History of the crude oil industry in Montana

Richard Dale Hennip

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HISTORY OF THE CRUDE OIL INDUSTRY IN MONTANA

By

Richard D. Hennip

B.S., Rochester Institute of Technology, 1969

Presented in partial fulfillment of the requirements for the degree of

Master of Business Administration

UNIVERSITY OF MONTANA

1973

Approved by:

Chairman, Board of Examiners

Dean, Graduate School

Date

April 20, 1973
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CHAPTER I

INTRODUCTION

The purpose of this study is to accomplish the following: (1) to chronologically arrange the data dealing with discovery and development of the crude oil fields of Montana, (2) to determine if the state has benefited from the industry, and (3) to study the possible effects on Montana's crude oil industry if the import controls were changed.

The paper is composed of six chapters. The first chapter is an introduction and it deals with the important role the petroleum industry plays. It also contains a few facts about Montana's crude oil industry. The development of the industry from the initial discovery until 1950 is dealt with in the second chapter. The third chapter covers the development of the industry during the 1950's. The 1960's are covered in the fourth chapter. The beginning of the 1970's and the future of the industry are analyzed in the fifth chapter. The possible effects of lowering import controls are also considered in chapter five. The last chapter is a summary of what the industry has done for the state.

Petroleum provides the power for almost every means of private and commercial transportation—land, sea, and air. Petroleum is at work for the housewife from the time she turns on the burner to heat the coffee in the morning until she turns off the last light in the evening. Petroleum provides power for many appliances and is the basic ingredient for many household products in daily use. By-products of petroleum are used
to make synthetic fibers for clothing and also cleansing agents such as soap and detergents.

In 1919, when the American Petroleum Institute was founded, petroleum provided only about 15 percent of our nation's energy requirements. Today, petroleum provides 75 percent of the energy used in this country.¹

In 1919, the industry supplied the nation with oil at a rate of about one million barrels a day. Natural gas, at the time, was a complete waste product. Today, the industry, through both oil and natural gas, supplies the nation with the equivalent of 18.5 million barrels a day.²

The close relationship between the use of commercial fuels and the real value of national production can be seen in the variation of living standards among nations and in the progress of nations over a period of time. The United States achieved economic gains between 1950 and 1970 of slightly more than 100 percent in both real gross national product and energy consumption. Almost all of the additional energy used in this period was obtained from oil and gas in about equal proportions, in terms of heat content.³

Energy to improve living standards around the world has caused a great surge in the demand for crude petroleum. The United States with less than 6 percent of the world population, uses about one third of the


² Ibid.

world output of fuels, or about eight times as much energy per capita as the average foreign country. If the rest of the world raised its standard of living even slightly toward the level enjoyed by the United States, the demand for crude petroleum would increase perhaps beyond the known reserve level. To illustrate, during the 1960's the demand for energy in the world increased more than it had in the prior 35 years.4

In the United States, the drive toward realization of many economic and social goals will require expansion of real national products at about 4 percent per year and comparable gains in the use of energy for improved productivity and greater output. At that rate, energy used in the United States would increase by at least 80 percent between 1970 and 1985. Even under optimistic assumptions about growth in the use of coal and nuclear power, the demands for both oil and gas can be expected to increase by more than 60 percent if sufficient supplies can be made available.5

Oil production in Montana during 1970 amounted to 37.9 million barrels. In spite of this level of production, in 1970 the estimated recoverable reserves for Montana dropped only 4.7 million barrels.6

In 1965, Montana ranked eleventh in crude oil production among the 31 petroleum states with 32.8 million barrels. The best production year, so far, for the state was 1968 when 48.5 million barrels of crude

4 Ibid.
5 Ibid.
6 Montana, Department of Natural Resources and Conservation, Oil and Gas Conservation Division, Annual Review for the year 1970, Relating to Oil and Gas, Vol. 14, p. 1.
Also during 1965, more than 6,000 Montanans were employed in the petroleum industry with an annual payroll of almost $31 million. The tax on petroleum and its products provides more than $21 million to the state coffers annually, about 30 percent of the total state revenue.

During 1970, 448 new wells were drilled with an average depth of 4,396 feet. The largest number of wells drilled during any year was 940 during 1968 with an average depth of 4,839 feet. The crude oil production from 1942 through 1969, by region, for Montana is covered in Figure 1. The dramatic effects of the discovery and development of Williston Basin in 1951 and Powder River Basin in 1965, are clearly evident in Figure 1.

Montana's oil industry is relatively young. The first year of recorded production was 1916. Crude production has increased over the years to the present level of 38 million barrels in 1970.

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10 Ibid., p. 3.
Fig. 1.—Crude Oil Production in Montana, 1942-1969
CHAPTER II

DEVELOPMENT OF MONTANA CRUDE OIL INDUSTRY UP TO 1950

Extensive research on Montana crude production was performed by Douwe Douma in 1952 at Montana State University.¹ The work contained in his thesis is the basis of this chapter, which is concerned with the history of the oil industry in Montana up to 1950. The first crude oil discovery in Montana was made by members of an immigrant train on August 10, 1864. While repairing a tire on one of the wagons, a group of men was sent out in search of water. Upon discovering a pool of water about twelve and one-half miles northwest of where the Bozeman Trail crosses the Big Horn River, the men skimmed some of the oil seepage off and used it to grease their axles.

In 1892, oil seepages were found around Kintla Lake in the extreme northern end of what was then Missoula County, four miles south of the Canadian border, (Figure 2). Seven years later, the Kintla Lake Field was the site of the first organized drilling. A few Butte businessmen organized the Butte Company and took out claims around the lake. An oil boom resulted and every square foot of the surrounding country was covered with claims. By December, 1901, the Butte Company had invested around $30,000 in the development of the field. Expectations ran high but the

excitement soon declined when it became clear that the Kintla Lake Field was unable to yield commercial production. However, the field did call attention to Montana's new natural resource.

A well drilled during 1902 by Montana Coal and Fuel Company 14 miles south of Dillon was reported to be showing oil. This oil strike indicated the presence of crude in other parts of Montana. But here, as elsewhere, commercial production could not be obtained and further development was not undertaken at that time.

The presence of oil was first noted east of the Continental Divide in 1901. Up until then Montana's crude oil indications had only been found in the area west of the Divide. A mining prospector, Sam D. Somes, noted oil seepage while digging for copper in the Swift Current Creek district, north of St. Mary Lake, (Figure 2). Somes later went to Great Falls and succeeded in interesting a few friends in the development of the oil field. The Montana Swift Current Oil Company was established. A drilling location was selected and drilling started in 1902. In the spring of the following year, Somes' enterprise was rewarded by striking oil at a depth of 500 feet.

Somes' discovery resulted in an oil boom for northern Montana. By 1906, twelve wells were in operation in the Swift Current Creek area and five were producing crude oil in paying quantities. However, as was the case with the Kintla Lake oil boom, the Swift Current boom did not last very long. Soon production declined, as wells were lost due to penetrating water. The field was abandoned when available funds ran out.

The conversion of some of the coal burning locomotives to oil burners by the Great Northern Railroad in 1910 and the following year, created a ready market for fuel oil in northern Montana. This new stimulus increased the exploration for crude oil in Montana.
1. Kintla Lake Field
2. Elk Basin Field
3. Cat Creek Field
4. Kevin-Sunburst Field
5. Pondera Field
6. Bannatyne Field
7. Cut Bank Field
8. Sumatra Field
9. Ivanhoe Dome Field
10. Bell Creek Field
11. Fred & George Field
12. Hiawatha Field
13. Weed Creek Field

Fig. 2.—Map of Montana with Location of Oil Fields
In August 1915, drilling operations started in Wyoming in an area known as the Elk Basin, close to the Montana border. Oil was struck in Wyoming during November and a month later on December 12, 1915, the Ohio Oil Company struck oil in a well drilled on the Montana side of the Elk Basin, as illustrated in Figure 2. The Ohio Oil Company No. 1, opened up the first permanent oil field in Montana. The field started out as a small one but increased to one of Montana's major oil fields after drilling reached richer sands below the initial discovery.

The Elk Basin discovery, with its promise of profitable production, brought new interest to oil prospecting in Montana during the following years. The presence of a permanent field helped in the raising of capital for future explorations.\(^2\)

In the latter part of 1919, the presence of crude oil in central Montana was proven when oil was struck in the Devils Basin area for the Van Duzen Oil and Gas Company. The Van Duzen well was never a commercial producer.

Montana's early crude oil discoveries and the short oil booms in the Kintla Lake and St. Mary's Lake districts mainly served to draw the attention of inhabitants of this state to a new mineral. With the exception of the Elk Basin discovery, all exploration work during the early stage of Montana's oil industry was financed by Montana people, as out of state oil interests did not believe in the oil potential of Montana. The funds raised in Montana were not of sufficient amount to finance sizable explorations but they did prove the existence of crude oil in central and northwestern Montana.\(^3\)

\(^{2}\text{Ibid.}, \ p. \ 36.\)
\(^{3}\text{Ibid.}, \ p. \ 38.\)
The Frantz Oil Corporation of Denver, Colorado, on December 8, 1919, struck oil in an unusually rich horizon. The Frantz Oil Corporation had discovered another oil field in Montana, later known as the Cat Creek Field located in Petroleum and Garfield Counties, (Figure 2). Within a short time several oil companies had secured leases on the surrounding acreage and by the end of 1920, close to 60 rigs were scattered over the Cat Creek Field. There were two reasons for this rush. First, the crude found in the Cat Creek Field proved to be of a high gravity, yielding about 50 percent gasoline. Second, the oil was located at a shallow depth. This, combined with the large quantity made the Cat Creek Field Montana's first commercial field. Actual production amounted to a total value of $734 thousand during 1920 for this field.4

Many people living in the Cat Creek area prospered from the near-by crude oil discovery. Scores of homesteaders lived in comfortable conditions from sale of leases and royalties. Lewistown, especially flourished from the new wealth made available by the oil discoveries in its vicinity.

The Frantz Corporation was well rewarded for its enterprise in 1920 when it sold its holding in the Cat Creek oil field for $450 thousand to the Mutual Oil Company, a Wyoming group.

Montana's first refinery was constructed during 1921 at Miles City with a capacity of two thousand barrels. The Kevin-Sunburst Field came into existence in 1922 when oil was discovered at the Miller ranch located in Toole County, (Figure 2). For several years the Kevin-Sunburst Field ranked first in crude oil production among Montana's oil fields.

4 Ibid., p. 40.
During 1926, the Alberta refineries had excess capacity and started purchasing Montana crude. Until that time, all crude exported to western Canada from the United States had been purchased from the Wyoming or Midcontinent oil fields. To stimulate production, the Canadian oil companies were willing to pay Kevin Sunburst producers part of the savings on transportation cost in the form of higher prices for crude than they were paying other suppliers.

The Sunburst Refining Company had been organized to handle the increasing production of the Kevin-Sunburst Field. A refinery was constructed by 1926 at Great Falls with a capacity of 3,000 barrels daily.

The production of the Kevin-Sunburst Field grew rapidly at first with an increase from 442 thousand barrels in 1923 to 6.4 million barrels in 1926. The production declined during the latter part of the 1920's to less than 2 million barrels in 1930. The decline in production was caused by a lack of new drilling. The demand for Kevin-Sunburst oil did not increase rapidly enough to handle the rapid increase in production.\(^5\)

Several new oil fields were discovered during the latter part of the 1920's. The Pondera Field near the town of Conrad was discovered in 1927 by the Montana Pacific Oil Company, (Figure 2). During 1929, almost one million barrels of crude oil were produced from this field which covered about 2,000 acres. The Bannatyne Field was discovered during July, 1927, by the Montana Pacific Oil Company, (Figure 2). The field was located on the Bannatyne farm 39 miles northwest of Great Falls. The crude produced from this field was 53 percent lubricant of fine quality which made it valuable to the refinery and enabled it to command a good market. The high quality of this crude provided a strong stimulus for

\(^5\)Ibid., p. 48.
development of the Bannatyne Field. By 1930, the field had reached maximum production. From 1930 to 1935, the production fluctuated sharply until it was abandoned in 1935.

Canadian wildcatters discovered oil in a well located 281 feet north of the international border across from Toole County, Montana. The Border Field was established October 1929 when oil was discovered on the Montana side. The production for the field was 93 thousand barrels of crude in 1930 and 138 thousand barrels in 1931. The Dry Creek Field came into existence in 1930 when the Ohio Oil Company completed a well that flowed 18 thousand barrels of crude in the first 24 hours with 62 gravity which is almost pure gasoline. The cost of drilling in the Dry Creek Field was very high because of the need to drill so deep. By 1933, the Ohio Oil Company had spent more than one million dollars in the drilling of eight wells with an average depth of 4,500 feet.

Most of the crude not utilized in Montana refineries found a ready market in Canada, as the Alberta refineries did not find sufficient domestic crude. The resulting complete dependency of many northern Montana crude products on the Canadian market was the cause of much economic grief during the following decade. The Canadian buyers reduced their crude purchases during the 1930's and the failure of northern Montana companies to expand their refinery capacity during the 1920's resulted in serious surplus of crude oil in northern Montana during the 1930's.6

The decade of the 1920's had witnessed the birth of the crude oil industry in this state, as it brought upon the discovery and development of Montana's four leading oil fields. The total value of the annual output of Montana's oil fields increased from the relatively insignificant

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total of $148,500 during 1919 to the more impressive total of $5 million during 1930.\footnote{Ibid., p. 58.}

The impact, in the Montana oil fields, of the depression was a decline in production caused by a lack of new drilling. The Cut Bank Field, located in Glacier and Toole Counties, was brought in during 1930, (Figure 2). The production of this field was an exception because of its high quality crude. It increased from two thousand barrels in 1932 to over 3.4 million barrels in 1937.\footnote{Ibid., p. 59.}

The near-by Kevin-Sunburst Field was the location of a new technique which involved the treatment of dry holes and slow producing wells with hydrochloric acid. When the acid was poured into a well producing from a limestone formation, the acid opened new oil containing cavities by eating its way through the lime. The average Kevin-Sunburst well showed a 20 percent increase in production after it had been treated with acid. The field showed an increase of more than 400 thousand barrels between 1933 and 1934.

The main problem confronting Montana's oil industry during the later part of the 1930's was the difficulty in finding a market for the crude produced from the fields of northern Montana. The Cut Bank and Kevin-Sunburst fields showed relatively small increases in production in 1938 and 1939 because of a lack of stimulus for new development due to insufficient demand for crude.\footnote{Ibid., p. 64.}

The reason for this decline in activity was the discovery of the Turner Valley Field in 1936 in southern Alberta, Canada. The Alberta oil companies were purchasing 8,000 barrels of Montana crude daily before the
discovery of the Turner Valley Field but by October 1937, they were not purchasing any crude from Montana. 10

Surveys held at the end of 1937 showed that Cut Bank, Kevin-Sunburst, and Pondera Fields had no market for 50 percent of their production. They were forced to store their surplus and to decrease the amount being pumped from the fields.

The marketing difficulties of the northern fields were not caused by a lack of refining capacity in the state but instead to a geographic distribution problem. The central and southern refineries had surplus capacity but the cost of transportation prevented the shipping of the surplus from the northern fields to the refineries. 11

During 1937 and 1938, several refineries were constructed to handle this surplus. The improvement in the refinery situation of northern Montana caused an increase in activities in the northern fields.

During 1936, a well located in Sheridan County in western Montana struck oil at a depth of 6,700 feet and showed an initial production of 7,500 barrels of crude per day. The discovery of oil at deeper horizons caused excitement because the present fields were not producing from this depth and the possibility of additional discoveries was good.

The 1930's did not bring the growth that was experienced during the 1920's. The lack of market in northern Montana curtailed production and caused cancellation of plans for new drilling during the 1930's. The refinery portion of the Montana oil industry expanded greatly during the 1930's just as the production of the crude sector of the industry had increased during the 1920's. 12

10 Ibid., p. 66. 11 Ibid., p. 67. 12 Ibid., p. 79.
The Inland Empire Refinery at Spokane opened the 1940's with an announcement that it planned to build a six-inch pipeline from Cut Bank to Spokane, a distance of 320 miles. The daily capacity of the pipeline would be 6,000 barrels of crude and the total cost was estimated at $2 million. The Great Northern Railroad feared it would lose business if the pipeline was constructed, so it lowered the rates from 22 cents to 16 cents per 100 pounds of crude and the pipeline was not constructed.\textsuperscript{13}

The demand for Montana oil increased during the 1940's because of the war effort. The increased demand caused a renewal of activity in the oil fields.\textsuperscript{14}

Stimulated by the discovery of crude oil in the Devonian horizon on the Baker-Glendive structure in Sheridan County, new deep tests were started during 1941. Several of the wells were later abandoned because they could not produce at commercial quantities.

The entrance of the United States into World War II brought the nation's oil industry under supervision of the Federal Government, in order to achieve the greatest possible contribution to the war effort. For this purpose the Office of the Petroleum Coordinator was created early in 1942 and was delegated the following authorities by Congress:

1. The price of crude oil and refined products were made subject to a ceiling, to be set by the Office.

2. New drilling operations could not be started without authorization of the Office.

3. The Office could grant priority for the purchase of drilling equipment.

4. The Office had to set the allowable production for each state to be divided among the separate fields by the Oil Conservation Board of the State.

\textsuperscript{13}Ibid., p. 82. \textsuperscript{14}Ibid., p. 83.
The drilling operations were interrupted while the oil operations adjusted to government supervision. The war situation created an unusually large demand for Montana crude oil and refined products. During the latter part of 1942, refinery requirements exceeded production by 6,000 barrels per day. The crude oil stored in northern fields during the late 1930's was sold during this period.

An outstanding development during the war years was the revival of the Elk Basin field. Deeper drilling brought in a 1,500 barrel a day well in the Wyoming part of the field during December 1942. Definite proof was provided, by this discovery, of the existence of a rich sand below the present producing horizon. In July, 1943, the Stanalind Oil and Gas Company brought in a large well on the Montana portion of the Elk Basin. The production of Elk Basin increased from 16 thousand barrels in 1942 to 940 thousand barrels in 1945.

The first half of the 1940's brought three developments of consequence:15

1. The Interstate Commerce Commission approved a considerably lower rail rate by the Great Northern Railroad on crude transported to Spokane. The new rate gave Montana's oil industry a firm hold on the northern Idaho and eastern Washington markets.

2. The deeper drilling in older fields and the revival of the Elk Basin field.

3. The transactions which put major oil companies in control of large producing properties in Montana.

The general slow-down in production tempo after the end of international hostilities accounted for the slight decline in Montana's crude oil output from 8.6 million barrels in 1944 to 8.4 million barrels in

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15 Ibid., p. 95.
During the war it had steadily increased from 7.5 million in 1941 to 7.9 million in 1943.

During the late 1940's, Montana's two leading crude oil fields showed a steady decline in annual output. From 1945 to 1949 the annual crude production of the Cut Bank Field declined from 4.9 million barrels to 3.4 million barrels. The Kevin-Sunburst Field declined to a lesser degree in the same period from 1.9 million barrels in 1945 to 1.6 million barrels in 1949. In spite of this substantial decline in the annual production of Montana's largest oil fields during the latter part of the 1940's, the total output of the state as a whole increased considerably during the same period. Production in 1945 was 8.4 million barrels and 9.1 million barrels, in 1949. The increase was caused by production from fields elsewhere in the state, such as Elk Basin, which increased from 940 thousand barrels in 1945 to 2.3 million barrels in 1949.

The satisfactory results of deeper drilling in Montana's oldest field caused a renewal of interest in testing the lower horizons of the Cat Creek Field. The lower horizons of the Cat Creek Field were tested in 1945. Oil was discovered 150 feet below the Cat Creek producing horizon. A new oil boom resulted from this discovery. From 1944 to 1949, Cat Creek's annual crude oil output increased from 115 thousand barrels to 459 thousand barrels in 1949.  

\[16 \text{Ibid., p. 99.}\]
CHAPTER III

MONTANA CRUDE OIL INDUSTRY DURING THE 1950's

The initial discovery that brought the oil industry in Montana to life occurred during the 1920's and the development of several fields followed. The 1930's was a depression era with the decrease in demand for oil and also the withdrawal of the Canadian market from the northern fields. The 1940's were dominated by the war. The increase in demand caused by the war helped the northern fields to recover and also led to extensive exploration. The 1950's started with a bang with the discovery of one of the largest oil fields in the history of the Montana oil industry. The Amerada Oil Company struck oil in April, 1951 in Williams County, North Dakota at a depth of 11,955 feet. This was the first commercial well of the Williston Basin.¹ The striking of oil by Amerada was significant for Montana because of the possibility for oil on the Montana side. Only a few months later, oil was discovered on the Montana portion of the Williston Basin on July 13, 1951. The gross value of Williston Basin was estimated at $21 million. The development of Williston Basin brought prosperity to Billings and the surrounding area. From 1951 to 1953, over 100 wells of exceptional caliber were completed in Williston Basin.²


The discovery and rapid development of Williston Basin put much pressure on the available pipelines. Several additional pipelines were rapidly constructed to handle the vast quantity of oil. Two major pipeline systems had been handling approximately 85 percent of the crude oil produced in the United States portion of the Williston Basin. The Service Pipeline Company began gathering crude in the Beaver Lodge and Tioga Fields for delivery to rail loading facilities at Tioga in December 1951. The Butte Pipeline Company began operations in eastern Montana in November 1955. The Butte Pipeline system is composed of approximately 510 miles of lines. Before completion of the Service and Butte Pipeline systems, the Williston Basin crude oil was transported by truck and gathering pipeline systems to local refineries in Montana and the rail loading facilities for trans-shipment to refineries in other states.\(^3\) In spite of early marketing problems solved by these pipelines, the production of Montana crude almost tripled by 1956 mainly because of the discovery of the Williston Basin. Montana’s annual production for 1950 was 8 million barrels of crude and it increased to 21 million barrels by 1956.\(^4\)

The Oil and Gas Conservation Commission of the State of Montana became a reality in 1954 with the following authority and duties:

1. To require
   a. identification of ownership of oil or gas wells, producing properties and tanks;
   b. that the making and filing of acceptable well logs, reports on well locations and the filing of directional surveys be made, provided however, that logs of exploratory or wildcat wells need not be filed for a period of six months following completion of each well;


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c. the drilling, casing, producing and plugging of wells in such a manner as to prevent the escape of oil or gas out of one stratum, blowout, cavings, seepages, and fires, and the pollution of fresh water supplies of oil, gas, or brackish water;

d. the furnishing of a reasonable bond with good and sufficient surety conditioned for performance of the duty to properly plug each dry or abandoned well;

e. proper gauging or other measuring of oil and gas produced and saved to determine the quantity and quality thereof;

f. that every person who produces, transports or stores oil or gas in this state shall make available within this state for a period of five years, complete and accurate records of quantities, thereof, which records shall be available for examination by the Commission or its agents at all reasonable times, and that every person prescribe with respect to quantities, transportation and storage of such oil or gas.

2. For the purpose of preventing waste,

a. to regulate the drilling producing and plugging of wells, the shooting and chemical treatment of wells, the spacing of wells, operation voluntarily entered into to increase ultimate recovery such as cycling of gas, the maintenance of pressure, and the introduction of gas, water, or other substances into producing formation, and

b. to fix, upon application made by any interested person after hearing, efficient gas-oil and water-oil ratios for any particular well or wells.

3. To regulate disposal of salt water and oil field wastes.

4. To classify wells as oil or gas wells for purposes material to the interpretation or enforcement of the act.

5. To promulgate and to enforce rules, regulations and orders to effectuate the purposes and the intent of this act.

6. To prepare and submit to the legislative assembly of the State of Montana, at least thirty days before the convening thereof, a report of the activities of the Commission, including among other things, a summary account of the monies received and expended by the Commission, the petitions which have been filed before it and such specific recommendations as the Commission shall deem proper as to the legislative
enactment which will further the oil development of the State of Montana and properly regulate the oil industry and the Commission.

The primary purpose of the state conservation regulations is and always has been to prevent waste of oil and gas and to protect correlative rights—not to stabilize the crude oil market and maintain prices. The Conservation Commission established definite guidelines that govern the spacing of wells and the daily production for each well. These practices would have prevented the enormous waste that took place in the early years of the oil industry when the crude oil was allowed to flow unchecked in the form of gushers. An example of this type of waste in Montana was the first wells in the Elk Basin Field in 1915. The oil was allowed to run into dammed-up coulees and given to anyone at no cost. The spacing of wells prevented the old practice of pumping the oil out as fast as possible. The Conservation Commission published "Rules of Practice and Procedures" including definitions such as:

MER—means the rate of production of oil, gas and water from a well, wells, or pool which the Commission finds will result in the maximum ultimate recovery of oil and gas from the pool, under prudent and proper operators.

It also established some general rules of spacing wells:

For established fields, special rules for the particular fields to be adopted after notice and hearing. For new fields, no wells

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5 Montana, Department of Natural Resources and Conservation, Oil and Gas Conservation Division, Eighth Biennial Report of the Oil and Gas Conservation Commission of the State of Montana to Governor Tim Babcock and Members of the Forty-First Legislative Assembly of the State of Montana for the Period July 1, 1966 to July 1, 1968, (Helena, Montana), p. 3.


7 Montana, Department of Natural Resources and Conservation, Oil and Gas Conservation Division, General Rules and Regulations and Rules of Practice and Procedure Relating to Oil and Gas Effective January 1, 1954, (Helena, Montana).
shall be drilled within 990 feet from every other drilling or producible well producing from same reservoir of the same lease or rent and no well will be drilled within 330 feet of any lease line or property line.

The development of the Commission established definite procedures but more important, it helped to increase the reservoirs in the state because with the use of these new methods the companies recovered a larger percentage of the oil from the pools.

The development of Williston Basin dominated the Montana oil industry but the fields in central Montana also showed a great improvement during this period. The annual production of central Montana for 1952 was 846 thousand barrels of crude but by 1956, it had been increased to 2.6 million. This increase of over 200 percent was due primarily to the Sumatra Field. Production from the latter field, located 80 miles northwest of Billings, was increased from 17 thousand barrels of crude in 1951 to 1.46 million barrels in 1956. Several other fields in central Montana also showed increases during the first half of that decade. The Wolf Spring Field had not come into production in 1954, but 413 thousand barrels of crude were produced in 1956. The Invahoe Dome Field's production in 1953 was 301 barrels of crude but in 1956 it was 224 thousand barrels. 8 This sharp increase in production encouraged a step up in exploration and development in this area during 1957.

From 1955-1958, the oil industry spent in excess of $660 million in exploration, while crude oil receipts were less than $250 million. 9 Because of the high price of finding new oil reserves, several promoters considered the possibility of increasing the production of the present

8 "12 Oil Wells in Extension of Northwest Sumatra Field," The Northwest, November - December, 1958.

producing fields by secondary recovery methods. By the end of 1957, Montana had produced some 276.7 million barrels of crude oil, almost all of which was reclaimed by primary recovery methods. At the same time that the crude production was increasing in the eastern part of the State (Williston Basin), the older fields were declining and many were at or near their economic limit by primary methods. A new technique, water flooding, was attempted in the Pine and Cabin Fields. The purpose of the pilot floods was to prove that sufficient quantities of water could be injected into porous limestone and dolomite zones at practical pumping pressure to effectively replace the produced crude oil, thereby maintaining or increasing reservoir pressures sufficiently to push oil ahead of the injected water toward producing wells. The Pine Field showed an increase in production from 450 to 660 barrels per day after the injection of the water.  

The Bureau of Mines and Geology believed that the use of water flooding could increase the reserves in Montana by 96 percent. The Bureau believed that there were 327 million barrels of secondary oil reserves available in Montana's 22 older fields. This would increase the primary reserves estimate for the State from a believed 343.4 million to 671.1 million barrels. The fields were broken down by horizons because of similarity in methods to be used to recover the secondary reserves. (See Table 1).

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<table>
<thead>
<tr>
<th>Producing Formations</th>
<th>Ultimate Primary Recovery</th>
<th>Possible Secondary Recovery</th>
<th>Ultimate Recovery All Methods</th>
<th>Ratio Secondary, Primary</th>
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<td><strong>TOTAL</strong></td>
<td><strong>259,317</strong></td>
<td><strong>327,696</strong></td>
<td><strong>623,013</strong></td>
<td><strong>1.12</strong></td>
</tr>
</tbody>
</table>

The predicted increase in gross value of crude oil due to water flooding was $942 million. The increase in tax value of secondary reserves was $59 million based on 1958 oil production data for Montana.\footnote{Ibid.}

In 1959, water flooding was used in the West Dome of the Cat Creek Field as a final oil recovery measure. An estimated 50 percent of the crude oil from the dome was recovered a number of years earlier through the use of natural flow, pumping and air-repressing system operations. It was estimated that an additional 30 percent of the crude would be recovered by water flooding and the balance of 20 percent was considered unrecoverable.\footnote{Editorial, Great Falls Tribune, Great Falls, Montana, November 29, 1959.} The use of water flooding could greatly increase the reserves in Montana as illustrated by the information presented.

Twelve new wells were brought into production in the northwest Sumatra Field during 1958. The field yielded oil from its sixth producing zone by 1958.\footnote{"12 Oil Wells in Extension of Northeast Sumatra Field," The Northwest, November – December, 1958.} Oil production from the central fields of which the Sumatra Field is a member, nearly doubled in a year and a half. This was due largely to the development of the Stensvod Field opened by Honolulu Oil Corporation in 1958, and continued expansion in the Sumatra and Ivanhoe Dome Fields. The growth of these fields was matched with an expansion of pipeline capacity to carry crude oil to refineries at Billings.\footnote{"Booming Central Montana," The Northwest, September – October, 1960.}

Pipeline activity was extensive during this decade. The Yellowstone Pipeline Company extended its lines from Billings to Spokane, a
distance of 540 miles. The line was completed in 1954 at a cost of $20 million. More than 37 million barrels of petroleum products were transported over the line in its first six years of operation. This was the first pipeline to reach Spokane and the Inland Empire from the Montana slopes of the Rocky Mountains. The Powder River Pipeline completed a line in 1956 at a cost of $2 million. During that period of time, the Husky Pipeline Company was planning a 96 mile line from Cody, Wyoming, to Billings, and the Cenex Pipeline Company was planning a line from its terminus at Glendive, Montana to Minot, North Dakota, a distance of 188 miles with a daily capacity of 15 thousand barrels. It was estimated to cost $5 million. The Yellowstone Pipeline Company, during this period, was planning a six-inch lateral line from its main line at Helena to Great Falls, a distance of 88 miles. The completion date was estimated for September, 1960.

Montana produced a total of 9 million barrels of oil in 1951, the year oil was discovered in the Williston Basin. The gross value of this production was $21 million. Oil and gas industry expenditures that year for exploration, leasing land, paying rentals, geologic and geophysical work, drilling and well equipment were estimated at $68 million. This latter figure represented 21 percent of the total amount of oil and gas industry expenditures in the total Rocky Mountain area during 1951.

The following year, oil was discovered in the Montana portion of the Williston Basin. In 1953, industry expenditures in the Treasure State

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17 "Increase Pipeline Activity," The Northwest, September - October, 1958.
increased to $120 million. Production reached 12 million barrels for a
gross value of $26 million, (22 percent of the total amount spent in the
Rockies).\textsuperscript{19}

By 1958, total Montana oil production was 28 million barrels and
the gross value was $74 million. Total industry expenditures in the state
were $141 million but only 13 percent of the Rockies' total. This amount
was substantially less than the 1956 peak year of $188 million following
the Williston Basin break-through. The year 1958 was the second succes­sive year that petroleum was the State's leading mineral in terms of total
value of production.\textsuperscript{20}

Montana's record production year was 1959 with an average daily
output of 82 thousand barrels. Value of oil produced also set a new all­time record. Nearly 30 million barrels (less than three days national
need) worth $75 million were produced during the year.\textsuperscript{21}

The search for oil in Montana during this decade brought the state
more than $1.25 billion. Montana received $3 million from oil and gas
leases on state land during the period of July 1, 1956 to June 30, 1958.
Montana's tax per barrel on oil was the highest of all the 31 states com­peting for oil-rich-capital.\textsuperscript{22}

The 1950's were dominated by three events that are worthy of
consideration:

1. The discovery and development of the Williston Basin.

2. The development of the fields in central Montana.

3. The use of water flooding in older fields.

\textsuperscript{19} Ibid. \hspace{1cm} \textsuperscript{20} Ibid. \hspace{1cm} \textsuperscript{21} Ibid.

\textsuperscript{22} Editorial, Great Falls Tribune, Great Falls, Montana, September 20, 1958.
The decade of the 1950's was a busy one for Montana. Crude oil production increased from 8 million barrels in 1950 to 30 million barrels in 1959. The total miles of pipeline in the State of Montana was increased from 842 miles in 1949 to 1,712 miles by 1958. The crude oil capacity of operating refineries in Montana increased from 52 thousand barrels per day in 1950 to 82 thousand barrels per day in 1958.\textsuperscript{23} The decade ended on a hopeful event for the coming years. Oil was discovered in the North Dakota Bad Lands at a depth of 9,399 feet. The well produced 1,526 barrels of oil in the first 24 hours. The discovery caused an immediate wave of leasing in eastern Montana.\textsuperscript{24}


CHAPTER IV

MONTANA CRUDE OIL INDUSTRY DURING THE 1960's

Montana's oil industry entered the 1960's with eagerness because it had just experienced an outstanding decade. The 1960's started with a discovery by the Murphy Oil Corporation that flowed 2,000 barrels a day. Sletvold Oil Well No. 1 was located 13 miles from Wolf Point and it yielded oil from a depth of more than 7,000 feet. ¹

The Continental Pipeline Company announced plans to construct a $13 million pipeline from Cut Bank, Montana to Byron, Wyoming in 1961, with a daily capacity of 50 thousand barrels. The 433 mile line was constructed to provide an outlet for the crude oil produced in northwestern and central Montana fields. They also planned a 55 mile lateral spur line from Roundup, Montana, to oil fields in central Montana. ²

The McAlester Fuel Company brought attention to the Williston Basin when it found high gravity oil in the middle of a vast area near the center of Williston Basin. ³

This was just one of the wells that helped set an active pace in Montana's drilling. The Cedar Creek anticline of eastern Montana set the pace in the Williston Basin. The Pine Field was still the largest producer

¹ Editorial, Great Falls Tribune, Great Falls, Montana, October 8, 1960.
² Editorial, Indiana Record, Indianapolis, Indiana, October 19, 1960.
³ Editorial, Great Falls Tribune, Great Falls, Montana, December 29, 1962.
in Montana during 1962, with over 13 thousand barrels per day and the Cabin Creek Field was second with 11 thousand barrels. The cumulative production from the Cedar Creek anticline by 1962 exceeded 78 million barrels of oil during the preceding decade. The Cat Creek Field yielded, at the end of 1962, $36 million in oil during the history of the field.  

The Modern Oil Refinery east of Shelby, idle since 1954, became operational in 1963. It had been incorporated under the name of North Star Refinery Company, and used local crude oil. Numerous oil discoveries were made in Montana during 1963 and in the first few weeks of 1964, with three of exceptional importance, in northwestern Montana. A well produced from a depth of less than 3 thousand feet, in Toole County; a well in central Montana; and a third well in the eastern portion of Williston Basin. This well produced from a depth of 12 thousand feet, and cost over $125 thousand to drill. All three wells were brought in by independent operators and resulted in large leasing programs around the wells.  

The northwestern portion of Montana showed increased activity since the price of drilling was much lower than in Williston Basin. The depth of the wells in Williston Basin were 12 thousand feet and the oil in the northwest was located at less than 3 thousand feet.  

The Humble Oil and Refinery Company dedicated a modern refinery operation control center at Billings, Montana, in 1965 along with the company's first hydrocracker to be completed anywhere in the United States. These improvements helped to keep the refinery modern.  

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4 "Gaps in Cedar Creek Anticline Closed by Added Wells," The Northwest, September - October, 1962.  
5 Editorial, Shelby Promoter, Shelby, Montana, October 24, 1963.  
7 Editorial, Great Falls Tribune, Great Falls, Montana, July 9, 1965.
Montana was the fastest growing crude-producing state in the Rockies by the end of 1965. All the other mountain states, except North Dakota, suffered a decline in oil output during the first half of the 1960's. Montana reserves increased substantially in 1963 and 1964. The reserves in 1962 were 341 million barrels of crude and in 1965 they were estimated to be 408 million barrels. The 1965 crude production gain can be credited to the Williston Basin with an increase in the number of wells from 497 in 1960 to 754 in 1965.8

Williston Basin, after a decline in 1964, recovered in 1965 with 53 thousand barrels per day compared to 49 thousand barrels per day in 1964. Central Montana's production declined steadily from 1961 when 17 thousand barrels per day was produced, to only 7.8 thousand barrels per day in 1965. Northern Montana showed a large percentage increase as its oil production went from 15.6 thousand barrels per day in 1964 to 18.7 thousand per day in 1965. Northern Montana's surging production could be credited to a revival of one of the state's oldest big-time fields, the Cut Bank Field. In 1964, Cut Bank was Montana's fifth largest producing field and in 1965, it had increased to the second largest producer. The shallow pool discovery in 1964 was responsible. A pool was discovered at a depth of 2,625 feet and flowed 1,248 barrels per day. The field then totaled more than 1,300 producing wells, almost one-half of northern Montana producers. Another boon to northern Montana's crude production was the discovery of the Fred and George Fields, in Toole County, in 1963. Production was from a depth of 2,735 feet. The well tested 400 barrels

8"Montana Counters Rockies Decline in Oil Output," The Oil and Gas Journal, August 8, 1966, pp. 116-119.
per day in the initial potential test. These two discoveries sparked off a shallow drilling spree in Toole County. In 1963, 69 wells were completed in Toole County.  

The Williston Basin rebound was credited to the Flat Lake and Weldon Fields. The Flat Lake Field production was 324 barrels per day while Weldon Lake produced 404 barrels per day. The Elk Basin Field, which accounted for over 90 percent of south central Montana's crude production, slipped slightly from 9.7 thousand barrels per day in 1963, to 9.4 thousand barrels per day in 1964.

Sumatra Field, central Montana's leading field, suffered a sharp decline in crude production from 1963 to 1965. In 1963, output was 4.8 thousand barrels per day. The following year production dropped to 3.6 thousand barrels per day and the next year to only 2.6 thousand barrels. Central Montana's oil exploration had also been dismal. In 1963, no commercial oil discoveries were made and in 1964, only one in Keg Coulee which produced about one thousand barrels per day and had only reserves of three million barrels of crude on December 31, 1965.

Secondary recovery boosted Montana's crude output. In 1965, six water-flood projects were started. The Oil and Gas Conservation Commission estimated that secondary production could amount to 21 percent of Montana's production.

Montana was the leading Mountain state in 1967 exploratory and development news. Two fields in central Montana produced growth. Hiawatha in Musselshell County and Weed Creek in Yellowstone County are important reservoirs for that section. McAlester Field Corporation discovered the

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9 Ibid. 10 Ibid. 11 Ibid. 12 Ibid.
Hiawatha Field, June, 1969. The well cost $80 thousand and produced from a depth of 5,026 feet. Weed Creek Field was discovered in 1966 and produced from a depth of 6,157 feet, and cost $85 thousand to drill.\textsuperscript{13}

Thirty-four dry holes were drilled in southeastern Montana over a five year period before Bell Creek became a reality.\textsuperscript{14} It was Ranch Creek in 1965 which opened the first oil production in southeastern Montana's Powder River County. This 1965 discovery was made by Baumgartner Oil Company.\textsuperscript{15} But it wasn't until 1967 that the big one was hit. In the first four months, 76 wells were producing oil in paying quantities. At a hearing of the Montana Oil and Gas Conservation Commission in September, 1967, it was estimated that the field could make 15 thousand barrels per day from the 18 wells completed at that time. Pine Field, the state's leading producer at that time, was only making 11 thousand barrels per day from 126 wells. One operator told the Commission that Bell Creek Field could produce 50 thousand barrels per day if drilled on 80-acre spacing. Montana's daily production at that time was only about 92 thousand barrels.\textsuperscript{16}

Bell Creek, a big shallow oil field, is located in southeastern Montana in the northeastern part of the Powder River Basin, just north of the Wyoming border. As of 1967, primary recoverable reservoirs were estimated at 50 million barrels with an additional 50 million barrels estimated recoverable from fluid injection. The average depth of the wells was

\textsuperscript{13}"Montana Highlights Rock Oil News," \textit{The Oil and Gas Journal}, November 27, 1967, p. 127.

\textsuperscript{14}A. A. McGregor, "Bell Creek Find Brightens Montana's Exploration Future," \textit{The Oil and Gas Journal}, August 7, 1967, p. 169.


4,500 feet. The Montana Oil and Gas Conservation Commission ordered 40-acre spacing in Bell Creek with a 300 barrel per day limit per well in 1967. As of October, 1967, 33 oil producers had been completed or were in final stage of completion and 101 were staked. By November 15, two pipelines were laid to the field, each with initial capacity of 15 thousand barrels per day.17

Bell Creek was enlarged by 33 square miles in November 1967, by the Montana Oil and Gas Conservation Commission. The new extension encompassed all of the Ranch Creek Field.18 At the end of the first four months, Bell Creek was faced with a problem in the Butte pipeline—the main crude trunk line in the eastern part of the Powder River Basin could not handle the increase caused by Bell Creek. It took ten days to drill and complete an oil producer in the 4,500 foot Muddy at Bell Creek. Despite this bottleneck, Bell Creek crude was due to be on its way to market via pipeline in less than six months after discovery of the field.19 By May 1968, the pipeline problem for Bell Creek's crude had been resolved.

The Permian Corporation, through its subsidiary Western Oil Transportation Company, operated a ten inch line to service Pipeline Company's Reno, Wyoming station and an eight inch line to the Butte Pipeline Company's Alzoda station in eastern Montana. Western Crude Oil, Incorporated, through its subsidiary, Bell Creek Pipeline Company, operated an eight inch line also to Alzoda. The downstream condition in all of the

17"Bell Creek: Dream Field in the Rockies," The Oil and Gas Journal, October 9, 1967, p. 71.
18"Bell, Ranch Creek Fields Join," The Oil and Gas Journal, November 27, 1967, p. 59.
pipelines could easily handle the 300 barrels per day that each well was allowed to produce. 20

As of April 1, 1968, only ten months after its discovery, Bell Creek Field consisted of 290 oil wells. A multiwell wildcat project was scheduled for a two-state area for 1968. 21 At the end of its first two years, Bell Creek had produced 24.2 million barrels of oil valued at $64 million according to Petroleum Information, a Denver Publication. It also included four pipelines with a combined capacity of 60 thousand barrels per day. The birth of Bell Creek fired land and drilling activities unheard of in the Rocky Mountain annals. 22

Farmers Union Central Exchange, Incorporated, made a dual discovery in Sheridan County, that was viewed as having significant importance. The well flowed over one thousand barrels of oil per day from two different depths. This discovery served to open a large area of "deep" oil located on the westside of Williston Basin where most oil had been in shallower horizons. 23 In 1968, total drilling soared upward to the tune of 33.6 percent with a surge of 69 percent in exploration. This increase can be credited to Bell Creek Field and the discovery of deep oil in Williston Basin. 24

20 Ibid.
21 Young O. Mitchell, "Bell Creek Nears First Place in Rockies," The Oil and Gas Journal, April 15, 1968, p. 35.
22 John C. McCaslin, "Bell Creek Comes of Age," The Oil and Gas Journal, July 28, 1969, p. 193.
23 John C. McCaslin, "Oil Hunters May Unravel the Williston Tangle," The Oil and Gas Journal, January 16, 1967, p. 117.
24 "Rocky Mountain Interest Surging," The Oil and Gas Journal, April 7, 1969, p. 193.
The Consolidated Oil and Gas Company discovery caused attention to shift to the Williston Basin when they brought in a well that flowed 744 barrels per day from a depth of 12,396 feet. This well provided additional proof of oil in the Red River Horizon. In 1968, about 20 exploration wells were being drilled in Richland County, all of which were going deep. Drilling activity in Canada and North Dakota was also directed at the deep horizons.25

The success ratio in Red River Ordovician hunting in the Williston Basin was 20 percent in 1969. This excellent record was due to an increase in seismic activity and better ways of finding Red River producing structures. The average depth of the wells was 12,616 feet. The Red River push covered Montana, South Dakota, and North Dakota with the Brush Lake Field in eastern Sheridan County, Montana with good showings. The central Williston Basin had revealed more than one billion barrels of oil reserves since its birth in 1951. Two oil strikes west and south of the sprawling Bell Creek Field in 1969 had put some of the old incentive back into lagging exploration around the pool.26

The industry may have overlooked possible petroleum way down in the Beaverhead, Madison and Gallatin County pocket of southwestern Montana. A few tests were drilled there with some minor indications of oil. The presence of favorable signs were presented at the October, 1969, symposium of the Montana Geological Society in Billings.27

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Three Montana fields were discussed at another symposium held in Billings in February 1970. These fields were Weldon, Kelley, and Hiawatha Fields. The Weldon Field is located in McCone County on the west flank of the Williston Basin. The field was found in 1964 and had cumulative production as of April 1969, of 5 million barrels. There were 18 wells with an average depth of 5,900 feet. The Kelley Field is located on the south flank of the Big Snowy anticlinorium in central Montana. The field was discovered in 1966 by McAlester Fuel and had a cumulative production as of April 1969, of 365 thousand barrels of oil. Output was 10 thousand barrels monthly for 1969. A water flood system was installed in 1969 to further secondary oil recovery. Ultimate recovery (primary and secondary) were expected to reach about 900 thousand barrels of oil. The Hiawatha Field, located in Musselshell County, was discovered in June 1967, by the McAlester Fuel Company. The estimated ultimate recovery was 850 thousand barrels and the cumulative production stood at 483 thousand barrels as of January 1, 1969. These various symposiums were important because they helped to attract attention to new areas of possible development.

Secondary recovered oil had become a major factor in the Montana crude picture in the late 1960's and added significantly to the nearly one million barrel increase in production calculated for the northern Montana portion of the state during 1969.

The Cruse Oil Field of southern Montana was the site of a proposed thermal-recovery test. The new electrothermic technique would be

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used in an attempt to recover part of an estimated 100 million barrels of
high-viscosity crude. Basically, the method involved the use of electric
current to raise the temperature of the reservoir and the crude in it, so
that the crude would flow into a producing well. The goal of the test
was to increase the temperature in the reservoir from about 175 degrees
to 200 degrees F., and recover some 30 percent of the oil in the affected
zone. 30

The annual production of crude oil reached an all time high in 1968 with 48.46 million barrels. Of this total, the Powder River Basin
contributed 16.6 million. 1968 was the best year for the Powder River
Basin, of which Bell Creek was the leading field. The Powder River
Basin produced only 17 million barrels of crude in 1967 and the produc-
tion for the basin declined to 13.2 million barrels in 1969 and declined
even more in 1970 to only 7 million. The decline in Bell Creek was the
principal factor in the decline of the state as a whole. The number of
producing wells in Powder River Basin did not decline but instead actually
increased from 328 in 1968 to 397 in 1969. The average daily production
per well, however, decreased greatly from 138 barrels in 1968 to 91 barrels
in 1969 and in 1970 only 58 barrels were produced, per well. All oil
activities declined greatly after 1968. For example, the number of devel-
opment wells drilled dropped from 300 in 1968 to 171 in 1969. The de-
crease in activity in 1969 was due largely to the reduction at Bell Creek
and this was due to the natural decline in reservoir pressures. 31

30 W. B. Bleakley, "Unique Electrothermic Recovery Methods Get
31 Montana, Department of Natural Resources and Conservation, Oil
and Gas Conservation Division, Annual Review for the Year 1970, Relating
The 1960's was a good decade for Montana's oil industry. Total miles of pipeline were increased from 2,348 in 1961 to 2,671 in 1967. This does not reflect the development of Bell Creek. The crude oil production for the state increased from 30.2 million barrels in 1960 to 44 million barrels in 1969. The crude oil capacity of operating refineries in Montana increased from 83 thousand barrels per day in 1960 to 126 thousand barrels per day in 1969. Several other significant events took place during the 1960's:

1. Bell Creek was discovered and developed. Original oil-in-place was estimated at 224 million barrels with 58 million barrels believed recoverable by primary methods and an additional 58 million barrels thought recoverable by secondary method. The cumulative production as of January 1, 1970 was 31.4 million barrels.\(^{32}\)

2. Oil was discovered in the Red River horizon of Williston Basin, a much deeper horizon than the initial producing level.

3. Successful performance of water flooding aided in reviving of many older fields.


\(^{33}\)Montana, Department of Natural Resources and Conservation, Oil and Gas Conservation Division, Annual Review for the Year 1969, Relating to Oil and Gas, Vol. 13, (Helena, Montana)
CHAPTER V

MONTANA CRUDE OIL INDUSTRY IN THE 1970's AND THE POSSIBLE IMPACT OF A CHANGE IN IMPORT CONTROLS OF CRUDE OIL

The most significant event of 1970 was the successful development of several deep (12 thousand feet) Red River dolomite fields in the Williston Basin. Initial production per well ranged from 244 to four thousand barrels per day. Most important was the high success ratio for these deep Red River tests. Of the 22 Red River tests drilled, oil was struck at a success rate of 31.8 percent. This exceeded any previous year in the eastern Montana oil history.¹

A Montana Oil and Gas Conservation Commission order was issued requiring 320-acre spacing units for exploratory and development oil wells if projected depth was 11 thousand feet or more. The succeeded order required a 160-acre pattern. Consolidated Oil and Gas Company testified that the wider-spaced wells could drain the formation and that the payout on closer-spaced fields was not economical.²

Four water-flooding projects were located in the Bell Creek Field in 1971. The first three separate units showed waterflood response and the fourth was just starting to take water by year end. The field's


²"Deep-Well Spacing Goes to 320 Acres in Montana Order," The Oil and Gas Journal, July 12, 1971, p. 39.
total production after the first three projects was 16 thousand barrels of oil per day. It was estimated that without waterflooding, the field would only have produced 12 thousand barrels per day. The cumulative oil production so far for Bell Creek exceeds 42 million barrels with one-half million barrels claimed to be waterflood oil. During 1972, two more units were scheduled to be injected with water. It has been estimated that cumulative production after waterflooding might be 125 million barrels or 45-50 percent of the oil originally in place.3

Two drilling sites were located in the Crazy Mountains of the Hamilton Coulee Area of central Montana. This area has always been an off-and-on leasing region.4 Another area of possible drilling activity is in Glacier National Park but the possibility of its taking place is slim. The oil companies claim that they will do little damage to the park's beauty but the conservation problem will be too great to overcome.5

Petroleum Conservation

It is obvious from the analysis presented, that for any particular field petroleum is a rapidly diminished resource. Fields with substantial promise pass quickly to depletion. Increasing awareness of this fact brought the Oil and Gas Conservation Commission for the State of Montana into existence in 1954. Conservation has meant squeezing the oil-bearing earth for maximum production at minimum cost over the long run. It has also meant bringing oil to the surface at a rate no faster

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3W. B. Bleakley, "Bell Creek Field Still Fast Paced," The Oil and Gas Journal, September 13, 1971, p. 87.
than required by market demand. From the standpoint of production con-
ervation has meant allowing everyone who had a legitimate interest a
place in oil well exploration and development—not just the large and
powerful. By so doing, physical waste has been virtually eliminated and
an ever increasing percentage of the estimated capacity of a well has
been recovered. In total the public interest has been well served.  

Petroleum Imports

Domestic requirements for petroleum products in total are met
through use of both foreign and local crude oil. There have been increas-
ingly bitter attacks on long-standing federal policies concerning domestic
oil production and the import program. In 1955, the Cabinet Committee
found that unrestricted oil imports were not in the national interest
because they discouraged domestic oil exploration. In 1959, President
Eisenhower imposed mandatory oil import restrictions.  

Given oil's dominant position in United States energy requirements, the reliability of
sources and the cost of oil supplies was of vital concern to all segments
of the economy. The government's legal basis for mandatory import controls
was the requirement to safeguard the national security through the encour-
agement of domestic exploration and production. The trend during the 1960's
was an increase in the amount of imported crude, (see Table 2). The in-
creased dependency on another source, such as the Middle East, could seri-
ously handicap the United States' ability to react to a serious military

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threat. The possibility of political blackmail is also a fact that must be considered.

**TABLE 2**

IMPORT FOR CONSUMPTION FOR SELECT YEARS

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<td>569</td>
</tr>
<tr>
<td>1970</td>
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Another fact to consider is the effect on the United States' Oil Industry. An increasing dependence on foreign oil would drive domestic producers out of business and weaken the ability of United States oilmen to meet the nation's growing needs. The American Petroleum Institute predicted the following results if import controls were eliminated:

1. **Domestic production** would be seven million barrels per day lower in 1985 than production anticipated with a continuation of import control.

2. **Elimination of import controls** would reduce the number of wells drilled in search of new oil and gas supplies by 85 percent or approximately 4,500 wells annually in the 1970-85 period. Drilling of wells in existing fields would be cut by 50 percent or approximately 8 thousand wells per year.

3. **The premature abandonment** of 185 thousand small wells, representing 60 percent of the active wells in the United States in early 1980 would result.

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4. It is charged, elimination would worsen the country's balance of payment problem. Removal of controls would mean that by 1980 the United States would be spending $4 billion more per year to pay for additional imports.

5. Elimination of controls would reduce the number of domestic oil workers by as much as 100 thousand individuals.

A possible effect on Montana's oil industry if the import controls were eliminated would be a reduction in exploration and drilling of new wells. The cost of drilling a wildcat in extreme eastern Montana was $125 thousand in 1968.9 The possibility of abandonment of the slower producing fields is also a consideration.

The 1970's saw an increase in activities in the Williston Basin because of the high success rates of the deep Red River tests. The success of the waterflooding projects in Bell Creek enabled production in the field to be increased. During the past 10 years, oil production exceeded additions to proved reserves.10 The cost of finding oil is increasing every year because the easily discovered oil has already been exploited and operators are having to drill deeper or develop new extraction techniques.

Montana has benefited from the oil industry in the form of employment. Six thousand individuals were employed in 1965. But more importantly, Montana has received revenues from the state's oil fields. By the end of 1971, the state's oil fields yielded 756 billion barrels of oil which was marketed for $1.7 billion.11 The state received revenue in the

9 Editorial, Great Falls Tribune, Great Falls, Montana, February 26, 1967.


11 Montana, Department of Natural Resources and Conservation, Oil and Gas Conservation Division, Annual Review for the Year 1971, Relating to Oil and Gas, Vol. 15, (Helena, Montana), p. 1.
amount of $2.9 million from the oil and gas leases on state land during a two year period, July 1, 1956 to June 30, 1958. The state benefited from oil and gas expenditures for exploration, rental payments, geologic and geophysical work, and drilling and well equipment, all together estimated at $188 million in 1956. Money was also spent for the expansion of refineries and pipelines to handle the increased production.

The future of the industry looks good. The demand for petroleum will continue to increase as the nation's need for energy rises. Montana's production has increased from 30 million barrels in 1960 to 48 million in 1968. The use of new methods to increase the percentage of crude recovered from the ground illustrates the ingenuity of the industry. The industry will continue to benefit Montana in the future.

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CHAPTER VI

CONCLUSIONS

The crude oil industry in Montana grew from a small sector of the economy to the state's leading mineral in terms of total value of production during a 53 year period beginning in 1919. Production for 1919 was worth $184 thousand\(^1\) while in 1971 the state produced $104 million worth of crude oil or 34.6 million barrels.\(^2\) The best year was 1968, when 48.46 million barrels of crude was produced.\(^3\) The industry experienced two major discoveries of national significance, Williston Basin in 1951 and Powder River Basin in 1967. Following each of these discoveries, the state's production increased rapidly. The growth of the industry created a need for an increase in the operating capacity of refineries and a need for additional pipelines. The major oil companies entered the state in the 1930's thereby reducing the importance that local money played in the development of the industry.\(^4\) It is noteworthy, however, that the first major oil fields were discovered by firms backed by local


\(^2\)Montana, Department of Natural Resources and Conservation, Oil and Gas Conservation Division, Annual Review for the Year 1971, Relating to Oil and Gas, Vol. 15, (Helena, Montana), p. 1.

\(^3\)Montana, Department of Natural Resources and Conservation, Oil and Gas Conservation Division, Annual Review for the Year 1969, Relating to Oil and Gas, Vol. 13, (Helena, Montana), p. 1.

funds, however, out of state capital and personnel were vital to continued development.

Montana fields contributed one percent of the total crude oil produced in the United States each year since 1958, (see Table 3). During 1941, the United States contributed 63 percent of the world production of crude oil. This declined to only 22 percent in 1969 due to rapidly increasing production abroad, (see Table 4). The demand for petroleum in the United States, as mentioned in the first chapter, increased steadily with the growth in energy consumption. The most significant result of this increase in demand was the growth in the amount of crude oil imported into the United States. In 1960, 401 million barrels entered the country while in 1970 the total was up to 534 million, (see Table 2).

As covered in the fifth chapter, Montana has benefited from the industry in the forms of employment, revenues, expenditures for equipment and exploration in the state. The industry will remain a vital portion of Montana's economy in the future because of the rising demand for oil.
TABLE 3

MONTANA AND U.S. PRODUCTION OF CRUDE OIL FOR SELECT YEARS

<table>
<thead>
<tr>
<th>Year</th>
<th>Montana Total Crude (barrels)</th>
<th>Percent U.S. Total</th>
<th>U.S. Total Crude (barrels)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1942</td>
<td>8,074</td>
<td>.5</td>
<td>1,386,645</td>
</tr>
<tr>
<td>1944</td>
<td>8,627</td>
<td>.5</td>
<td>1,677,753</td>
</tr>
<tr>
<td>1946</td>
<td>8,825</td>
<td>.5</td>
<td>1,733,939</td>
</tr>
<tr>
<td>1948</td>
<td>9,382</td>
<td>.5</td>
<td>2,020,185</td>
</tr>
<tr>
<td>1950</td>
<td>8,109</td>
<td>.4</td>
<td>1,973,574</td>
</tr>
<tr>
<td>1952</td>
<td>9,606</td>
<td>.4</td>
<td>2,289,836</td>
</tr>
<tr>
<td>1954</td>
<td>14,195</td>
<td>.6</td>
<td>2,314,988</td>
</tr>
<tr>
<td>1956</td>
<td>21,760</td>
<td>.8</td>
<td>2,617,283</td>
</tr>
<tr>
<td>1958</td>
<td>27,957</td>
<td>1.1</td>
<td>2,448,987</td>
</tr>
<tr>
<td>1960</td>
<td>30,240</td>
<td>1.2</td>
<td>2,574,933</td>
</tr>
<tr>
<td>1963</td>
<td>30,875</td>
<td>1.1</td>
<td>2,752,723</td>
</tr>
<tr>
<td>1964</td>
<td>30,646</td>
<td>1.1</td>
<td>2,805,125</td>
</tr>
<tr>
<td>1966</td>
<td>35,380</td>
<td>1.2</td>
<td>3,027,763</td>
</tr>
<tr>
<td>1968</td>
<td>48,460</td>
<td>1.5</td>
<td>3,329,042</td>
</tr>
<tr>
<td>1970</td>
<td>37,879</td>
<td>1.1</td>
<td>3,517,450</td>
</tr>
</tbody>
</table>


TABLE 4

WORLD PRODUCTION OF PETROLEUM (CRUDE) AND U.S. PERCENT OF TOTAL FOR SELECTED YEARS

<table>
<thead>
<tr>
<th>Year</th>
<th>World Production Petroleum (crude) (million barrels)</th>
<th>Percent U.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1941</td>
<td>2,221</td>
<td>63</td>
</tr>
<tr>
<td>1945</td>
<td>2,595</td>
<td>66</td>
</tr>
<tr>
<td>1950</td>
<td>3,803</td>
<td>52</td>
</tr>
<tr>
<td>1955</td>
<td>5,634</td>
<td>44</td>
</tr>
<tr>
<td>1960</td>
<td>7,674</td>
<td>34</td>
</tr>
<tr>
<td>1965</td>
<td>11,058</td>
<td>26</td>
</tr>
<tr>
<td>1969</td>
<td>15,220</td>
<td>22</td>
</tr>
</tbody>
</table>

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