of success at a test well proposed for Washington County in New York slated to begin in June.

Others may be hoping lease payments will go up after drilling commences.

But whatever the reason, the wait is stretching VLA's finances to the limit.

If Stone's group reaches the goal of 10,000 leased acres, Doran will pay VLA 25 cents an acre, "actually, we need about 30,000 to pay all of our bills," Stone said.

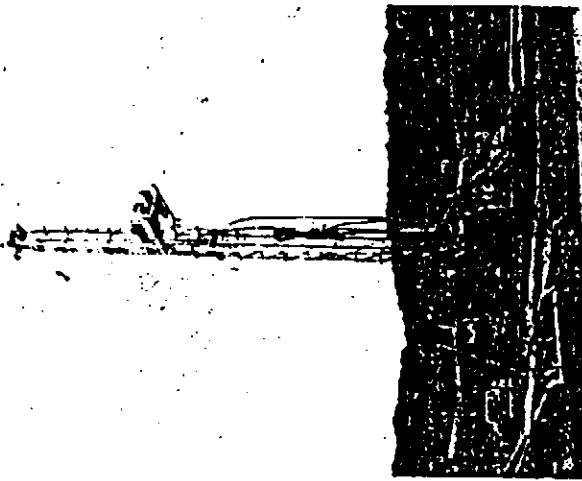
Most of the costs have been encountered in mailings to lease prospects and legal fees in drawing up the 15-page lease agreement.

Stone foresees no real problems in reaching the goal and more as there are about 1.4 million acres available west of the Green Mountains and about three quarters of this is not presently leased.

But leasing land is not VLA's only business.

Zoning

Stone said he has learned town zoning laws may become a stumbling block to oil and gas well drilling.



Typical Doran drilling rig.

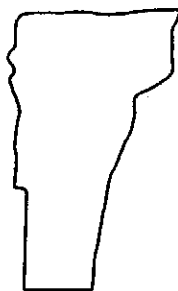
and the landowner for the location of wells, roads, gas pipelines and utility lines; prohibits the use of surface or domestic well water; provides the landowner with 250,000 cubic feet of free gas per year; requires Doran to contain hazardous wastes and return the land to its original condition after drilling is finished.

The agreement details an exact period it will be in effect and requires Doran to release it when the expiration date is reached.

It provides for a bonus of \$1 per acre upon signing and a \$1 per acre, per

"We had been told that if zoning laws are silent regarding oil and gas drilling than such operations are permissible. The attorney general now says just the opposite. If zoning is silent on the matter than drilling is prohibited. This will have to be faced before drilling can begin," Stone said. ■

THE GREEN MOUNTAIN GEOLOGIST



QUARTERLY NEWSLETTER OF THE VERMONT GEOLOGICAL SOCIETY

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Exploratory Oil and Gas Well being drilled at Fairfield, Vermont

Drilling started on Thursday, July 19, 1984 on a 10,500 foot deep exploratory oil and gas well on Chester A. Arthur Road in Fairfield, Vermont. The well is being drilled by Delta Drilling Company of Tyler, Texas for the Columbia Gas Transmission Corporation. Drilling is expected to be completed in early November.

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The well is expected to provide a stratigraphic test of the Eastern Overthrust involving an upper thrust plate of Precambrian - Eocambrian Underhill Formation east of the Hinesburg thrust. The Paleozoic section, perhaps repeated by additional thrust slices is expected to be encountered at depth. Seismic surveys conducted during the summers of 1982-83 detected structures several thousand feet below the surface that appeared to provide favorable trapping conditions for hydrocarbons.

Charles Ratté
State Geologist

ASSOCIATION OF AMERICAN STATE GEOLOGISTS

State Geologists Journal - 1985

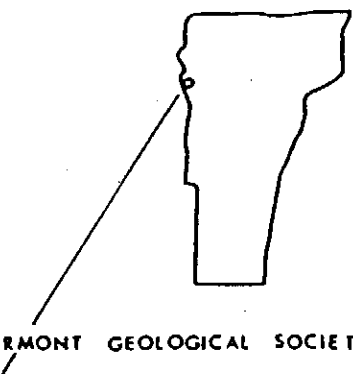
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VERMONT

Charles A. Ratté, State Geologist, Office of the State Geologist, Agency of Environmental Conservation, State Office Building Post Office, Montpelier, VT 05602. Phone: 802-828-3365.

Oil and Gas. The David and Jean Burnor well #1 drilled by Columbia Gas Transmission Company in Fairfield, Vermont, was abandoned and plugged on October 22, 1984, at a depth of 6,970 feet. Information regarding geologic formations encountered, structural geology, geophysical logs, seismic interpretations, etc., are (by law) to remain confidential for two years unless released earlier by Columbia. The drilling site will be rehabilitated in the spring.

THE GREEN MOUNTAIN GEOLOGIST

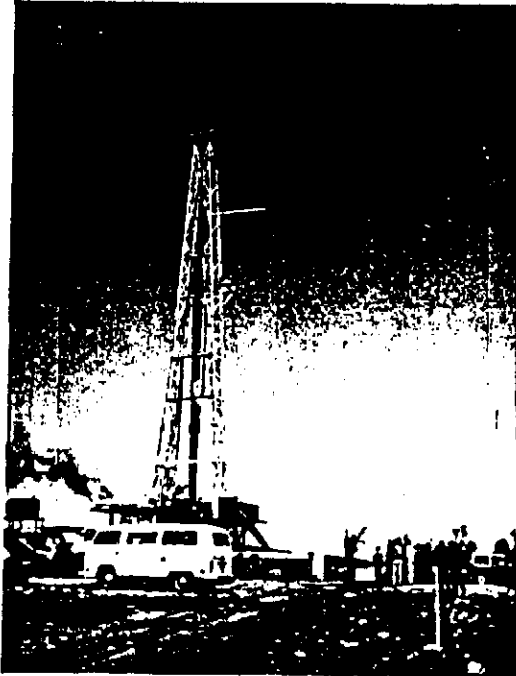


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Burnor Well #1 in Fairfield, VT.,
October 6, 1984, 16 days before
it was plugged and abandoned.

STATE GEOLOGIST'S REPORT

OIL AND GAS - The David and Jean Burnor well #1 drilled by Columbia Gas Transmission Company in Fairfield, Vermont was abandoned and plugged on October 22, 1984 at a depth of 6970 feet. No hydrocarbons were encountered. Fresh water zones occurred at depths of 50' (at the interface between glacial sediments and bedrock), 350', 880' and 3380'. Information regarding geological formations encountered, structural geology, geophysical logs, seismic interpretations, etc. are (by law) to remain confidential for two years unless released earlier by Columbia. The drilling site will be rehabilitated in the spring.

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