SIXTEENTH BIENNIAL REPORT

OF THE

STATE GEOLOGIST

OF THE

STATE OF WYOMING

For the Period
October 1, 1930 to and Including
September 30, 1932

To the
Twenty-second Regular Legislative Session
1933

Sixteenth Biennial Report

of the

State Geologist

FOR THE PERIOD
OCTOBER 1st, 1930
TO AND INCLUDING
SEPTEMBER 30th, 1932

John G. Marzel, State Geologist
Cheyenne, Wyoming

JOHN G MARZEL . . . . . State Geologist
C. S. DIETZ . . . . . Deputy State Geologist
FRANK B. TAYLOR . . . . . Oil and Gas Inspector
CYRUS O. WERTZ . . Mineral Production Supervisor
P. A. COLE . . . . . Clerk
ALICE WRIGHT . . . . . Stenographer
FERN BOMAN . . . . . Stenographer

To His Excellency,
Leslie A. Miller,
Governor of the State of Wyoming.

Dear Sir:

Pursuant to the requirements of Section 302, Wyoming Compiled Statutes 1920, I have the honor to submit herewith the Biennial Report of the State Geologist for the period ending September 30, 1932.

The report sets forth the activities of the department and certain recommendations, statistics of mineral production for the years 1930 and 1931 and other pertinent statistics.

In the compilation of this work, I am indebted to the loyal members and employees of this department, to the United States Geological Survey and to the various oil companies and operators in the State for their aid and co-operation in furnishing and checking statistics herein contained.

Very respectfully submitted,

JOHN G. MARZEL,
State Geologist.

Cheyenne, Wyoming,
October 31, 1932.

Sixteenth Biennial Report of the State Geologist

October 1, 1930 to and including September 30, 1932

CHAPTER I

A Resume of the History *of the* STATE GEOLOGIST'S OFFICE

Laws Creating and Duties of the Office

The Geological Department existed in Territorial days, from 1881 to 1891, during which period there were four Territorial Geologists. Upon the admission of the Territory to Statehood, the office of the State Geologist was provided for in the Constitution. From 1891 to 1901 the office was vacant. During the period from 1901 to date there were seven State Geologists.

List of Wyoming Territorial and State Geologists

Name	Politics	Term
Territorial		
F. J. Stanton	Republican	1881-1882
G. E. Bailey	Republican	1882-1885
Samuel Aughey	Democrat	1885-1887
L. D. Ricketts	Democrat	1887-1891
State		
Vacant		1891-1901
Henry C. Beeler	Republican	1901-1909
Edwin Hall	Republican	1909-1911
C. E. Jamison	Democrat	1911-1915
L. B. Trumbull	Democrat	1915-1919
G. B. Morgan	Republican	1919-1923
A. B. Bartlett	Democrat	1923-1927
John G. Marzel	Republican	1927-Date

The laws creating and prescribing the duties and personnel of the office are as follows:

Article 9, Section 6, Constitution of the State of Wyoming

Geologist—Term—Duties. There shall be a state geologist, who shall be appointed by the governor of the state, with the advice and consent of the senate. He shall hold his office for a term of six (6) years or until his successor shall have been appointed and shall have qualified. His duties and compensation shall be prescribed by law. No person shall be appointed to this position unless he has such theoretical knowledge and such practical experience and skill as shall fit him for the position; said state geologist shall ex-officio perform the duties of inspector of mines until otherwise provided by law.

Article 10, Section 109-1001 Wyoming Revised Statutes, 1931

Appointment by Governor. There shall be a state geologist of the state of Wyoming who shall be appointed by the governor by and with the consent of the senate. He shall hold his office for the term of six years or until his successor shall have been appointed and qualified. (L. '01, c. 45, Par. 1; C. S. '10, Par. 208; C. S. '20, Par. 221).

Article 3, Section 78-302, Wyoming Revised Statutes, 1931

Appointment of Inspectors. To enable him to carry out the duties imposed upon him by this article and to enforce the rules and regulations so prescribed, the state geologist shall appoint, with the approval of the governor, two inspectors who shall be petroleum engineers or practical drillers with not less than three years field experience, and who shall receive a salary of two hundred and fifty dollars per month and their actual traveling expenses. The state geologist may from time to time delegate his authority to supervise the abandonment of wells or the extinguishment of fire to an inspector of the bureau of mines or to the field superintendent of any company or operator operating in the same field, who shall receive no compensation, but no such appointment

of a special representative shall be made without the consent of the owner of the well. (L. '21, c. 157, Par. 2.)

Article 10, Section 109-1006, Wyoming Revised Statutes, 1931

Deputy State Geologist. The state geologist shall have the power to employ a deputy state geologist at a salary not to exceed three thousand dollars ($3000.00) per annum who shall have the theoretical and practical knowledge and experience sufficient to fit him for the office. (L. '27, c. 90, Par. 2).

Article 10, Section 109-1004, Wyoming Revised Statutes, 1931

Duties. The state geologist shall make or cause to be made, examinations and reports on any state or school lands when so requested by the state land board and make written reports concerning the geology of any lands in which the state of Wyoming is or may hereafter become interested, and on such other matters as the respective state boards may desire information. He shall be charged with the duty of enforcing all of the laws of the state of Wyoming relating to the oil industry. It shall be his further duty to perform such other acts as are provided by the laws of the state of Wyoming relating to the oil and mineral deposits, (other than coal deposits). He shall make or cause to be made valuation surveys, investigations, appraisements and reports on the mineral resources of the state. He shall have authority to designate and supervise mining operations on state and school lands in the interest of economic development. He shall have authority to co-operate with the United States government, departments of the state of Wyoming, university of Wyoming, or private corporations in the matter of geological, topographic, soil and mineral surveys, also industrial investigations and examinations that may bring about further economic development of the mineral resources of the state; provided, that the said co-operative activities of his office be accomplished on whatsoever basis he may determine, but in no case shall the cost to the state exceed fifty per cent. (50%) thereof. He shall make a biennial report to the governor, covering

the activities of his office, and shall include therein suggestions as to the enactment of laws relating to the mineral resources of the state. He shall keep in his office full and complete records of all work done by him or under his supervision, all of which shall be the property of the state. He may publish such reports, maps and data as he considers advisable and of public interest, and shall distribute the same to the public upon request, either free or at such price as he deems reasonable. (L. '27, c. 90, Par. 1, amending C. S. '20, Par. 224.)

Article 3, Section 78-301, Wyoming Revised Statutes, 1931

Rules and Regulations. For the purpose of conserving the natural resources of the state and to prevent waste thereof through negligent methods of operation, the state geologist shall prescribe and enforce rules and regulations governing the drilling, casing and abandonment of oil and gas wells and the waste of oil and gas therefrom upon all lands in the state of Wyoming excepting public lands subject to the act of congress approved February 25, 1920, (Public 146). The rules and regulations so prescribed shall be those from time to time adopted by the bureau of mines or by the secretary of the interior of the United States pursuant to said act of congress, governing methods of operations of operators upon lands embraced within permits or leases issued under the provisions of said act of congress, and it shall be the duty of all persons and corporations drilling or operating oil or gas wells upon patented or state land to comply with the said rules and regulations, to file with the state geologist all logs of wells and other reports required thereby, and to case, control and plug all wells as therein prescribed. (L. '21, c. 157, Par. 1.)

REVIEW

By a perusal of the above quoted laws, it will readily be seen that the office of the Wyoming State Geologist was primarily created to furnish technical information, to aid in promoting industries and to disseminate information concerning our mineral resources, to the state's citizens and others interested, to co-operate with other state departments, to conserve the oil and gas resources of the state and to enforce all the laws relating to the oil industry.

It is the business of this department and its constant endeavor to ascertain the facts and marshal them in such intelligible form as will yield most readily to industry, not only the technical but the practical information upon which investment and development are predicated. A great amount of information has been made available by the Geological Department on the metallic, non-metallic, oil, gas and various other natural resources, in an effort to place Wyoming in a position of industrial importance.

The location of dams, oil and gas wells, iron deposits, manufacturing sites, roadbeds, etc., are now determined after geological reconnaissance. The stability or collapse of great and small impounding dams rests not basically upon their structure but upon the nature of their foundations. Such cases all revert directly to the Geologist for his advice and recommendation.

Many geologists have devoted the best part of their lives in unraveling the potentialities of the vast mineral deposits of Wyoming. Many more geologists and specialists could now be occupied supplying needed data on the occurrence of source beds of petroleum, on structures favorable for the accumulation of oil and gas, and on the reserves of oil left in the oil sands but not recoverable by ordinary pumping methods. In addition to the oil and gas resources a great amount of research work should be done on the constitution of clays suitable for a wide range of ceramic products, of cement-making materials, concrete aggregate, limes, structural stone, highway materials, pigments, mineral fillers, absorbents, rock products for the manufacture of chemicals, fluxes, soil-conditioning and soil-nourishing materials, and other earth substances. Such information would serve as the background of reference for exploration in the search for certain specific adaptable crude materials and for handling problems of utilization and synthetic manufacture.

Although operating with a skeletal organization, maximum efficiency by the State Geological Department has been attained by careful attention to the most important details and making each dollar of expenditure do its full duty through advertising the State's mineral resources and supervisory activities to conserve the oil and gas resources.

Government owned lands in Wyoming comprise 63% of the area of the state. A large force of geologists, trained field men and office workers are engaged in the supervision of the oil and gas production from these lands. State owned and patented lands in Wyoming comprise 37% of the State's area and the Geological Department which consists of the State Geologist, one State Oil & Gas Inspector, one Mineral Production Supervisor, one clerk and two stenographers endeavors to keep abreast of the constantly increasing supervisory duties looking to the conservation of our oil and gas resources which yield the largest income to the State Treasury and in addition to this, personal attention must be given to callers and letters requesting information on other mineral resources which abound in Wyoming.

Impossible to estimate, but of great importance to the State are the results obtained by the stimulation of interest and dissemination of information regarding the many and varied mineral resources of the state through the medium of correspondence and personal conferences.

Gathering and assembling of new and already existing data, keeping up with present trends and the constant need of supervision to conserve our oil and gas resources and mineral production from State owned lands, precludes the possibility of attempting new investigational labors with the force now alloted. Attention is directed that the duties of the State Geologist's office are primarily of an economic nature dealing almost wholly with practical problems. It would be entirely unfeasible to combine this department with an academic department where theories only are propounded and where practical experience and requirements are not predominant.

A complete library of United States Geological Survey publications has been assembled after painstaking effort. These publications are card indexed so that anything pertaining to or written about any Wyoming mineral can be found at a moments notice. This makes instantly available the findings of experts of this Government agency who have spent many years on investigations of our mineral resources.

A file has also been developed giving complete information about any mineral that has been or might be discovered in Wyoming.

The Geological Department identified many mineral specimens for citizens of the State during the biennium, rendering thereby a service which would have run into several hundreds of dollars if it had been necessary to have these specimens analyzed by commercial assayers and mineralogists. A great many of these specimens were of uneconomic worth, but most of them were products which held some economic possibilities. In all cases, the office was able to advise the inquirer on the probable value of the mineral deposit from which the specimen was taken and inform him how to proceed to develop the same.

During the spring and summer of 1932 numerous requests were received daily for pointers on placer mining laws and methods of recovering placer gold in the streams of Wyoming, and a pamphlet was prepared and mimeographed and is now available for those desiring such information.

The original law creating the Department stipulated that the State Geologist make examinations and reports on mining properties and take any steps likely to advance the development of the mining industry.

In 1903 the State Geologist was made ex-officio Inspector of Mines.

Until 1913 the office consisted only of the State Geologist and the biennial expenses of the Department were limited to $6,800.00. During the two biennial periods 1913-1915 and 1915-1917 the biennial appropriation was $14,800.00, which provided for some office help and additional travel expenses.

In 1919 the Legislature required the State Geologist to make examinations and reports on State or School lands to the State Land Board and charged him with the duty of enforcing all of the laws relating to the oil industry. From 1919 to 1921 the appropriation for the Department was $15,700.00.

The laws of 1921 provided for further conservation of the natural resources of the State, placing all oil and gas operations on State and patented lands under the supervision of the State Geologist. Their intent is to prevent waste of valuable oil and gas resources by grossly negligent methods of operation. The Oil and Gas Inspectors perform protective duties that the State Geologist may direct with the view of prolonging the life of our greatest source of direct revenue,

the oil and gas fields of the State. From 1921 to 1923 the appropriation for the Department was $35,700.00.

For the 1923-1925 biennium the appropriation was $29,140.
For the 1925-1927 biennium the appropriation was $27,000.
For the 1927-1929 biennium the appropriation was $36,600.

In 1927 the State Legislature again increased the scope and duties of the Department by creating the office of Deputy State Geologist and in 1929 the State Mineral Production Supervisor was transferred to the Department from the State Land Office. During the 1929 to 1931 biennium the amount appropriated was $53,700.00 and for the 1931 to 1933 biennium the amount appropriated was $51,720.00. In comparing the expenses of the present administration during the 1929 to 1931 biennium with that of the one from 1915 to 1919, when there were no oil and gas inspectors, Deputy Geologist, or Mineral Production Supervisor provided for, it will be noted that during this period the expense of the office increased only $1,400.00, and during the period 1931 to 1933 the expense will not be appreciably increased.

The State being in the business of producing oil, gas and other minerals from its own lands requires the State Geological Department to supervise and check the production in order to protect its income which to date amounts to more than $38,000,000.00.

While this Department exists by direct taxation, yet the royalty payments to the State on oil and gas production alone greatly exceeds the amount used for supervision. Therefore, with the close supervision and geological aid being extended companies and individuals already operating and the furnishing of information to those contemplating development of the State's immense mineral resources, power and manufacturing possibilities and potentialities, it is reasonable to expect a consequent proportional increase in royalties to the State, as well as increased population, taxable wealth and also a market for our agricultural products.

Since assuming the duties of State Geologist, the volume of correspondence has quadrupled. Hence owing to constantly increasing demands for information about the mineral resources of Wyoming, much time of the State Geologist has been occupied with correspondence. These added duties made it necessary to carry a second stenographer and, during the past two years, an extra typist has been hired on a number of occasions.

Resume of the Appropriations for the State Geological Department, the Amount of Mineral Royalty from State Owned Land and the Mineral Production of the State

(Coal Not Included)

Year	Appropriations for Geological Department	Royalty from State Owned Land	Mineral Production (Coal Not Included)
1901	$ 3,400		
1902	3,400		
1903	3,400		
1904	3,400		
1905	3,400		$ 1,320,251
1906	3,400		1,050,321
1907	3,400		938,906
1908	3,400		585,104
1909	3,400		436,091
1910	3,400		404,099
1911	3,400	$ 500	974,514
1912	3,400	21,915	1,726,000
1913	7,400	30,236	2,172,046
1914	7,400	28,956	2,384,005
1915	7,400	70,023	3,152,434
1916	7,400	105,093	7,427,281
1917	6,650	401,167	12,973,967
1918	6,650	565,397	20,014,793
1919	7,850	686,879	22,349,185
1920	7,850	1,947,106	53,946,897
1921	17,850	1,558,223	28,006,650
1922	17,850	1,457,761	40,367,284
1923	14,750	1,570,546	56,748,547
1924	14,750	1,867,578	57,167,166
1925	13,500	1,675,306	60,479,915
1926	13,500	1,664,978	61,161,066
1927	18,300	856,430	38,014,600
1928	18,300	794,308	35,587,875
1929	26,850	756,411	34,185,407
1930	26,850	642,247	31,617,000
1931	25,860	333,567	15,178,000

By observing this tabulation, it can readily be seen why the expense of the office increased at different definite periods. The jump occurring in 1921 was due to the creation of the oil

and gas conservation department by the addition of two oil and gas inspectors.

In 1927 another raise was occasioned by the addition of a Deputy State Geologist.

In 1929 expenses were again increased by the transfer of the Mineral Production Supervisor from the State Land Office. The expenditure in connection with the transfer from the Land Department is not an additional appropriation inasmuch as the transferred Supervisor was formerly carried on the payroll of the State Land Commissioner at the same salary and expense allowance that he now receives in this department and the appropriation for this branch of the department is merely an item transferred from one State department to another.

SUPERVISION AND CONSERVATION OF STATE'S OIL AND GAS RESOURCES

Supervision of the State's mineral resources, especially petroleum, is required in order that the State shall receive just compensation due it from its lands that produce mineral. This duty of supervising the income from the State's mineral resources has been delegated to the State Geological Department, and the Legislature has provided that certain men of experience be appointed as inspectors to look after the details of this work.

For the past several years only one State Oil and Gas Inspector has been employed, and this man has proven sufficiently experienced so that a second inspector has not been found necessary. The law, however, states that two inspectors can be appointed. Through the employment of a single Inspector, the State has effected a material saving of several thousands of dollars. If the State Geological Department were eliminated and no department substituted for same, the State would have no way of ascertaining whether it was receiving its just share of mineral production. It would be in the position of a merchant, who, in order to save the cost of bookkeeping, relied upon his customers to keep a correct account of their purchases.

Were it not for the State Geological Department and the State Oil and Gas Inspector, the State of Wyoming would be placed in the position of taking whatever the oil and gas producing companies would say was its due, without redress, since there would be no one to determine what the amounts were except the oil firms themselves.

The State Oil and Gas Inspector's office is the Oil and Gas Conservation Division of the State Geological Department and this Division has direct charge of all oil field supervision. Only really competent men can give satisfaction in this Division because of the special technical knowledge and experience required. Not only must the Inspector be a geologist and petroleum engineer, but he must also have a working knowledge of chemistry and mineralogy, understand microscopic science and have had long experience in actual oil field work to enable him to intelligently supervise oil and gas operations in the various fields of the State.

A professor of chemistry would be unable to cope with the problems the State Inspector has to solve; likewise, a professor of geology would be lost when asked to recover a lost string of drilling tools, though both the above would probably know more in their special lines than the State Inspector.

A single mistake as to the procedure of cementing a well or the shooting of an oil sand on the Inspector's part may easily result in the loss of the well and subsequent damage to the field or area where the well is drilled. The present administration can point with pride to the record of the oil and gas conservation division in this respect, since no serious mistake was made during the term of office.

The Casper office, under the present administration, has grown from a bare office room to a well equipped bureau of supervision and information. It now comprises a reference library on geology, petroleum and kindred subjects; a laboratory for making chemical and physical tests; a stock of field maps covering practically all operations in the State; a complete set of field instruments for field work; drafting equipment, and regular office equipment for the routine business. This office and equipment has been established at a very low cost to the State because much of same is privately owned and donated to the State for the use of this Division.

The field work of the Oil and Gas Conservation Division includes not only the supervision of mineral operations upon State lands, but also those upon private lands through an act of the Legislature in 1921. If it were not for the Legislature placing the private owned lands under supervision in Wyoming, any operator could drill wells as he pleased on private lands with no concern as to what damage he might do to the field or neighboring tracts of Government or State holdings. This condition did prevail in many of the older oil and gas fields in the East and resulted in the ruin of several productive areas, but under the present regime it cannot happen in Wyoming since the United States Geological Survey has a large force to supervise operations on Government lands and the State of Wyoming has the Geological Department and the State Oil and Gas Inspector to take care of the State and private land holdings.

In past years, the office of the State Oil and Gas Inspector was located in Cheyenne. However, it was found that it required two days to reach the fields in the northern districts of the State from the Capital city. The Inspector's office was, therefore, moved to Casper because of its more central location and from the office at Casper the Inspector can reach any field in the State in one day's drive. Also, the fact that practically all of the oil firms make Casper headquarters for their operations in Wyoming, as well as the United States Geological Survey, places Casper as the logical point for the State Oil and Gas Inspector's headquarters.

One of the outstanding facts regarding the present oil and gas conservation division's administration of the mineral affairs of the State can be seen by comparing the number of the State of Wyoming's personnel of this division as compared with that of the Federal Government. In Wyoming only one man has charge of the field work of inspection while the Geological Survey of the Federal Government has some twenty odd people employed for the same purpose.

The Oil and Gas Conservation Division also has charge of the State mineral exhibit at the State Fair held each year at Douglas and during this administration this exhibit has been brought up from a mediocre showing of the State's minerals to an exhibit that displays the State's mineral resources in an adequate manner.

CONSERVATION WORK IN WYOMING

Prior to 1916, the Wyoming State Geological Department was more or less an honorary, scientific, one man office to which little attention was paid by the legislature and others.

The start of the great petroleum development in 1916, however, caused the State officials generally to look about for some means of protecting the State's interests in the new industry that was so rapidly assuming great proportions, and the State Geological Department appeared to be the logical office for such work. Accordingly, the State Legislature in 1921, under Governor Robert D. Carey, passed the necessary bills requiring the State Geologist to make examinations and reports on State owned lands and gave him the power to enforce the laws relating to the oil industry on all State owned and patented lands in the State. The scope of work included all petroleum operations in Wyoming except those located upon Federal owned lands.

The intention of the lawmakers was to prevent waste of the natural resources of the State by negligent methods of operation. The State Geologist was authorized to appoint two Inspectors, who were to be experienced men, to supervise the field operations of the oil industry. The later legislative acts authorized the State Geological Department to supervise the production of oil and gas from State owned lands from which the State of Wyoming derives an income that to date amounts to more than $38,000,000. The State Geologist is also ex-officio Inspector of all mining operations in Wyoming.

The State of Wyoming has its area divided into three classes of land; first, the Federal lands, or lands owned by the Federal Government; second, the Patented lands, consisting of homesteaded lands that were formerly Federal lands or lands purchased direct from the Federal Government, or from the State; and third, the State lands, owned by the State and deeded to the State when Wyoming entered the Union as a State.

It will be readily seen, therefore, that two forms of supervision exist in Wyoming, one operated by the Federal Government for the supervision of Federal lands, and one by the State Geological Department for the Patented and State lands. The two systems work in harmony and assist each other by adopting similar regulations and the exchange of statistics and other information.

Cheyenne, the State capitol, is located in the southeast corner of Wyoming, and, because of its geographical location, is not so readily accessible to all the oil fields as some other points. The headquarters for the State Inspectors was, therefore, located at Casper, that city being a central point in the State and enabling the Inspectors to reach any field in the State in one day's drive from the Casper office.

The Federal office of the U. S. Geological Survey is also located at Casper, although the Survey also has an office and field force at Midwest, consisting of three engineers and office help and a laboratory and two chemists, and an office at Thermopolis with two engineers. The Casper office of the Survey has the Supervisor and eleven members, besides a force of accountants. The State office at Casper now has one Inspector and the office comprises a reference library and a testing and chemical laboratory.

The nature of the work of inspection of the petroleum industry and its regulation to prevent waste and conserve the natural resources is such that it requires the employment of experienced men. The Inspectors must be able to note at once upon entering a field operation of drilling, any discrepancies in the method of work that might result in a waste of oil or gas. They must be familiar with the approved methods of controlling heavy pressures of oil or gas and preventing water from encroaching on productive areas. They should be geologists so as to be able to discern and survey structures on State owned areas and make chemical and other tests of sands, oils, gases and waters in order to become cognizant of the underground conditions in the fields.

The Inspectors must be familiar with methods of production of petroleum; they must be gaugers in order to check the work of the pipe line gaugers in the fields and they must be familiar with pipe lines and the workings of same. In short, an all-around knowledge of the whole oil industry is an essential part of the Inspector's qualifications.

The Inspectors are authorized to represent the State Geologist in all field work. They can, and often do, shut down wells or work that in their opinion may result in injury to sands or waste of the resources. The method employed is to order the shut down, place special State of Wyoming seals on the machinery in such manner that it cannot be used without breaking the seal, and post a notice at the well or work of such shut down and the reasons for same. The State Geologist is notified at once of the sealing and the seals are maintained until the conditions objected to by the Inspector are removed or the State Geologist orders the seals broken.

When an operator or oil company prepares to start field work in Wyoming, presuming that an area is already under lease, a Sundry Report is filled out and sent to the State Geologist, giving the data on the well to be drilled. This Sundry Report usually includes the exact location of the well, the probable depth it will be drilled, and the different strings of casing that will be used. This Sundry report is passed upon by the State Geologist and Inspector and approved by both. Subsequent reports keep the State Geologist informed as to the progress of the work and the reports are checked up by the Inspectors on their field trips over the State. Upon the completion of the well, a complete log is sent to the State Geologist and if the well finds production, a monthly report is sent in thereafter. In case the well is a dry hole, a report of abandonment and compliance with the regulations for the proper abandonment of wells is required.

These reports are made out on forms so that there is only a minimum of clerical work required in doing same. The forms required and furnished by the State and Federal Government are practically the same.

Production from Patented lands in Wyoming is largely left to the direction of the operators themselves. Statistics are required for the purpose of keeping the records at Cheyenne, and the Inspectors may visit operations on Patented lands while making their field trips. Should a condition develop that might endanger the production on adjoining property, the Inspectors then confer with the producers and remedy same.

Production from State owned lands is supervised by the State Geologist through his Inspectors. The operators having leases on State owned lands are usually allowed to select their own methods of operation as they see fit, provided such methods are suitable for the purpose intended. Particular attention on the part of the Inspectors is directed to wastage that might occur and also to the gauging and steaming of oil in tankage. Pipe line gaugers are checked annually or oftener as the Inspector may elect, to see that the production is measured correctly. Tanks are strapped occasionally for the same purpose. In gas fields, inspection of the metering systems, valves and line heaters, and the wells and lead lines for leakage, are the main points of the Inspectors' work.

One of the results of the Wyoming system of oil and gas inspection, is a much closer co-operation between the oil or gas operator and the State. Because of the experience of the Inspectors and their familiarity with field conditions, the operators have found them a reliable source of information and assistance in solving field problems and this, in turn, has caused the Inspectors to include equipment and material so as to help operators when asked. Hardly a day goes by that the Casper office is not visited by some operator or field worker, looking for information on some problem of his work. These inquiries come from the larger and smaller firms and single operators who ask questions on all phases of the industry, from simple statistics to complicated questions on geology and similar subjects.

A second result, and one of more importance to the State, is the elimination of questionable methods of operation by which much of the natural resources of the State could be wasted without profit to anyone. The oil companies, as a whole, are ready and willing to change some process or method on the advice of the State Inspector, on the chance that it will show a profit or stop a leak of revenue. The larger firms are especially willing to co-operate in this way and the trouble arising from lack of co-operation is found mainly in the operations of the small firms and those operators who have had little or no experience in the business. At the present time, natural gas as it comes from the wells can be manufactured into the following substances and materials:

Water gas	Methyl Alcohol
Formaldehyde	Acetaldehyde
Butadiene	Saccharine
Rubber	Toluene
Xylene	Propylene
Anthracene	Ammonia
Ethyl alcohol	Ethylene Glycol
Propyl alcohol	Chloroform
Butyl alcohol	Carbon tetrachloride
Hydrogen	Acetone
Bakelite	Acetylene
Resorcinol	Ink
Benzene	Carbon black
Ethylene	Butylene
Naphthalene	Alizarine
Ethylene Chloride	Indigo
Methylene Chloride	Naphtha
Methyl chloride	Gasoline

Petroleum oil can be manufactured into a multitude of substances too numerous to list and the conservation of these great resources is, therefore, a matter of prime importance. The State of Wyoming, therefore, is well repaid in that it has never, since the passage of the laws regulating the production of oil and gas within the State, lost any appreciable amount of petroleum through wasteful methods of operation.

SUPERVISION OF PRODUCTION OF STATE'S MINERAL RESOURCES

To assist the State Geologist in his duties of supervising the State's mineral resources, the office of Mineral Production Supervisor was created for the primary purpose of checking the actual production of all minerals from state owned lands, especially gas and oil, and since the creation of the office, the State has been receiving its just dues in the matter of royalties.

With the constantly changing conditions in the oil business, especially in production methods, many technical questions arise that require special knowledge or experience, or both, and among the first was the matter of adoption by the state of the Government standard barrel of oil, which became effective in all fields except our major producing field, Salt Creek, in which the correction for the volume of oil produced is on a different basis under a U. S. Geological Survey regulation. Under our statutes, the regulations promulgated by the U. S. Geological Survey are the regulations of the State of Wyoming. Notwithstanding the fact that we were unable to force the Government standard barrel of oil on our major producing lease, the state has received from other leases approximately $5,000.00 in additional revenue from its oil since the adoption of the standard barrel.

In another instance, the state received $4,126.65 as compensatory royalty as the result of much research by the Supervisor, covering the period from 1922 to 1931, on account of the lessee having failed to drill an offset well on state land to a well he was producing on adjacent land. In addition to this amount , the state has been receiving additional compensatory royalty each month and will continue to receive same until the offset well is drilled.

A great deal of research work has been done and data compiled, with necessary graphs, on the subject of crude oil and gasoline, all of which has been and is available to representatives of the state attending various oil conferences, and will be available to the next Legislature in its study of these subjects.

Considerable additional revenue has been brought to the state by the tabulation of heating temperatures of field tanks, and in one instance, this led to the installation of gas tighted equipment by the operator without any solicitation by this department. Not only was the production increased, but the average gravity of the oil was increased from 33° A. P. I. to 36° A. P. I., resulting in a very material increase in revenue on account of the oil being sold on a gravity basis.

The Supervisor has always co-operated with other Departments, especially the Land Department and the Board of Equalization. Many inspections have been made for the Land Department by the Supervisor when on field trips for the Geological Department that saved the expense of sending a representative of the Land Department. In checking oil production he has furnished the Board of Equalization with the names of operators unknown to them, which has enabled the Board to secure a great deal of additional revenue. Through this co-operation, the Board was enabled to assess 76,379.26 barrels of oil for the year 1932 that would otherwise have escaped taxation.

At the invitation of one of the inventors, the Supervisor spent three weeks testing an electrical heating device of particular benefit to oil wells with high operating costs due to paraffination, and as a result of the data obtained during the test, the Geological Department will permit the abandonment of no more wells on state land on account of paraffination only.

Probably the greatest service rendered the State of Wyoming by the Mineral Production Supervisor was his analysis of a proposed leasing bill sponsored by the major oil companies operating in the state before the last Legislature. That his analysis was the major factor which resulted in the defeat of this bill was conceded by the members of the large and active oil lobby urging its passage. If the bill had become a law as presented, it would have cut the royalty income of the state in the various fields from March 1, 1931 to July 31, 1932, as follows:

	Royalties Paid State	Royalties Under Bill	Loss Under Bill
Big Muddy	$ 16,903.24	$14,086.00	$ 2,817.24
Grass Creek	118,555.90	39,315.15	79,240.75
Rock Creek	18,432.35	9,216.18	9,216.17
Salt Creek	149,783.63	28,804.55	120,979.08
	$303,675.12	$91,421.88	$212,253.24

EXAMINATION OF DAM SITES AND RESERVOIRS

Geologists are required to furnish information on a wide variety of subjects related to their work and members of the Wyoming Geological Department are no exception to the rule. Geological examinations and reports by this department in co-operation with other State departments have become one of the features of its work and the State Geologist often furnishes information to the State Engineer's office, the Attorney General's office, the Land Department, the Board of Equalization and other State departments.

A feature of this work during the past few years has been the examination of dam and reservoir sites for the impounding of water for irrigation and domestic purposes. The work of this department in making these examinations was to ascertain or confirm the geological fitness of the location of the proposed dam or reservoir project. If the geology of the site were faulty, through the existence of pervious material in the bedding or through weak and shattered foundation material, then the proposed undertaking would be at fault and the dam itself in danger of destruction.

The climate of Wyoming is arid and at certain seasons of the year the streams are practically dry; therefore, it is necessary to store their excess flow of water in reservoirs whenever it becomes available. In this manner the surplus flow of a stream may be stored and drained off when required. If a suitable reservoir can be found for the storage of water from an intermittent stream, irrigation of agricultural lands can be accomplished which would otherwise be impossible if dependence had to be placed only on the natural flow of the stream.

Geologically, three great divisions of sedimentary strata exist in Wyoming: the Tertiary or later strata, the Cretaceous or middle strata and the Carboniferous or early strata.

A fourth division, the ancient crystalline and igneous core of the Aezoic era which underlies all the sedimentaries of the geological column, must also be considered since it constitutes a part of the surface geology at points where dam sites may be located. When sites for reservoir dams are to be selected, each division presents certain characteristics that require special study and consideration. Large reservoirs and dams have been successfully constructed and are in existence today because geological conditions were taken into consideration. Attention is called to the largest earth dam now functioning in the world located near Belle Fourche, South Dakota, which is constructed on Tertiary material.

The Tertiary, and more recent periods of geology in Wyoming, laid down strata of pervious sands and muds that have not yet had time to become strongly cemented. The result is seen in the pervious beds of shale and clays occurring with interbedded sandstones of a friable, loose texture. Some of these strata, however, contain what is commonly referred to as gumbo muds that are quite adaptable for puddling purposes in the construction of dams and reservoirs.

The Cretaceous period also laid down pervious strata which was under more compression and received better cementation, due partly to greater age and other conditions. As a result, we find some strata that are fairly uniform in their solidity and readily adaptable for reservoir construction.

Under the Cretaceous formations lie the heavily compressed strata of the Carboniferous formation which includes all strata from the upper Ordovician to its basal members. These beds, because of their solidity, are practically all readily adaptable for reservoir construction.

In Wyoming, the Aezoic core is represented mainly by granites, schists, gneiss and their derivatives. All of these are adaptable to water holding purposes, although in these underlying strata the material does not lend itself to earth dam construction without the addition of material from the other divisions.

In general, it may be stated that the lower in the geological column a dam site or reservoir can be located, the better material for the retention of the water will be found and, inversely, the higher in the geological column the dam site is located, the more care should be exercised as to the material used for the dam that will impound the water and floor the bottom of the reservoir. There are many other conditions

to be considered, however, in each and all of the above four divisions.

The main danger in the use of Tertiary material for dams and reservoirs is the liability of serious seepage problems showing up after the system is in use, due to the loosely cemented materials. There is also the possibility of the material going into a mud solution when subjected to contact with water over long periods of time.

The Cretaceous materials present similar problems as do the Tertiary strata, though in lesser degree. In this division veins of bentonite and colloidal clays occur that constitute a serious menace if used in dam construction.

The Carboniferous derivatives are probably the best all-around materials to be found in Wyoming for the building of dams and reservoirs. Consideration should be given to faulting and to the presence of gypsum beds which are always detrimental.

The Aezoic formations are excellent dam materials and foundations laid on this type of geologic material are stronger than any other. A serious defect, however, may occur through the existence of fault planes filled with shattered debris that permit the formation of seepage channels. Oftentimes these fault planes are closed by nature to possible seepage by being filled with calcite that has percolated from the overlying massive limestone beds.

Among the dam sites examined during the past year, one near Big Piney was located in Cretaceous strata with one end of the dam resting upon a re-deposition of Cretaceous detrius. This re-deposition presents a problem of possible seepage after the dam is completed, since the material is already shattered by previous earth movements. The foundation of another dam recently inspected, located on Owl Creek near Thermopolis, will rest on the lower Carboniferous rocks with an ample factor of safety.

PUBLICATIONS

Next to oil conservation work, the greatest share of the Department's remaining biennial appropriations were expended in the preparation and dissemination of literature on the character and magnitude of the Wyoming mineral depository. Before starting work in this direction, no way was available

to gauge the measure that industrial, scientific and educational circles could become interested in Wyoming. Responses received from the new line of activities have already reached a great volume. Instead of dwindling in this severe depression period, more interest is being displayed in the Wyoming type of resources by the research departments of progressive industrial concerns than ever before.

Bulletin No. 21
Developed and Undeveloped Resources of Wyoming

By far the largest volume printed in the history of the Department was Bulletin No. 21, "Developed and Undeveloped Mineral Resources of Wyoming". This 194-page bulletin was received from the printers in February, 1929. Already the 1,000-copy edition is exhausted and to supply increasing demands a more timely volume will have to be published.

By no means was the demand for the bulletin entirely due to this department. Since its appearance, beet growers in Wyoming and in nearly all of the surrounding states phosphated their lands for the first time. Already record-breaking crops have been obtained by the lately tried plant food. As the success of the venture became better known, trade journals and the larger fertilizer companies addressed inquiries to this office in regard to the suitability of Wyoming phosphate rock for the manufacture of the soluble product. Before the growers tried the experiment, this department recognized the potentialities contained in the then largely unheralded phosphate resources of Wyoming. As a result, a chapter in the bulletin provided the only published information available on the manufacture of phosphate salts wholly from the Wyoming angle.

The bulletin served to stimulate other interest in the raw chemicals of Wyoming. Several of its chapters have received much attention from widely known research staffs. In his letter of October 7th, the editor of the largest industrial chemical journal made the statement—"There can be no doubt that Wyoming is one of the focal points of chemical interest at the present time."

In view of the preceding observation and other reasons, I am of the opinion that the publicity output of this department should be concentrated on Wyoming chemicals during the next biennium. At present, they attract far more attention from industrial organizations than any other form of resources appearing in this State. To merely reprint an edition of the exhausted bulletin would be a waste of money. To prepare a revised edition on the quarter of the State in which a staff member conducted ten years of prior investigation would require more than six months of uninterrupted time. Manifestly, such a work would have to be supplemented with maps, illustrations, as well as other unpublished data on local market developments technological advancements and other matters that seem to arouse the most enthusiastic interest among my growing list of correspondents.

As far as can be predicted, the next stepping stone in the industrial history of Wyoming should involve the development of its low-cost chemical stores. Past experience indicates that it is not always easy to establish a new industry in this State. Before the first major oil company would come to Wyoming, many years of fruitless effort were expended by our State departments and some of our foremost citizens. At the present time, leading chemists are willing to ask about Wyoming. For their accommodation, this department at all times stands ready to assemble data.

Bulletin No. 22
The Dinosaurs of Wyoming

The interest that has been displayed in regard to the Dinosaurs that formerly thrived in Wyoming prompted the publication of our Bulletin No. 22, entitled "The Dinosaurs of Wyoming." This interest is not surprising. Many million years ago the Dinosaur family reached its maximum degree of development in or near the fresh water ponds and lakes that dotted the terrain we now call Wyoming. It may seem strange to relate that no work has recently appeared in which an attempt is made to review the supremacy of Wyoming in bone and brawn development for all time. To rectify this outstanding omission, Dr. Roy L. Moodie, the well known paleontologist, was prevailed upon to write this book. Perhaps no savant was better qualified to undertake this important commission. As a hunter of Dinosaur fossils, Dr. Moodie covered the most promising areas of Wyoming during the past 25 year period. The composition of Dr. Moodie's manuscript is of the non-technical style and being profusely illustrated with restorations of Wyoming material, this publication is proving to be unusually fascinating.

Bulletin No. 23
(In Course of Publication)

The Electro Metallurgical Resources of the North Platte River Basin, Wyoming

January 11, 1932, Senator Kendrick introduced a bill in Congress for the construction of the Casper-Alcova division of the North Platte River irrigation project. The pending measure calls for the reclamation of 66,000 acres of land situated in the vicinity of Casper as well as such incidental power development that the Secretary of the Interior may find necessary and feasible to generate by the operation of the storage and other component members of the proposed irrigation system.

Heretofore, the Federal Reclamation Service has almost exclusively relied upon the sale of irrigation rights for financing their projects constructed in Wyoming and elsewhere. As the main reservoir unit of the Casper-Alcova proposal involves the completion of a dam in the Seminoe Canyon, capable of producing 50,000 horse power of hydro energy, leading sponsors of the project have long maintained that both power sales and irrigable land sales will yield equally important sources of income for assuring an early repayment on the entire construction investment.

Preliminary reports so far filed by the engineers of the United States Reclamation Service indicate that all of the hydro energy developed by the Casper-Alcova project will be absorbed during the next ten-year period by normal expansions in the power market already existing in Wyoming and in the adjoining states of Colorado and Nebraska. On the other hand, certain industrial technologists are of the opinion that the available output will find its most profitable market wholly within Wyoming. According to their calculations, the proposed volume of thermal energy could not begin to reduce the huge dowry of metalliferous ores and raw chemicals that has long remained unexploited directly within the Wyoming sector of the North Platte basin.

On three famed river courses of America, the colossal sum of $300,000,000 has so far been expended by Federal and other agencies for the construction of sundry power works. These huge outlays of capital were not always preceded by economic surveys of the scope already completed for the pending hydro proposals. Auxiliary power projects so far constructed

at two points on the Wyoming stream channel have unfailingly poured large profits into the Federal Treasury, and last year, these preliminary operations enabled one of the more progressive municipalities of the state to conduct its government on a tax-free basis.

For development of its power resources, no stream offers the unique and complete possibilities of the North Platte River. Along its rapidly descending Wyoming gradient, geologic forces long ago excavated in the even tenor of their way the rock-ribbed canyon gorges so essential for the construction of high dam barriers at the minimum cost. Moreover, other dynamical and chemical agencies did not remain idle in the distant past. Conveniently awaiting development near the unusual structural sites are great deposits of uncommon ores. So far the giant steel industry of the nation has scoured all continents for similar mineral to manufacture the newer and stronger metals, commonly designated as ferro-alloys.

Heretofore, many of these alleged rare ores have been hauled from far away mountain-top, desert or jungle for domestic reduction at Niagara Falls. To both mine and refine such minerals in a single valley would add a new chapter to American electro-metallurgical practice. Nevertheless, until such steps are taken, in Wyoming or elsewhere, this nation will continue to rely on foreign raw material for the manufacture of the several grades of steel capable of passing present-day military specifications.

All automobile and airplane concerns, likewise, must introduce larger volumes of imported alloy material into their annually improved vehicular models. Such trends of progress in the transportation field cause technologists to display increasing interest in the strategically located ore potentials of the remarkable Wyoming basin. In time, the direct reduction of these ores by known electrothermal methods may become imperative if American leadership in the constantly advancing steel industry of the world is to remain unchallenged.

The present outline is not offered as a strictly technical or geological work, but rather as a commercially convenient compilation of the mineral resources that are most feasible for hydroelectrical development in southeastern Wyoming. Its general form is along the lines of a companion handbook published three years ago, in which the raw chemical deposits of the southwest quarter of the state were given the most attention.

CHAPTER II

SUGGESTED BILLS FOR THE FURTHER CONSERVATION AND PROTECTION OF THE MINERAL RESOURCES OF WYOMING

Among the many duties of the office of the State Geologist required and set forth in the statutes of Wyoming, may be found that the State Geologist in his Biennial Report should include suggestions as to the enactment of laws relating to the mineral resources of the State and, inasmuch as he is specifically charged with the duty of enforcing all of the laws and other acts relating to the oil industry and the development of other mineral deposits, aside from coal deposits, it is suggested that the following bill be presented to the next legislature:

"The taking of crude oil or petroleum from any oil-bearing sand or sands in the State of Wyoming at a time when there is not a market demand therefor at the well at a price equivalent to the actual value of such crude oil or petroleum is herbey prohibited, and the actual value of such crude oil or petroleum at any time shall be the average value as near as may be ascertained in the United States at retail of the by-products of such crude oil or petroleum when refined less the cost and a reasonable profit in the business of transporting, refining, and marketing the same.

"The State Oil and Gas Inspector shall have the power to enter and inspect any oil refining plant located within the State of Wyoming, or any plant or establishment used for the extraction of natural gas, gasoline or other products of natural gas or petroleum oil, for the purpose of examining for wastage and also for the purpose of reporting to the State Geologist as to the plant and its methods of operation.

"The loss by evaporation or leakage and the increased hazard of loss from fire and other causes resulting from the storage of crude petroleum oil and / or its refined products in excess of the quantities which are reasonably necessary to insure continuity of an adequate supply for such current requirements is waste within the meaning of this Act."

In the event of the discovery of a new flush field, or fields, which is not at all improbable; with geophysical and other new

methods of prospecting, the lifting of the Federal leasing ban and the promising potential productive areas in Wyoming, the above proposed bill, if enacted into a law, may be the means of preventing a situation which almost disrupted the oil industry in 1931.

CHAPTER III

THE MINERAL INDUSTRY OF WYOMING, 1930

Petroleum and Natural Gas

Wyoming produced 17,698,857 barrels of oil during 1930, maintaining production leadership of the Rocky Mountain region by a wide margin. The general decline in the oil industry prevailing for the past two years continued over the Nation and was accentuated in Wyoming by the consequent decline in the oil purchasing market, the over-production of crude and the Presidential order withdrawing all Federal lands from being leased by the prospectors.

The condition of the oil industry, cited above, caused the oil man, and especially the independent operators, to withdraw their efforts in regard to wildcatting and drilling for new fields. This, in turn, caused idleness for many oil field workers and the storage of equipment used in the prospecting work. The reaction was felt all over this state and in all lines of business because of the cessation of money circulation that had previously been had from this branch of industry.

With few exceptions all fields in Wyoming witnessed a decline in output last year, although new discoveries placed several in line for larger production.

The Byron, Cody, Frannie and Warm Springs fields of the upper and lower Big Horn Basin country were among those which showed an increase. The Pilot Butte, Dallas-Derby and Hudson fields of Fremont County were also in the favored group together with the Dutton Creek field in Albany and the Osage field in Weston County.

Total production from Salt Creek as usual was approached by that of no other district although it fell off to 10,516,636 barrels. The Oregon Basin black oil field held second place in volume of output with a total of 1,272,413 barrels, while the Lost Soldier field of Carbon County was the only other district to cross the million-barrel mark with 1,195,232 barrels. Big Muddy, Grass Creek, La Barge and Rock River fields each yielded between seven and eight hundred thousand barrels, the remainder of the State's output being widely distributed.

It is interesting to note, however, that the Osage field marked up the largest percentage of gain by an output of 469,340 barrels, or more than double its production of the year before.

Discoveries which will add untold wealth to the golden flow from Wyoming oil and gas fields have been recorded during the last year, carrying assurance of continued activity and further prosperity for thousands dependent upon the industry.

Predictions that deep drilling operations encouraged in part by restrictions upon wildcatting would uncork new sources of supply were more than fulfilled. The year was one of important developments destined to encourage further exploration of lower formations in fields already producing or which failed to give up production in the upper sands. Reserve supplies thus revealed together with other large reservoirs yet to be opened promise profitable returns when over-production problems have been solved and when the time comes that the demand for oil products is such as to permit prices high enough to recompense the oil operator for the investment and risks inherent to his trade.

The progress made in research work in the oil industry, especially in the discovery of new products that can be made from gas and oil, and the better methods found to make use of the many products already known, will enable the oil and gas operator to assume a much more prominent place in the world's business than heretofore.

It is a regrettable fact that the oil operator has not kept pace with the laboratory and research chemists. Obsolete methods of development work and great waste still mark the field operations, though much has been accomplished in promoting new kinds of tools that make for better and quicker accomplishment of field development; and regulations are being enforced that will conserve much of the waste that is now taking place in our natural resources of petroleum. Present losses through wastage occur through three main channels —evaporation, corrosion and leakage. Losses may be occuring because of water flows under ground in the oil bearing sands, but there is not enough data available to make accurate determinations in this regard. Another source of loss is the wastage at refining plants where large quantities of oil are burned in sludge pits. Owing to the foresight of our lawmakers of former years, the State of Wyoming has not suffered from this wastage as much as other commonwealths which were not protected in like manner.

Black Oil

Oil refiners have cooperated in recent years in the production of road oils suitable for binding highway surfaces under improved methods of construction and the result has been the manufacture of oils adapted to various kinds of material. Wyoming is rapidly taking the lead in this form of highway surfacing in the Rocky Mountain region and it is estimated that two million barrels will be required for the treatment of the State highway system as at present constituted.

Other states are recognizing the merits of similar improvement methods for roads and highways too costly to pave. The west has thousands of miles of roads of this character which can be built and maintained more economically by oil surfacing.

The best advertisement for such methods will be the completion of Wyoming's highway system, which has been speeded up by a bond issue to meet increased federal aid allocations.

Tests also have shown that Wyoming asphalt-base oils appear to have a better binding and cohesive quality than those of other regions.

The cut-back asphaltum produced here is likewise coming into prominence. This is a high melting point asphalt made from black oils which is practically a solid at all ordinary temperatures. It is cut back to a fluid state at the refinery with volatile oils and marketed in the form of tar.

Upon being applied to highway surface the volatile content evaporates in from seven to ten hours, leaving a homogenous asphalt covering equal in many respects to asphaltic pavement and at much less cost. Road mats of three-fourths inch to three inches can be applied with this material at a cost of from $600 to $1,500 per mile. Without being cut back with oils, this surfacing would require elaborate heating and distribution units to obtain the same results.

Petroleum products have thus solved another problem in highway building and the application of these advantages on an extensive scale is a prospect of the near future.

Natural Gas

In 1930, Wyoming produced 39,445,650,000 cubic feet of natural gas valued at $1,643,626, compared to the 1929 output of 56,664,383,000 cubic feet, worth $2,266,575.52. It is believed

that when final tabulations are available, a less severe decline will be recorded within this promising field.

One Wyoming gas field — the Wertz dome — produced more than five billion feet last year. Sand Draw, Baxter Basin and Mahoney Dome were also high with considerably more than two billion feet each, and five other fields produced between one and two billion feet each. Twenty fields in all were on commercial production in addition to others shut in.

As in preceding years, the oil industry continued to be the big consumer of the gaseous fuels. Modified refinery processes, that largely do away with the high temperature stills, caused a decline far greater than the 15 per cent reduction in oil output recorded for the year.

Pipeline Construction

Pipeline construction on a major scale and extension of natural gas service to serve additional towns and industries will combine this year to provide a larger market for Wyoming production in this and adjoining states.

Projects already assured and proposed will pave the way for an increase in last year's total production and consumption of 21,603,229,106 cubic feet of Wyoming gas. They likewise call for the expenditure of millions of dollars at a time when construction will serve to improve the employment situation.

The largest project completed last year was a 55-mile eight-inch line from the Billy Creek field in Johnson County to Buffalo and Sheridan. These towns were supplied with natural gas for the first time although the Billy Creek field has five completed wells and was proved for production several years ago. The line was laid by the Northwest Utilities Company.

Another service extension was recorded in Fremont County where the New York Oil Company laid a 22-mile line from near Lander to Fort Washakie on the Wind River Indian reservation. The cost of these two projects was approximately $1,000,000. The Muskrat field in eastern Fremont County was also connected with the trunk line leading from the Sand Draw field southeast of Riverton to augment supplies marketed in Casper and Glenrock.

The only other pipeline construction of last year consisted of a few miles laid by the Ohio Oil Company at Byron and Garland to afford outlets for production there.

Ambitious Program Looms

Opening of the new year has been marked by a revival of major projects that have marked time for the last year.

Under a permit recently issued by the Wyoming Public Service Commission the North Central Gas Company, subsidiary of the New York Oil, is starting work on a trunk line from the Muskrat field in Fremont County through central and into southeastern Wyoming. Surveying crews have been busy for several weeks.

The new line is intended to supply the towns of Douglas, Orin, Glendo, Guernsey, Torrington, Wheatland and Laramie in Wyoming, and plans call for its extension into Nebraska. Natural gas will be made available for 11 sugar factories in addition to thousands of domestic users.

It is understood that the 411 miles of main line and laterals together with the cost of construction will involve the expenditure when completed of no less than $6,000,000. In addition to the Muskrat field, the line will draw for its supplies on the Big Sand Draw field, where the largest gasser in the Rocky Mountain region was opened recently, and from production at Powder River and Pine Mountain, all adjacent to the route to be followed.

Pessimistically inclined folks can already be heard expressing doubts as to the ability of the Wyoming fields to meet the additional markets proposed. Such fears may well be dismissed. As long as 25 years ago, much was heard of the pending exhaustion of the Appalachian fields in Kentucky, Ohio, West Virginia and western Pennsylvania. In spite of the fields' relative senility and the large continued withdrawals within the densely settled local territory, prospecting in recent years indicates that a supply still exists so vast that serious consideration is being given to bringing the gas to the large cities on the eastern seaboard including Washington, Baltimore, Philadelphia and even New York.

Already, in Wyoming the 8,000-foot hole has been drilled. In view of recent strikes made in deep sands, one indeed would have to be pretty much of a killjoy to believe that the constantly augmented reserves would prove inadequate to meet the market requirements of the metropolises now thriving in the North Platte River Valley.

In reality, the day has arrived for Wyoming to be an exporter in lieu of an importer of modern gaseous fuels. Costly expansions have materially increased the taxation revenues of this State. Incidentally, when gas is exported beyond the Wyoming line, outsiders also do their share in contributing heavy funds to the State treasury in the form of most welcomed mineral royalty exactions.

Royalty Receipts

In other directions satisfactory developments can be marked up for the Wyoming oil industry. Naturally, the most desirable tape line used by administrations in power in critically measuring annual outputs of the oil industry must necessarily record its figures in royalty payment receipts. For the Federal fiscal year of 1930, the mineral royalties collected on the Wyoming Public Domain totalled $3,042,603. That collection exceeded the return of the immediately preceding year by $31,486.

The sale of the Oregon Basin leases, concluded last month, paid into the Federal treasury an additional sum of $197,600. The Wyoming cut on that extra bonus will closely approach $75,000. Supplemental mites like that can be particularly welcomed at times when cut-throat prices are the rule in the oil industry.

RESUME FOR 1930

The outstanding developments in the State of Wyoming for 1930 are as follows:

In March, Mr. Hale B. Soyster assumed the position of Supervisor of the United States Geological Survey in the Rocky Mountain region with offices at Casper.

In April, a new refinery was built at Gillette, Campbell County. This plant is to operate on crude from the Osage field in Weston County and it has a daily capacity of 500 barrels.

An important decision was handed down by the courts in April. The Secretary of the Interior was upheld in his decision regarding the price to be paid for crude oil. In the Oregon Basin field, the Texas Company was ordered to sell oil for not less than 85 cents per barrel by the Secretary of the Interior. The matter was tried and found as above noted.

The Carter Oil Company sold all its holdings and gasoline plant in the Salt Creek field to the Continental Oil Company. In the Dallas and Derby fields in Fremont County, the English companies there sold their holding to the Atlantic Pacific Oil Company, composed of oil men of the United States.

In July, the Northwest Utilities Company started work on the laying of an eight-inch pipeline, 55 miles long, from the Billy Creek field in Johnson County to Buffalo and Sheridan. This line to carry gas from the field to serve the towns and cities along the route. Gas was turned into the line September 24th.

In the latter part of July, the Wyoming Montana Pipe Line Company made application for a permit to lay a pipe line from the Big Horn Basin in Wyoming to refining points in Montana. Later the application was refused.

The Standard Carbon Company moved a carbon black plant in the Buffalo Basin Dome in the Red Desert country northwest of Rawlins and will place the plant in operation there in 1932.

The Ohio Oil Company laid a pipeline from the Polecat Dome in Big Horn County to a connection with the company's gas system to Lovell and Powell.

The New York Oil Company laid a pipeline from the firm's system in Fremont County to Fort Washakie, to serve that point with natural gas from the Sand Draw field.

Coal

In a wire received from Lyman Fearn, State Coal Mine Inspector, the coal production was estimated at 6,000,000 tons, worth $18,000,000 at the mine. In 1929, the output for the State finally totalled 6,704,790 tons. When all tabulations are completed, it is believed that Mr. Fearn's preliminary estimate will again be slightly exceeded.

The year witnessed a further concentration of coal mining activities in the important Rock Springs district. In view of factors later mentioned herein, future industrial developments should considerably strengthen the position long commanded by the premier coal field of Wyoming.

All told, the coal mining industry of this State contributed its full share in retaining business conditions far

above the level prevailing for the nation at large. Wyoming coal miners still receive the highest wage scale ever paid in any State, and regardless of market inroads, made by growingly popular gaseous fuels, our operators did not have to cut the price of their mine product.

In the way of an economic contrast, it may be mentioned that in some leading metal producing States the refined output of the mines is now selling at the lowest levels ever touched within the annals of recorded history. Comparatively speaking, the ability of Wyoming to reflect and retain its general air of prosperity is not entirely a deep mystery. Interpretations of latest statistical analyses plainly disclose that the big end of the coal mined in Wyoming continues to be burned at points that lay well beyond the geographical boundaries of the State. In times of prolonged economic distress, the leading mining industry of Wyoming has repeatedly demonstrated its ingrained vigor to everlastingly remain within the very much preferred class.

Metallic Minerals

The value of metallic minerals produced in Wyoming during 1930 slightly exceeded $1,000,000. As in the immediately preceding years, nearly all of this output was from the Sunrise iron mine.

Gold

During the year, gold bullion received at the Denver mint from Wyoming mines amounted to $6,578.33. This production was the largest reported for Wyoming since 1916.

Most of the gold produced in 1930 was received from the property of the Union Gold Mining Company, located at Atlantic City. Last summer, this company completed a modern mining and milling plant at a cost of $142,000.

In 1930, the Union Gold Mining Company confined their operations on the McGrath claim. Early this year, they will drive a 1,100-foot tunnel in their adjoining property known as the Peabody Hill. In this highly mineralized area are two cross dikes and a network of five veins, all of which will be cut by the tunnel at depths ranging from 250 to 500 feet below the surface. The width of the veins vary from 2½ to 21 feet, and they are reported as averaging $10 in free milling gold values. Exceptionally low cost recoveries can be made from this type of ore body.

During the year, other shipments of bullion and concentrates were made from the Atlantic City district. Important gold strikes were also reported in the Centennial and Encampment districts. In other areas considerable exploration work was done.

The outlook for gold mining is now brighter than at any time during the past decade. Gold is the one commodity for which an actual shortage always did exist throughout the world. At no time has there been an overproduction of the yellow metal, and due to its fixed and irreducible value the gold mining industry most easily attracts capital during periods of prolonged depression. Entirely due to the prevailing situation, mining engineers have addressed in recent months more requests to this office for detailed information on Wyoming placer and lode properties than during any preceding year.

Silver

A small amount of silver was received from Wyoming at the Denver mint during the year. No silver mines are in this State. The silver was yielded as a by-product from the gold mines operating in 1930. Due to the extreme richness of the Wyoming gold alloy, the mint payments did not exceed $100.00.

Silver is one of the metals previously cited herein, whose quotations suddenly nose dived to the low level of all time during the past year. Manifestly, until some individual succeeds in multiplying present quotations by at least four times, no room is on hand for a silver mine within the relatively prosperous Wyoming mineral empire. At less fortunate places such mines appear more in the light of liabilities than assets at this particular time.

Copper

Selling at the lowest levels in 30 years, interest in copper mining development in Wyoming and elsewhere was unusually mild in 1930.

At the beginning of the year, the Big Creek Copper Mining Company shipped their first car of ore from their property near Encampment. Exploratory operations conducted since then have uncovered a new body of ore in a secondary enrichment zone. In metallic content and magnitude, the ore reserves of the Big Creek property appear to excel all others known in Wyoming at this time.

In remaining districts only assessment work and other minor developments were reported for the year.

Iron Ore

Producton from the Sunrise property of the Colorado Fuel & Iron Company totaled 320,091 gross tons. The value of this ore exceeded $1,000,000 at the mine. In the preceding year, the record output of 639,759 tons was shipped from the Sunrise mine.

In 1928 and other normal years production from the Wyoming property averaged slightly less than 500,000 tons. Operations for 1930, therefore, approached the 65 per cent level, or a figure appreciably above the average for the nation at large.

During last summer, the company engaged a well known geophysical prospecting firm to conduct exploratory surveys of their mining holdings in this State. Subsurface conditions were studied by electrical methods. The measured resistivity differentials of highly contrasting rock strata are generally capable of yielding considerable information as to the approximate location and size of hidden metallic ore bodies. Among progressive managements, several systems of geophysical practice are finding increasing favor. In the search for expectable ore, preliminary surveys of the concluded character generally avoid subsequent and far more costly drilling operations in blind and barren zones.

Short-cut detection practices, along the preceding lines, are largely responsible for the gross overproduction evils that now confront the American petroleum industry. Aside from completely upsetting the oil shortage calculations, advanced at the beginning of this decade by alarmists and conservationists in Federal employ, the net economic results of the new prospecting practice look rather questionable in these immediately ensuing years suddenly saddled with divers overproduction problems from all non-restricted, cardinal directions of the compass.

Beryllium

At the beginning of the year, a prospector brought into the office a large mineral specimen that was identified as the leading ore of beryllium. Since then, his original discovery claims on Copper Mountain were acquired by a group of five business men in Lander.

The Wyoming discovery was immediately reported to a technical journal. Since then the leading buyers of the mineral addressed inquiries to this office and in more recent months several engineers completed examinations of the Wyoming property in behalf of eastern clients. Due to the unusually high analyses of the Copper Mountain mineral, a number of attractive offers have been received for the property. At present writing it is under option for purchase.

Since the Copper Mountain discovery was announced, many other minerals were received from Wyoming and other States as possible beryllium ore. Aside from the deposits in the Hartville uplift, no other occurrence of beryllium minerals has so far been confirmed in this State. The Hartville minerals do not carry as high a metallic content as the Copper Mountain ore and, for that reason, they arouse considerably less interest among technologists, extremely desirous of obtaining large quantities of the newly isolated metal found to be lighter than aluminum and stronger than steel.

Radium

During the past fortnight, the leading mining journal, published in New York, carried an announcement that the Smithsonian Institution discovered a new deposit of radium ore in Wyoming.

For some time a wide search has been under way for an American ore deposit sufficiently rich to yield radium considerably below the tremendously high reduction cost levels still prevailing. As the principal use of the extremely costly and powerful metallic substance is for the treatment of cancer, it is apparent that current surveys are mainly actuated by benevolent and humanitarian principles.

When explorations for domestic supplies of radium ore now start, the limelight is immediately focused on Wyoming. In 1919, five cars of rich radium ore were mined and sold in Lusk for $33,857.48. Since then a single discovery of higher grade African ore quite sufficed to close down all radium mining operations previously established in Wyoming and elsewhere throughout the world. In recent years, the tenor of the African ore has continually diminished. The latter factor has helped considerably to revive interest in the known radium deposits of this country.

Ceramic and Non-metallic Products

Due to the comparatively good conditions that prevailed in the building trade industries of the intermountain area, total output in the non-metallic field will not fall far below the normal annual evaluation of $1,500,000.

The new cement mill at Laramie operated throughout the construction season. At the big plant, a product is turned out ready to stand the severest competition that invades this area from time to time.

Outputs of the various brick, tile and gypsum plants, located throughout the State, generally approached normal levels. As there was no reduction in highway construction, regular payrolls were retained in the larger quarries and gravel pits. Due to the record-breaking sugar beet crop harvested this fall, increased demands arose for the chemical limestones of Wyoming. Approximately 250,000 tons of this superior material, worth $400,000 was quarried in the larger pits for use in the sugar refineries of Wyoming and adjoining States.

After a suspension of several years, work was again resumed in the Larsen sandstone quarry at Rawlins. Stone from the quarry has been used in the construction of the leading public buldings in this State as well as at points as far distant as Denver and San Francisco.

Recently, the Casper Chamber of Commerce has requested that only Wyoming stone be specified for the new Federal building that is to be constructed in that city. Due to efforts of the character cited, as well as the fact that the current public building program of the Government breaks all prior records, an exceptionally promising year is ahead of the owners of Wyoming quarries able to ship surpassing types of stone.

Bentonite

All things considered, the new bentonite industry of Wyoming made a remarkably good showing during 1930. Unlike any other native mineral, all of the bentonite, a colloidal clay, quarried in Wyoming must be sold and exported to points located outside of the State. Unfortunately, most of the prepared product is shipped to automobile manufacturing centers and other large industrial areas in which the present period of economic distress has been far more acute than out here in this favored region.

Regardless of the existing market situation, established users were unable to reduce their purchasing requirements to the drastic levels applying to other lines of raw materials. However, Wyoming producers are always at work inducing additional industries to use their products. Also, at all times, efforts are under way for widening the market area for the typical Wyoming product. No longer are the uses of bentonite solely known in the United States. During the year, one concern shipped their first orders for Wyoming bentonite to points as widely separated as Bombay and Buenos Aires.

As yet, Federal statistical agencies do not segregate the annual production figures for the new bentonite industry. Following established practice, the bentonite production for 1930 is simply recorded as over $200,000 in this review.

New Developments

Only one new development was reported during the year in the non-metallic field.

Last fall, machinery for crushing and preparing mica was installed at a large mica seam, near Guernsey, which was recently acquired by the Western Mineral Products Company through the efforts of Wheatland and other Platte County business men. At present 14 men are employed in building houses and laying track preparatory to opening the mine.

The Guernsey area has long been recognized as containing the best mica deposits in Wyoming. The highest grade mica is in wide dikes containing immense tonnages of select varities of feldspar. The latter minerals will be recovered as by-products by the mica operators. During this year requests were received for the first time from the larger producing companies for information on the feldspar resources of Wyoming. To stimulate development of domestic deposits, the Tariff Act, signed last June, carried an added impost against importations of foreign minerals.

Chemical Deposits

Only two companies produced raw chemicals in 1930. Nevertheless, our records disclose that during the year no local type of resources drew more attention among technologists, public and private research workers, editors of scientific journals and managers of industrial enterprises, than the multifold chemical deposits long remaining dormant in this State.

Sodium Sulphate

Several factors served to stimulate interest in the large deposits of sodium sulphate that occur in this State. Newly modified industrial processes now turn out far less quantities of the salt as a by-product at the big chemical plants in the seaboard States. Moreover, as the Tariff Act of last June raised the duty on the prepared anhydrous product 50 per cent, several important eastern consumers sent out engineers to make surveys of the Wyoming situation. Our native salts are situated nearest to the big consuming markets and, as they appear in many instances as surface deposits in a state of almost chemical purity, the recent visitors were invariably impressed in regard to the possibilities of the Wyoming natural deposits.

The firm now operating in the new field of activity is the Pratt Sodium Sulphate Company of Casper. This concern already controls the more accessible deposits in this State. Their conveniently located holdings in the vicinity of Casper are quite sufficient to meet increased market requirements for many years. Present operations are conducted by a steam-shovel, and 10 trucks are owned to haul the output to the railroad. In an illustrated review published last June in the Casper Tribune, the local production for 1929 was recorded at 10,000 tons. Production for the year just closed should again considerably exceed all prior records of the State.

Potash and Phosphate Developments

In 1930, interest in Wyoming's varied wealth of fertilizing minerals was of a far more widespread and enthusiastic order than ever before. No longer is talk on these matters merely heard within the boundaries of Wyoming. Discussions on Wyoming chemical possibilities now extend from coast to coast. In the last issue of the largest chemical journal published in New York, an advance notice was printed on latest Wyoming developments by permission of the Director of the United States Bureau of Mines. Two paragraphs therefrom follow below:

> "An equally interesting proposition has been investigated in Wyoming. At Superior, within a few rods of the railroad, there is an extensive formation of wyomingite, an aluminum silicate-silica rock containing about 50 per cent leucite (K_2O. $Al_2O_3.4SiO_2$). This mineral is composed of about 11.5 per cent K_2O, 51.7 per cent SiO_2,

13 per cent Al2O3, and the balance Fe, Ca, Mg, Na2O, and P2O5. The engineering firm of Pike & West, of Emeryville, California, set about the development of a process to utilize this material, the results of which are embodied in United States Patent 1,770,995. This process makes ingenious use of several other raw materials found within reasonable distances of Superior to yield a concentrated fertilizer material containing both potassium and phosphorus, KH2PO4. At Green River, 41 miles from Superior, there are soda brine wells, the liquor of which contains about 11 per cent solids. Of this, 8.3 per cent of the total is Na2CO3, a necessity for the Pike & West process. The distances from Green River to the other raw material supplies are as follows: phosphate rock at Georgetown, Idaho, 137 miles; sulphuric acid, Garfield, Utah, 230 miles; natural gas, South Baxter Basin, 21 miles; and sub-bituminous coal and slack, 15 miles.

"In this process, the soda brine is concentrated and used to leach ground wyomingite, yielding a mixture of potassium and sodium carbonates. The sodium carbonate is salted out in an evaporator, and the K2CO3 removed by crystallization. The product is treated with sulphuric acid and phosphate rock, and the resulting KH2PO4 isolated by crystallization. Sodium carbonate is obtained as a by-product. It is understood that a California group is giving serious consideration to further development of the process."

Some pioneer Wyoming concerns are bound to take serious exception to one of the preceding statements. At this writing, both the Cokeville Phosphate Company and the Wyoming Super Phosphate Company are in a position to supply high analysis rock at far nearer sites than the Idaho source of supply suggested. For 20 years the Cokeville Company has been shipping to distant markets the finest phosphate mineral mined in this continent. The second listed company was organized the past fall to develop a large phosphate bed located near Kemmerer. At that site, rock could be shipped to the Green River focal point at half the distance of the suggested source of supply in Idaho.

In our bulletin No. 21, "Developed and Undeveloped Mineral Resources of Wyoming," printed in 1928, facts were massed and presumptions correlated for the first time on all of the divers types of raw chemicals and potential energizers concentrated within the Green River Valley sector of this

State. Since then many research technologists, both here and abroad, demanded more authentic information on assertions made in the now exhausted State booklet. Thanks entirely to the Winter Potash Research Measure enacted into law in 1929, far more facts of a sustainable character have since accumulated on the potentialities of the southwestern Wyoming area for large-scale industrial operations than in all preceding years.

The measure of Congressman Winter appropriated $100,000 to the Bureau of Mines and also a like sum to the Federal Bureau of Chemistry and Soils for the object of ascertaining the commercial possibilities of Wyoming potash deposits within a specified period of four years. To date the Bureau of Chemistry and Soils have confined their investigations to the Wyoming angle.

In their tests, both Wyoming potash and phosphate rocks are placed in a blast furnace for dual volatilization recoveries after being fired by native coals from the Rock Springs district. In an Associated Press dispatch, dated December 16, Dr. Knight, Chief of the Federal Bureau, stated that present type of experimentation is designed to cut down the farmer's annual fertilizer bill, $60,000,000. Our Green River Valley is the one big storehouse for all of the mineral energizers consumed by plant life. By this date, both Federal groups of research workers are carrying on their Winter Act investigations with visibly increasing degrees of enthusiasm. The progress report on Wyoming experimentation, that arrived the first of this month from the Bureau of Chemistry, came too late for analysis and condensation in this review.

Another factor trending towards earlier commercialization of Wyoming's deposits of mineral fertilizers was the 1930 application of phosphates on lands in this, as well as in adjoining States in which no such resources appear. In Wyoming, half of the sugar beet acreage was phosphated for the first time last spring. At Wheatland, where 96 per cent of the beet land was treated, average production per acre was stepped up to 15 tons, against the eight and nine tons averages formerly yielded before phosphates were first tried out two years ago in that original experimental area of the Rocky Mountain region. At Lovell, with 88 per cent phosphated, the 1930 harvest was 14.12 tons per acre instead of the 10.28 ton crop of the preceding year. At the present time, directors of chemical industries find the record-smashing showings of our beet growers to have a far more practical slant than all of the activities of State and Federal bureaus.

Educational Trends in Wyoming

Interest in the Wyoming laboratory of natural science is continually broadening. During 1930, more universities and scientific institutions conducted field classes and scientific explorations in Wyoming than in any preceding year.

Of far more gratifying significance is the growing interest that native educators show in the geological science. Within the past two-year period, courses is geology have been added to the Rock Springs, Superior, Lusk, Gillette, Rocky Point, Sheridan, Douglas, Casper and Thermopolis High Schools. At Douglas, where the bookwork is supplemented with occasional excursions in the field, the subject is said to be the favorite of the youthful students.

So far as known, no other high schools are teaching geology in this State. As yet, some educators appear to be bitterly opposed to including geology in high school courses. In their opinion, the subject is of the collegiate grade, and as such, it should duly be preceded by courses in physics, chemistry, biology and other fundamental sciences.

In Wyoming, it may not pay to raise the preliminary requirements for geologic instruction too high. In some instances, a high school training has quite sufficed to begin geological studies. Moreover, not all scientifically inclined folks had to go to college. A learned incongruity among his erudite colleagues, is the geologist and paleontologist, Berry, the degreeless dean of Johns Hopkins—the leading graduate college of applied science in this country. In Wyoming, the warmest friend and most active co-worker of the brilliant dean also happens to be a scientist of the self-trained school.

To date, the Wyoming background has served to provide its full quota of distinguished geologists on the staffs of the leading scientific foundations and higher universities of this nation. Moreover, the day has passed for professional and business men, residing in this State, to lead in their respective lines of endeavor without first mastering fundamental principles of the geologic science. Today, leading members of the Wyoming bar do not hesitate to subject the biggest geological experts to rigid, and at times, devastating cross-examinations.

Time and again local journalists have reported complicated developments with a degree of clarity worthy of the best efforts of learned academicians. Also, to successfully father important research measures, as well as to combat discriminatory Governmental procedures, the statesmen of Wyoming now speak the phraseologies of technical specialists in Federal employ.

Other outlets for basic geological instruction in Wyoming could be cited ad infinitum. Obviously, the courses recently started in the high schools will not yield immediate benefits, but in decades to come such pioneer efforts should materially advance the prosperity of the State.

So far, 59 cents out of each dollar received from the huge Federal mineral royalty payments have been expended on educational pursuits. In time, that magnificent measure of support may break down the arguments of learned pedagogues still relentlessly opposing a policy primarily designed to lead to a broader understanding of tremendous forces yet unharnessed within the vast natural laboratory of Wyoming.

CHAPTER IV

THE MINERAL INDUSTRY OF WYOMING—1931

Petroleum and Natural Gas

Total mineral production of Wyoming in 1931 amounted to $30,178,000. For the preceding year the valuation was $46,750,000. Depressed prices for the leading products, rather than reductions in output volumes, were chiefly responsible for the 35 per cent decline in valuation. Apparently, this decrease was no better or worse than the shrinkage suffered by other industries in the State.

By this time, slow but steady advancement is noticeable in several divisions of the Wyoming mineral industry. Towards price stabilization, no basic commodity has yet approached the progress made by crude oil, long the leading mineral product of Wyoming. This constructive movement, more so than any other factor, has produced unmistakable evidence that the oil industry passed the extreme bottom point fully six months ago. Since then four successive price advances, effective on Wyoming crudes, did much to restore confidence in the soundness of the industry on which the existing taxation structure of the State is mainly based. Each one of those rises diverted reciprocal increases in royalty payments to the treasury of the State. Moreover, a contract let last December in which the State will receive a higher premium on the bulk of its royalty oil than actually paid during the boom period, also provided additional encouragement for making long range forecasts on the stability of the leading income producing industry so far established in Wyoming.

Other improvement trends were observable during the latter half of the year. Within this period, a large ore reserve of unusually high quality was discovered by new scientific prospecting operations. Most surprising of all was the continued and unabated interest that visiting and other technologists displayed in Wyoming localities as prospective sites for new types of industrial enterprises.

Petroleum

Important developments marked the year 1931 in the Wyoming oil fields in the face of adverse conditions common to other petroleum States, and declining production may be expected to stimulate exploration during the coming year in

areas open to such prospecting. Tests are already under way or projected that may prove of immense value to maintenance of the industry, which depends upon the correction of more immediate problems for larger expansion.

Wyoming in 1931 produced more than 14,700,000 barrels of crude oil, the bulk of which continued to come from the Salt Creek oil field, but the total was nearly three million barrels short of 1930 production and about half a million barrels under that of New Mexico. Because of extensive refining operations, the wide distribution of activities and its added gas output, however, Wyoming retains its supremacy as the leading oil State of the Rocky Mountain region. Salt Creek, with an output of 8,733,585 barrels last year, increased its total production since the field was discovered to more than 237,000,000 barrels, or more than half of the amount of crude expected to be recovered from Wyoming sands.

Demands Govern Production

Refinery demands as heretofore continued to govern production in large part, but few fields with the exception of Salt Creek suffered a material setback. Lost Soldier, Rock River, Grass Creek and Big Muddy continued to supply light crude in volume and the Osage field jumped into the larger producing class.

Prediction that the increased use of road oil would provide a larger market for black grades was borne out during the year, largely as the result of Wyoming's big highway improvement program.

By mid-summer the outlook for the national industry looked bad. Since then, four substantial price advances went into effect for the fields of this State. Due to constructive work, already accomplished, present trends give hope for another general rise in the near future. As soon as that day arrives, oil should again be recovered on a satisfactory basis in this State.

Late advances in crude oil quotations are the direct result of fact-finding investigations recently carried on by leaders of the industry. During the past year the State Geologist represented Wyoming at the leading curtailment conferences held in Washington and at other cities within the major producing States. At these meetings proceedings were arrived at to prorate production in an equitable and orderly manner. Some of the more novel measures debated at the sessions, such as the

military control and enforcement of output in the giant fields of the southwest, might have been slightly extra-legal in scope; but constitution or no constitution, all conferees agreed that the day had arrived to salvage a prostrated industry from the abysmal depths it had unwittingly plunged into, by the quickest and most direct action route available at the time.

At present Wyoming is an informal adherent of the brief compact signed last September between the governors of Oklahoma, Kansas and Texas. In that instrumentality or working arrangement it is agreed to restrict production to a sane and scientifically determined figure for the good of the industry in general. Since the preceding agreement has been signed, the price of crude has advanced appreciably. In fact, recent advances effective for oil crudes, greatly outrank the rises so far noticed for other raw mineral products and basic commodities generally purchased throughout the nation.

Other industries might profitably hold similar conferences at which a leaf might well be taken from the oilman's handbook. But so long as Wyoming must chiefly rely upon the petroleum industry to supply the bulk of her income, either in the form of royalty receipts or in normally collected revenues, no economic spectacle could be more gratifying than to witness crude oil leading the procession of basic commodities in their upward swing.

Black Oil

During the past year a far less gloomy spirit pervaded the atmosphere of the black oil division of the Wyoming petroleum industry. In 1931, more miles of oiled paved highways were built in Wyoming than within the entire 10 preceding year period. For the 596 miles of roads paved in 1931, the State Highway Department purchased 9,425,280 gallons of asphaltic tars at a cost of $392,930.50 from the White Eagle, Standard and Texas refineries. All of this material was derived from the various black oil pools of Wyoming. For 1932 an equal gallonage will be consumed to complete the construction program mapped out by the State administration. For the roads to be built next summer in northern Wyoming, the Standard refinery at Greybull has already started to run 200,000 barrels of crude recently purchased from tributary oil pools.

For the exploitation of the black crudes, credit is almost entirely due to the Wyoming Highway Commission. Each year their engineers succeed in building a better and more durable pavement for local traffic conditions. Their success

in this line of endeavor has already attracted much favorable comment from distant sources. In 1931 more highway officials from outside States conducted inspections of our latest types of asphaltic pavements than in any preceding year. Inasmuch as Wyoming still has a virtual monopoly of black oil production within the entire Rocky Mountain region, our proven pools may in time provide the material for similar road construction in several neighboring States. Among other things, such a market would increase the royalty inflow received by the State treasury. Therefore, in Wyoming more than the individual motorist should draw dividends from a logical expansion of the oiled road construction program.

For roadway construction on a big scale, the black oil pools of Wyoming are fully capable of supplying superior varieties of all asphaltic derivitives required. Due to recent discoveries, the daily production of the proven black oil fields now shut in has been estimated at 50,000 barrels. In volume, that potential is 30 per cent greater than the total oil output of the State in 1931.

Natural Gas

Natural gas, which Wyoming produced last year in the amount of 37,860,470,556 cubic feet, was another of the major industries that showed decrease in both output and valuation. The volume decrease was more than five billion cubic feet under the total produced in the previous year, and at the conservative field appraisal of four cents per thousand feet, the gas valuation for 1931 totals $1,514,418.82.

Salt Creek continued to lead in gas production, and the industry has as a sideline the recovery of natural gasoline from plants operated in the Salt Creek, Grass Creek, Lost Soldier, Rock River and Wertz fields.

Natural gas is now produced commercially from 25 fields in Wyoming. Heretofore, a considerable portion of this production was exported to Montana and Utah points. By pipeline construction completed during the year, Nebraska also joined the list of State customers for Wyoming gas. This added market did its share in swelling the output total for the State. As gas sales pay the same royalty premium as oil, it is manifest that the Wyoming treasury collects additional tributes as expansions in the export market field develop.

Additional Discoveries

Wildcat operations conducted during the year had better luck penetrating new gas sands than finding expectant oil-bearing horizons. New well strikes ranging from 10,000,000 to 15,000,000 cubic feet daily were made in the Dutton Basin, Elk Basin, Alkali Butte, Garland and Lance Creek structures. At other points, lesser discoveries were also reported. These new potentials can be relied upon to offset the production now marketed from our older reservoirs. Moreover, such newly discovered reservoirs are bound to attract the attention of engineers in the employ of the big pipeline companies who are more and more on the lookout for potential gas fields as the cost of long-distance transmission is further reduced by continuously improving practice.

Manufacturing Possibilities

As yet, natural gas is only utilized for the manufacture of gasoline and carbon black in this State. Figures submitted by the Wyoming oil and gas inspector show the 1931 valuation of these two products to approximate $2,400,000. Federal statisticians always accredit the foregoing outputs directly to the mineral industry.

In recent years, natural gas has served as the basic raw material for the manufacture of an ever widening list of complex molecular organic chemicals that are finding increasing application in the textile solvent, pigmentation, welding, refrigeration, explosive and mineral fertilizer industries. So far, none of these new and costly synthetic primaries are manufactured within the more and more inviting Wyoming field.

A recent economic achievement may soon cause increased interest to be displayed in the potentialities of the Wyoming gaseous fuels. In a report published last October by the United States Bureau of Mines, the domestic consumers of Wyoming gas were found to be paying the lowest rate average of all States for the first time. Basic economic attainments of that order should help Wyoming to face the future with a growing degree of confidence. In course of time, such attractions may be deemed suitable for incorporation in aggressive advertising literature to be published by the State itself.

Pipeline Construction

Most of the natural gas utility concerns operating in this State constructed extensions from their main lines to nearby

settlements during the year past. However, the major construction was the 10-inch line laid to the populous communities of the North Platte River Valley in Nebraska by the North Central Gas Company. In Wyoming, their operations involved a re-laying of the Sinclair oil line as well as the construction of 32 miles of new connections.

Among the Wyoming cities connected with gas by the new line were Douglas, Wheatland and Torrington. The completion of the latest network leaves only eight county seat towns in Wyoming without natural gas lines, probably no State can surpass the present record of Wyoming.

For ability to continue peak sales volume in both good and bad years, few national industries have so far approached the virility of the gas utility field. Any enterprise that can operate without wide variations in profits is generally a stabilizing asset for the community in which it is established.

In 1931, the valuation of all pipelines in Wyoming for taxation purposes totaled $10,214,170. Increasing assessments from this source are rapidly approaching the total cattle valuation of the State. Today, recent pipeline and other affiliated construction visibly fortifies the financial structures of several counties in this State.

Outstanding in Wyoming utility expansion of the last year and as a factor in providing a larger market for natural gas produced in the central area was the extension of service to southeastern Wyoming and western Nebraska by the North Central Gas Company, subsidiary of the New York Oil Company.

The program was by far one of the biggest, as well as one of the most important, effected by any industry in the State during 1931. It entailed the total expenditure of approximately $3,500,000.

Construction of an entire new line, at an estimated cost of $11,000,000, was contemplated when preparations for the project were initiated, but acquisition by long term lease of the former Sinclair Oil Company pipeline solved one of the major problems of the enterprise and by saving of time made gas available to customers much earlier than otherwise would have been possible.

Reconditioning of the Sinclair line, and replacements found necessary, provided employment for much Wyoming labor and proved one of the largest items of Wyoming's aggregate payroll in 1931.

Before the project was undertaken, exhaustive business surveys in the communities to be served were made. By means of these surveys the estimated patronage that might be expected and the volume of business upon which the company might reasonably count were gauged. A total of approximately $75,000 was expended in this manner, together with the cost of engineering surveys and estimates, before the project itself was begun.

Construction and Labor

The North Central Gas Company was organized early in 1931. The Sand Draw field, near Riverton, is the pipeline's principal source of supply, the Muskrat field, in the same area, being tapped for additional supplies when needed. A 10-inch pipeline was extended from the Glenrock terminal of the line from the field via Casper, to the Clayton tank farm, a distance of 12 miles; there it makes connection with the Sinclair line, leased by the North Central Gas Company. From this point the Sinclair line extends east as far as Lewellen, Nebraska.

The Sinclair line was completely reconditioned and cleaned. Some sections of it required replacement. While reconditioning was a large item, renewal of a large portion of the line comprised an equally important feature of the project. The entire line is now in first class condition.

Drips were installed at low points for the purpose of drying the gas en route from the source of supply to municipal distribution systems.

A compressor plant, costing between $400,000 and $500,000, was constructed just east of Casper on land secured from B. B. Brooks. This plant maintains sufficient pressure, as the load demands, to force the gas from the wells to all points on the pipeline.

There are 390 miles of line, extending from the Muskrat field to Lewellen, Nebraska. It has put natural gas into the following Wyoming communities: Douglas, Guernsey, Wheatland, Fort Laramie, Lingle and Torrington, and the following Nebraska communities: Henry, Morrill, Mitchell, Minatare, Baird, Northport, Bridgeport, Lisco, Oshkosh, Broadwater and Lewellen.

Fifteen Towns Served

Complete distribution systems were installed in a total of 15 towns. Besides these installations, such miscellaneous matters as repair of local lines, putting in of extensions, installing

of local offices, construction of heating plants, shop buildings, warehouses and establishment of various equipment necessary for efficient distribution and maintenance of service were required.

Branch offices were established in each of the towns served. Each is in charge of a local manager, chief of an office organization. The respective distributing systems are served by crews of workmen who keep them at a high standard of efficiency. To assure a maximum of service to customers and to eliminate any possible interruptions, a corps of "line riders" constantly patrol the pipeline, to detect any leaks that may occur.

In some towns, branch office buildings were constructed; in others, office room was leased. In many of the branches, all attractive and efficiently operated, are new model gas equipment displays, demonstrating to the public the latest type heating and other gas-burning appliances.

In Scottsbluff and in Gering, both Nebraska cities, local gas distribution systems already in operation were purchased, materially enlarged and their scope of distribution broadened. An important extension from the main line was one constructed to the Great Western Sugar Company plant near Scottsbluff.

Each town served has a pressure regulation and meter system, installed at great expense, a necessary adjunct to distribution of the fuel.

Project Justified

"The company's expectations have been more than realized by the volume of business experienced since this expansion of natural gas service was put into effect," was the statement of company officials. "The entire project has come fully up to the quota set for it and the large expenditure required to put gas into the communities now being served has proved to be more than justified."

Company plans for 1932 contemplate the following tentative items of continued expansion:

1. Possible extension of the pipeline in Nebraska.

2. The expectation that by this time next year the line will be loaded to full capacity, to its present eastern terminal, Lewellen, Nebraska.

3. Construction of another compressor station, similar to the one east of Casper, at Guernsey, Wyoming, if found necessary. The company has a desirable site in view, and if increased demand in coming months requires a greater load on the line, the Guernsey plant will be a necessity.

4. Carrying out of a regular program of maintenance throughout the system.

Muskrat to Hoboken

Central Wyoming fields are the source of an almost unlimited supply of one of the cheapest and most economical of fuels. Establishment of the North Central line and other facilities for tapping the gas wells of this area make possible almost unlimited distribution. It is the one outlet to a steadily growing consumer territory. Eventually it may prove an outlet tapping all gas fields in central Wyoming.

Potentially, these fields can supply the continent. It seems almost incredible, on first thought, that Muskrat field gas could be turned on by consumers of Hoboken, New Jersey, on the Atlantic seaboard, yet such is the case. An official of the New York Oil Company traced on a map of the United States the linking of successive pipelines across the nation. Opening of valves would, in a short time, deliver Muskrat gas into New Jersey homes, much in the same manner as a voice is transmitted by long distance telephone from New York to San Francisco.

In addition to its regular maintenance program in the State, the New York Oil Company effected considerable expansion of service during 1931. Renewed mileage of natural gas pipeline between Riverton and Lander was completed, and a three-mile extension of the line from Riverton to the State prison farm was constructed. Considerable changes and renewal of line was effected between the Sand Draw field and Riverton. A new crossing was put in at Wind River to assure uninterrupted service to consumers in the basin area.

The company's telephone line from Rock Springs to the South Baxter Basin field was reconditioned and is now in first class service. Improvements of the gas line between these two points also were effected. Considerable extension work was done in Rock Springs, bringing the distribution system in that community to a higher peak of efficiency and assuring better service than ever before.

Rate Reduction Effective

In Casper a substantial rate reduction was effected in July. This reduction, from eight to 12 per cent, according to volume of consumption, represents a saving to local consumers of more than $20,000 a year.

General offices of both the New York Oil Company, of which J. M. McIntire is vice president and general manager, and the North Central Gas Company are located in Casper.

Oil and Gas Pipelines

Pipeline construction in Wyoming last year was limited to minor projects with the exception of extensions in the system of the North Central Gas and New York Oil Companies, detailed elsewhere, which stood out as the major factor also in expanding the market for gas produced in this State.

The Illinois Pipeline Company laid an oil line of six and eight-inch pipe from the Garland field in northern Wyoming to the town of Cowley to provide an outlet for Byron-Garland black oil.

The Ohio Oil Company laid a three-inch line from a connection on the trunk line near Worland to the Wyoming Industrial Institute, a distance of five miles, to supply the school with fuel.

The Rocky Mountain Gas Company laid a three-inch line from the little Buffalo Basin to the town of Meeteetse, a distance of eight miles, as a source of supply.

A six-inch line was laid by the Northwest Utilities Company from Sheridan to the United States Veterans Hospital, a distance of two and one-half miles, to serve the hospital.

Other changes were made and are pending, the Midwest Refining Company having taken up a 16-mile line of six-inch pipe from Salt Creek to the Teapot pump station. The same company also took up about eight miles of the old Franco-Wyoming line, the first one to carry crude from Salt Creek to Casper.

At the present time a movement is under way to abandon two Wyoming oil lines, both owned by the Illinois Pipeline Company. One extends from Salt Creek to Illco to Casper, a distance of over 40 miles, and the other from the Pilot Butte field to Riverton. Neither line is needed, it is said.

The last compilation of pipeline ownership and operation in the State follows:

Name of Company	Mileage
Big Horn Gas Company	85.149
Bolton Oil Company	30.3
Central Pipe Line Company	37.75
Colorado-Wyoming Gas Company	10.4
Dallas Dome Wyoming Oil Fields Company	13.76
Egaso Operating Company	13.75
Empire State Oil Company	
Fargo Western Oil Company	22.5
Illinois Pipe Line Company:	
Salt Creek district	33.45
Big Muddy district	
Lance Creek district	25.20
Mule Creek district	14.00
Osage district	6.77
Rock River district	40.51
Rex Dome district	1.87
Elk Basin district	63.30
Oregon Basin district	15.41
Grass Creek district	88.70
Pilot Butte district	29.10
Midwest Refining Company:	
Salt Creek-Casper district	337.44
Natrona-Carbon district	89.23
Labarge-Opal district	38.
Midwest-Wyoming Gas Company	34.73
Mountain Fuel Supply Company	97.
New York Oil Company	59.86
Northwest Gas and Pipe Line Company	14.75
Prairie Oil and Gas Company	32.575
Producers and Refiners Corporation	248.72
Sinclair Pipe Line Company	163.1
Uinta Pipe Line Company	95.69

Drilling Operations

Wyoming oil operators during the year 1931 completed a total of 70 wells with aggregate new production, as measured by initial tests, of 10,655 barrels of oil and 73,500,000 cubic feet of gas to maintain leadership in drilling activities of the Rocky Mountain area. The total fell short of the preceding

year when 152 wells yielded a total of 24,060 barrels daily and considerably more gas.

Of 1931 completions, 44 were oilers, four were gassers and 22 were dry. Successful completions showed approximately the same percentage as those of 1930 in proportion to the number drilled.

Of special interest in connection with the summary, as compiled by the Inland Oil Index, is that Salt Creek, which has held the lead over a long period of years in new development work, witnessed only three new completions during the year while the Osage field in northeastern Wyoming reported a total of 32, of which 20 found oil. Larger development activities there were the result of the westward extension of the field and maintenance of crude oil values far above the general level, due to demands from Montana and other small local refineries for the high grade product the field produces.

Other Districts Mark Time

New operations in a great majority of other producing districts continued to mark time during the year with the exception of additional exploration operations confined to from one to five tests. Approximately a dozen wildcat tests were also scenes of activity most of the year in widely scattered areas.

From January to December, inclusive, the average number of drilling wells ranged from 70 to 78 for all districts of the State and before the winter shutdown 72 operations were under way.

Completions and their results for all districts are summarized in the following table, which also shows comparisons for the preceding year:

District	Comp.	Oil	Gas	Dry	New Prod.
Big Muddy	5	4	0	1	615
Byron	1	1	0	0	1,200
Elk Basin	3	1	1	1	50*
Ferris	0	0	0	0	00
Frannie	3	2	0	1	100
Garland	4	3	1	0	4,000**
Grass Creek	0	0	0	0	00
Hamilton Dome	1	1	0	0	125
LaBarge	1	1	0	0	30
Lance Creek	4	2	1	1	300***
Lander	4	3	0	1	260
Midway	1	1	0	0	100
Oregon Basin	0	0	0	0	00
Osage	32	20	0	12	2,575
Pilot Butte	1	0	1	0	Gas
Poison Spider	2	2	0	0	250
Salt Creek	3	2	0	1	50
Miscellaneous	5	1	0	4	Gas
Totals 1931	70	44	4	22	10,655
Totals 1930	152	100	17	35	24,060

* Elk Basin 1 gas well, 9,250,000 cubic feet.
** Garland 3 gas wells 55,000,000 cubic feet.
***Lance Creek 1 gas well 9,250,000 cubic feet.

Gas was encountered in some other wells not yet listed as completions and may be saved for future production.

Refineries

Petroleum refining is Wyoming's big manufacturing industry as measured by the outlay for labor and materials and by the value of its products.

While values have shrunk perceptibly, interesting comparisons are found in statistics of the 1930 census, recently made available, which show that of products for a single year with a combined value of $96,348,076, those made from oil amount to $68,846,821.

The census reveals that manufacturing is a major force in providing employment and contributing to economic

growth and stability in addition to absorbing the products of other activities and industries in the form of materials. Wyoming has 248 manufacturing establishments of all kinds with 896 salaried officers and employes who are paid $2,288,632 a year and 6,258 wage earners who receive $10,255,365. The cost of materials, containers for products, fuel and purchased electric energy amounts to $62,720,084, and the value added by manufacture totals $33,627,992.

Seventeen Refining Plants

Seventeen petroleum refineries are listed in this compilation, with a total of nearly 2,000 salaried officers, employes and wage earners who receive approximately $4,000,000 a year. This total is exceeded slightly by the 2,400 men engaged in steam railroad repair shops on car and general construction and repairs. Lumber and timber products rank third in classification for labor outlay.

No separate statistics are given for sugar manufacture in first reports on industrial activities but with five factories operating on large beet production this industry also falls into the class of big business.

Petroleum refining is centered largely in Casper where the Standard Oil Company of Indiana operates big plants which turn out scores of products, and where the Texas Company and the White Eagle Oil & Refining Company also have modern plants equipped with cracking processes. Refineries are also operated at Greybull, Glenrock, Parco, Laramie and Cody, although the Texas plant at the latter point was shut down late last summer after fulfilling road oil requirements.

Improvements Made

No expansion was authorized last year in refinery operations and none is expected, but certain improvements were carried out in the regular course of maintenance in keeping plants up to standard.

At Greybull two cracking units were installed in the Standard-Midwest plant to handle a larger volume of black crude by perfected processes.

This winter work was launched by the same company on the installation of improved units at its Casper plant with a charging capacity of 6,500 barrels daily. The new stills will replace antiquated equipment in a plant which already has

a charging capacity of 50,000 barrels daily. Work will continue until late in the summer, it is estimated, and was instrumental in offsetting a normal reduction in the winter operating force. Casper labor was given preference in employment.

Operations Moderate

Operations were maintained on a moderate but steady basis throughout the year and during the last winter. Where reductions were necessary employes were placed on a part-time basis and the winter schedule was maintained without great loss of time on the part of regular workers.

Company policies in general in this respect proved a great asset to the State and helped maintain economic conditions on an even keel when many other industrial cities and states suffered heavily.

The year saw some shifts in crude oil supplies, including the purchase by the Producers & Refiners Corporation of government royalty oil in Salt Creek and the contracting of State royalty oil from Big Muddy by the Continental Oil Company, which operates at Glenrock. It is understood, however, that the Texas Company has negotiated the purchase of oil from the Producers & Refiners and that the White Eagle may obtain a supply from the same source. The Texas and White Eagle had received this oil under contract for a period of several years. Oil was also shipped to Casper for refining from other points during the year.

Plants Rank High

The Standard refineries in Casper rank as one of the foremost industries of the Rocky Mountain region. They supply a large trade demand for gasoline, lubricants, coke and other products throughout Wyoming, Colorado, Montana and east to Minnesota. Equipment is modernized from year to year as a basic policy.

The Texas plant has a crude capacity of 7,000 barrels a day and that of the White Eagle is 5,000 barrels. Both are equipped to handle any grade of crude, and along with the Standard have supplied the State Highway Department with road oil in volume.

For the continued stability of the huge amount of capital invested in the several petroleum refineries, the right to search and explore the more likely sources of crude supplies must not

be prolonged for unduly prolonged periods in this State. In fact, to offset the declining production, the same remarks can be applied with equal emphasis to all States in which the refining industry is established on a similar scale.

In 1931 a trend developed for the little man to enter the Wyoming refining field. At widely scattered points, skimming and topping plants were erected by small independent producers and other individuals for the manufacture of gasoline, tractor and furnace fuel, and distillate. Plants for the purpose were built in Kemmerer, Newcastle, Torrington and Upton, and also in the Big Muddy, Brenning Basin, LaBarge and Osage fields.

So far, crude from the Osage field seems to be the first choice for this new alignment of refining interests. At present no less than 10 small refineries located in eastern Wyoming as well as in Montana and Nebraska towns operate on crude hauled by truck from the Osage field. These new developments were of sufficient magnitude for the field to maintain its prices when the bottom dropped out of the market for the production from the larger oil pools of the nation.

Having very little overhead, the private refiners have been generally able to undersell the larger marketing companies and still make a good profit.

These plants, it may be added, have had a tendency to curtail the market for products of the leading refiners although consumption has increased at the same time. The movement spread to Wyoming from the Mid-continent area.

Royalties

For the federal fiscal year ending June 30, 1931, the mineral royalties collected from the Wyoming Public Domain totaled $2,184,422.88. In the preceding year the receipts amounted to $3,274,459.06. Oil and gas operations provided over 90 per cent of the foregoing incomes. Inasmuch as crude quotations touched an all-time low level during the year, the mineral royalties received by the State suffered a corresponding decline. Serious as this loss was, the Wyoming tribute again totaled 60 per cent of all the mineral royalties gathered by the Federal treasury.

A number of constructive ascendencies at work during the year measureably fortified the future position of the Wyoming royalty revenues. In spite of the recent bad condition of the oil industry, the Government actually received a higher

bid for its royalty oil from the Salt Creek field than paid in the boom period. This bid made by the Producers & Refiners Corporation, was accepted last December, and for the next three-year period, the bulk of the Federal royalty oil, produced in Wyoming, will be sold at $0.22½ a barrel above the posted Mid-continent prices. Fortunately, this highly gratifying differential is of sufficient margin to produce sizable revenues, even if ruination quotations should again prevail for the general run of crude oils. Moreover, a premium of that magnitude offers material evidence as to the strength and stability of the oil industry as now established in Wyoming.

Federal oil royalties have suffered a continuous decline ever since 1924, when the record payment of $12,270,500.75 was collected from operations in this State. At that period Wyoming wallowed in money to an extent that caused certain eastern economists to forecast that it would be the first American fairyland to operate its government on a tax-free basis. Unfortunately, that day never came to pass and while royalty windfalls continued to pour into the State's treasury from federal as well as State sources, administrations, then in power, made distributions to schools and other outlets on a scale of liberality seldom approached by any state.

Regulation Strikes Blow

Some people believe that the Federal royalty payments of this State are soon due to start on their upward swing. Under existing regulatory measures, such anticipations are altogether hopeless. Only two avenues are open to attain the above mentioned conditions. Either substantial strikes will have to be made in the deeper sands of our old producing structures, or else new pools must be discovered directly on and within the class of lands that alone can pay Federal royalties. Incidentally, for the latterly owned lands, a drastic anti-drilling embargo went into effect three years ago in this State.

Recent tests completed within the older fields have generally proven the deeper sands to carry much less petroliferous content than the higher and more prolific horizons. Moreover, when production is encountered in the lower levels it frequently is of an inferior quality. As matters now stand, areas other than the present producing structures must provide the big royalty payments of the future.

The solution of the royalty problem is apparently in a bill now pending in Congress. The bill referred to would transfer title to the remaining public domain to the several

States in which those areas are contained. While it specifically excludes known mineral lands from transfer, passage and subsequent acceptance of its various provisos on the part of Wyoming would again throw open the larger areas of the State to free and unrestricted prospecting operations.

Modern prospecting operations are vastly more elaborate than at the time the domes of this State were located by rockhounds and other casual passers-by. In more recent years, systematic geophysical and core-drilling campaigns conducted in the deeded land States have brought in tremendous pools from terrain no more promising than the huge geologic basins yet untested in Wyoming. Apparently, rights to explore the latter area will remain closed until the State itself may deem it fitting to accept the full titles thereto.

Proprietorship of the public domain lands should open more spacious channels for pouring additional revenues into the treasury of the State. At the outset, far wider reaches would be at the command of the State for gathering in prospecting fees of the pattern now received from the school sections. In turn, such officially sanctioned activities should yield a reasonable number of discoveries, and finally, as production is developed, the State, itself, would exact all of the royalty fee, in lieu of the 37½ per centum now remitted as its share under existing Federal statutes. For unobstructed royalty development, the bill now before Congress would seem to offer the maximum opportunities, at least from the all Wyoming angle.

Other advantages would accrue to the citizens of the State as soon as the pending proposals went into effect. Formerly, prospecting and divers other petroleum activities provided liberal fees to members of several professions practicing in Wyoming. It stands to reason that such past sources of private income never will return until oil development work is once more resumed over the wider expanses of this State.

Other grade handicaps could be rectified as soon as the State ownership plans would supercede the drilling policy now in effect on the public domain. If Wyoming can retain its select classification among the major group of oil states, normal production declines in the older fields will have to be offset by an intensified search for new pools. Such exploratory operations should no longer be delayed in this state.

Resume of Oil and Gas Operations for 1931

Progress made in research work and work tending to develop new methods and tools for field operation was satisfactory during the past year, but did not bring forth anything spectacular in either line. New types of tools that will tend to drill wells more speedily and efficiently are perhaps the outstanding development of the year. Much attention was given to research work to the vapor phase methods of refining oils and some new principles were found.

Wastage, the dark cloud of the oil industry, was reduced to a minimum during the past year in Wyoming fields. Although the State Oil and Gas Inspector made frequent and rigid inspections for wastage in the various fields in Wyoming during the past year, practically nothing of consequence was found and the oil operators in the main were giving hearty cooperation to the State and Federal officials in their efforts to cut wastage of our natural resources to the minimum. There is still some wastage being had from evaporation and corrosion, but efforts are being made to eliminate this also.

The natural gas industry, allied to the oil industry, had a good year, considering all things. The price of this commodity has kept up at practically the same figure as previous years and all the major gas companies report some extension to their lines during 1931. In the marketing of natural gas from the various fields in Wyoming, there is little or no wastage. The gas companies are normally very careful regarding wastage and the main lines and wells are equipped to prevent same.

Under the present system in Wyoming, the State Geological Department has no authority to examine conditions in a refining plant or make any recommendations looking to the saving of waste. Other states have empowered the State Oil and Gas Inspector or a similar official with authority to make periodical inspections of refining plants and also to supervise the grades of gasoline marketed within the state.

During the past year, the Osage field in Weston County presented an anomaly in comparison with the rest of the fields of Wyoming. Due to the location of this field on the mail line of the Burlington Railroad, and also its isolation from the rest of Wyoming, the oil from Osage wells could be delivered at the refineries in Montana at a lower cost for transportation than crude from the fields in central Wyoming. Fields in the Big Horn Basin could also take advantage of

this fact, but as the Basin fields are mainly controlled by the Standard interests, the crude produced there goes to the refineries of this organization. These conditions enabled the Osage operators to continue producing their wells at a fair price for the oil when other fields were shut in or producing oil at a loss. Osage crude was commanding a price of one dollar per barrel when Salt Creek oil was selling for nineteen cents per barrel.

In January, the Continental Oil Company opened a refinery in Denver, Colorado, which is to refine oil from Colorado, Wyoming and New Mexico, with Wyoming furnishing the major portion of the crude.

The Standard Oil Company of Indiana placed two new cracking units at the Greybull refinery.

The Utah Oil Refining Company, operating in several fields in Wyoming, sold its interests in Wyoming to the Midwest Refining Company, of which it is a subsidiary.

The North Central Gas Company started work on the laying of a gas line to several towns and cities in western Nebraska and eastern Wyoming. This line utilizes the Sinclair oil line to transport its gas from central Wyoming to these towns.

C. Leonard Smith built a refinery at Kemmerer and the Oreana Refining Company built a plant in the LaBarge field.

The Goshen Oil and Refining Company completed a refining plant at Torrington, Wyoming.

The Ohio Oil Company laid a gas line from the trunk line near Worland to the State Industrial School. This line is five miles long and laid with three inch pipe.

The north Central Gas Company completed its line to eastern Wyoming and Western Nebraska and turned the gas in the latter part of September.

In October the Midwest Refining Company took up a six inch gas line about eighteen miles long, extending from the Salt Creek field to the Teapot pump station, about half way between Casper and Salt Creek. This line was for use in the new Fort Morgan field in Colorado.

The New York Oil Company laid a three inch line three miles long to the prison farm near Riverton from its distribution system.

The Producers and Refiners Corporation moved its absorption gasoline plant from Casper to Lost Soldier and rebuilt the plant in the Lost Soldier field.

The Standard Oil Company of Indiana announced that it will build a large cracking unit at the Casper refinery, this unit to have a capacity of 6,500 barrels per day.

Non-Metallic Minerals

A widely diversified list of ceramic and non-metallic materials was produced in Wyoming during the past year. Total output of the various cement, brick, tile, gypsum, mica, sodium sulphate plants, sand and gravel pits, limestone, building stone and paint-ore quarries that operated during the year amounted to $2,000,000.

Obviously, some of the preceding operations had to be conducted on severely curtailed schedules. Other divisions, however, were able to maintain their production volumes of previous years. The largest manufacturing operation in this field is that of the Monolith Cement Company at Laramie. In 1931, the output of the big $2,000,000 plant was 22 per cent above the 1930 total.

Another important non-metallic produced in Wyoming is chemical limestone. This superior material is shipped to many sugar refineries located at widely separated points in the Rocky Mountain region. As there was practically no reduction in the tributary beet acerages, the refinery demands from the Horse Creek, Granite Canyon, Hartville, Spence, Altus and Greybull quarries totaled 135,751 tons in 1931.

Increased quantities of ordinary limestones and other suitable material were also quarried for the roads. In 1931, $5,000,000 was expended on the greatest highway improvement campaign in the state's history. As an ample portion of the preceding outlay was disbursed for surfacing materials, more than the usual number of men found employment in newly opened quarries and gravel pits. These activities as well as other mentioned expansions did their bit in maintaining the annual output of the Wyoming non-metallic industry at the normal valuation level.

At the close of the year the Iowa Soda Products Company announced that they would build a sodium sulphate refinery at a cost of $25,000 in the Rawlins area. At this time, considerable progress is reported on the new construction.

Last year, shipments of the raw salt were made from the lake beds near Casper, the original producing area of the state. So far, no other new plants have been announced for the Wyoming chemical industry.

Industrial Investigations

Several areas in Wyoming were subjected to dispassionate analysis and rigorous appraisal of contained resources on the part of plant engineers and technical writers during the past year. Remaining space in this review will permit mention of the fundamental studies so far concluded at two points in this state.

For years the immense deposits of titanium bearing ores at Iron Mountain have powerfully attracted the attention of professors and other scientists chiefly interested in abstruse academic studies. However during the past summer this office conducted joint examinations of these deposits with visiting engineers from two competitive concerns in the paint manufacturing field.

In recent years, the better and more durable lines of paints and enamels have been made from suitable titanium ores. Already, expansions in the new field are of considerable concern to the old-line manufacturers, and in event basic materials for the new products can be put on the market at sufficiently low levels a thorough-going revolution will likely transpire within the pigmentation industry, as hitherto organized.

On arrival, both engineers gazed in open-eyed bewilderment upon the prodigiousness of the Iron Mountain deposits, long recognized as the greatest reserve of titaniferous bearing ore so far revealed in the United States. But finding the rock to range from 22 to 25 per cent, titanium dioxide, the compound consumed by the paint industry, it had to be doomed as too low in quality to justify shipment to Niagara Falls the nearest point where titanium ore imports are now successfully reduced in this country.

In view of the foregoing finding, it was mutually concluded that the refractory Iron Mountain deposits would never be exploited until cheap hydroelectrical current could be purchased on the spot. An ample supply of such energy will be available upon completion of the Seminoe dam.

Construction of the vital power unit is proposed in the bill since introduced by Senator Kendrick, which in the main, is basically concerned about the early completion of the Casper-Alcova irrigation project. According to income analyses already completed by the senator, power sales from the dam will prove adequate to pay the major costs of the $21,000,000 irrigation project. Such premises would appear to rest on sound economic trends. In recent years federal reclamation projects in Wyoming and elsewhere, have more than ever depended on the growing power market to provide the bulk of their profitable revenues.

From a purely investment standpoint, precedents for the pending hydroelectrical proposals are by no means lacking. In recent years, even larger outlays of American capital have been expended in the development of both titanium mines and power dams, in Norway. In time, investments in similarly interconnected projects may be considered justifiable and expedient wholly within the domestic Wyoming field.

Industrial Possibilities of Southwestern Wyoming

A description on the industrial potentialities of southwestern Wyoming recently appeared in the Country Gentleman, an agricultural magazine published by the owners of the Saturday Evening Post. The description concluded a national economic survey in the chemical field, and as such it is inserted below:

"Out in Wyoming there are mountains of lava bearing approximately 12 per cent potash in this silicate combination. Not very far away from the potash deposits are vast phosphate beds, and still in the same vicinity are deposits of low-grade coal. This haul is too long to justify bringing either the coal or the phosphate across the plains to eastern markets, and nobody has heretofore known how to use the potash. But Turrentine and Royster, of the United States department of agriculture, have found out that a blast furnace, operated on this cheap Wyoming coal, could be utilized to bring about a reaction between the silicate of potash and the phosphate of lime.

"The proper proportion of the two ores is loaded along with the coal into the blast furnace. When a temperature of up around 2,000 degrees is reached and everything in the blast furnace is at fusing heat, the potash leaves the silica combination and joins up with the phosphate, which has similarly left its combination with lime. The silica and the lime then get together to make a clinker, while the potassium phosphate which is formed becomes volatile at this high temperature and goes as a fume up the smoke stack. Before it reaches the outer air and is lost, however, an ingenious device known as an electric precipitator throws it down in solid form.

"Tentative figures put out on a basis of small experimental operation of the process point in fact to costs so low as to be more or less revolutionary. These experimenters get a cost of only eighteen dollars a ton for pure potash. It will be remembered that we are now paying around forty dollars a ton for 50 per cent potash from abroad. If we can produce the same stuff for nine dollars, or even double this amount, not only would we cease to draw on a foreign supply, but potash use in this country would tilt sharply upward."

Technological problems, hitherto unsolved, have delayed the exploitation of the immense chemical deposits of southwestern Wyoming. Thanks to the brilliant research work recently conducted under the Winter Act, a large number of technologists are becoming convinced that the door is at last open to develop the Wyoming chemicals on a commercial scale. Despite their enthusiam toward Wyoming possibilities, the fact remains that basic market conditions are not favorable for heavy capital expenditures on chemical plant construction at this time.

During the year, a number of other complimentary notices appeared on the economic potentialities of Wyoming. In better days, such unsolicited favors may bring handsome rewards to our state.

Building Stone

Determined efforts to secure the use of Wyoming building stone in federal structures authorized in this state brings the reminder that the materials abound here in limitless volume. It is because of this fact that the importation of stone from a distance is being opposed by those interested in the utilization of home products. Directly flanking the granite cores of the great Mountain Ranges of Wyoming, are beds of limestones of the Pennsylvanian-Mississippian series. At many places the railways and highways of the state are constructed directly through scenic canyons eroded in these vast deposits of limestone. Granite is found in abundance in the Hartville

uplift, Laramie range and the Medicine Bow range. Limestone occurs and is mined in Albany county near Laramie, in Carbon county near Rawlins, in Fremont county near Lander, in Hot Springs county near Thermopolis, in Laramie county at Horse Creek, in Platte county at Hartville—near Guernsey, in Sheridan county near Sheridan, and in Sweetwater county near Green River.

Marble occurs in Albany county on the west flank of the Laramie range, on the east flank of the Medicine Bow range near Cooper Lake station on the Union Pacific, in Converse county near Douglas, in Crook county on the west flank of the Black Hills, in Fremont county in the Rattlesnake Mountains, in Johnson county in the Big Horn Mountains, in Platte county near Hartville, and on the east flank of the Laramie range. It occurs abundantly in the carboniferous in pure white form about twenty miles west of Wheatland.

Sandstone is quarried near Laramie in Albany county, at Cody in Big Horn county, at Rawlins in Carbon county, at Alladin in Crook county, at Lander in Fremont county, at Thermopolis in Hot Springs county, at Iron Mountain and Underwood in Laramie county, at Arno, Dietz and Absoroka Park in Sheridan county, in Cumberland, Evanston, Oakley, Frontier and Glencoe in Lincoln county, and at many other towns and villages in the state.

In order to be able to economically produce building stone, it is necessary to equip a quarry with much machinery and, while building stone has in the past been produced in all of the localities before mentioned, there are only three quarries in the state that are at the present time equipped to furnish stone suitable for building purposes. These quarries are located at Rawlins, Laramie and Lander. In all three instances the rock quarried is sandstone. The Rawlins quarry produces a gray sandstone and the size of the blocks obtainable therefrom is limited only to the size of the derrick that can handle the same. The quantity available is unlimited. Rock from this quarry is at the present time being furnished for the postoffice buildings at Casper, Wyoming, and Ogden, Utah. The State Capitol building at Cheyenne and several other of the prominent buildings in Cheyenne are constructed of rock from this quarry. Buildings in Laramie, Denver, San Francisco, Portland, Los Angeles, Beatrice, Nebraska, and buildings in other cities have been built of this rock.

The light buff sandstone quarry at Laramie can furnish unlimited quantities of blocks three feet square and eight feet long. Some blocks of larger size may also be quarried. Over 5,000 tons are at present ready to be wedged out. The Wyoming State University has built its gymnasium of 9,000 tons of this rock and the structure cost approximately $400,000. In the engineering hall of the university, 1,200 tons were used. This building cost $200,000. In the Men's Dormitory 2,000 tons were used. This building cost $160,000. The Old Ladies' Home in Laramie used 1,000 tons of this rock and the building cost $70,000. Eight hundred tons of the rock were used in trimming the Laramie county high school building and this structure cost $225,000. The Cathedral building and the Sherwood hall in Laramie were built of this rock forty or fifty years ago. The Albany county court house at Laramie has just been completed and has used more than 1,500 tons of the rock. This building cost approximately $200,000. The Mountain States Telephone and Telegraph Company is contemplating the use of the Laramie sandstone in two proposed buildings and four hundred tons of the rock will be used in each building.

The quarry at Lander is located on Baldwin Creek and produces a buff sandstone which has been in buildings in the Lander Valley since 1896. The Ranney residence, which is a two-story full exposure and built of this stone, shows no faults and sharp edges are retained at this date. The First National Bank building at Lander, extended to two stories in 1910 with both south and north exposures and the pillars and lintel of this building are still sharp as the day on which it was erected. Base of the pillars and the water table rock are also in the same condition. This rock permits panelling, scroll work and finest carving.

The quarry at Iron Mountain has furnished the rock for several of the buildings in Cheyenne, notable among which is the Stock Growers National Bank. It, however, at the present time does not contain any machinery with which rock could be quarried for more buildings. This, in fact, is the case with practically all of the numerous quarries first above mentioned.

Metallic Minerals

In 1931, only iron ore and a small amount of gold ore was mined in Wyoming. The value of this production equaled $550,000. In the preceding year the output of the metallic division totaled $1,000,000.

The outstanding operation in the Wyoming metal mining field was again made by the Sunrise Mine, owned by the Colorado Fuel and Iron Company. Last year only 185,367 tons of iron ore, valued at $3.00 per ton, were recovered from the property. In normal years, the production is around 500,000 tons. Inasmuch as the national steel industry is now operating on a 20 per cent capacity basis, the production decline in the Wyoming area has not yet been as severe as elsewhere.

As mentioned in the preceding "Coal" section, most of the Wyoming iron ore finally goes into finished steel products, bought by the railroads. To meet the structural requirements of the larger western roads, the Colorado Fuel and Iron Company was organized 33 years ago. Ever since that time the company has chiefly depended on the Wyoming ore for the operations of their mills in Pueblo.

While additional lines of steel products are continuously being fabricated at the Colorado plant, nevertheless sales to the railroads invariably gross higher than the combined purchases provided by the industrial and building trades markets in this territory. In normal times, the railroads are the big customer of the steel industry, and until the advent of the modern pipeline era, rails were always the chief product turned out by the American rolling mills. Obviously, this huge tonnage market must remain quiescent until rail-relaying, double-tracking and new line construction is resumed.

Big Ore Reserve Discovered

Last November the Colorado Fuel and Iron Company announced the discovery of a large ore reserve on their Sunrise properties. The discovery was made by a geophysical survey, which among other things involved an interpretation of the resistivity differentials measured in several stratum contrasts of the locality. These studies were in progress over a year before the presence of the hidden ore body was finally confirmed by diamond drill tests.

A description of the geophysical methods used to locate the new reserve first appeared in my annual review of a year ago. Therein, the statement was made.

> "Short-cut detection practices along the preceding lines are largely responsible for the gross over-production evils that now confront the American petroleum industry."

From the standpoint of pure and applied science, it is now gratifying to report the discovery of an immense high-grade ore reserve the first time that modern "Doodle-Bug" instruments were used to search for metallic minerals in this state.

Using diamond drills at the point of discovery, miners penetrated 300 to 400 feet into a bed of ore of higher quality than any thus far worked in the Sunrise region. For many years past the old Sunrise ores have carried a far higher metallic content than the product mined in the big iron-ore producing areas of the nation. Had the discovery been made in any year other than 1931, the new field would have doubtlessly been hailed as possessing tremendous economic significance. However, leading officials of the company soon announced that the Sunrise discovery would obviate further purchases of outside ores, and that from thence on, all of their ore mining operations would be confined to their own properties in Wyoming.

In the boom period, the output of the old Sunrise mine was beginning to prove inadequate and supplemental purchases of New Mexico ores were made for the operation of the Colorado mills. As the discovery of the new deposit has again returned all of the company's ore mining activities to Wyoming, added prosperity will be in store for the Sunrise region as soon as a business revival is staged by the basic rail and steel industries.

Gold Mining

During the year gold bullion received at the Denver mint from scattering Wyoming prospects amounted to only $300. No mines were in operation, but at a number of points new discoveries were reported. In the Centennial, Wind River and Copper Mountain districts, continued development work was done on the more promising areas.

Copper, Silver, Lead, Zinc, Etc.

In Wyoming, aggregate output for these metals literally amounted to nothing for the year past. Quotations within this group still continue their descent. As depressed conditions in this line may prevail for a long while, no development work in even the more promising prospects of the state is recommended at this time.

Most of the foregoing metals find their outlet in the manufacture of devices and equipment that is mainly distributed

during periods of comparatively easy circumstances. Before profit margins will loom into sight for the miners of these metals, it will be necessary for the mental attitude of the nation to make a complete somersault. Accordingly, no quickening of activities may be expected in this field until funds now hidden away in old socks, mattresses, and other receptacles are extracted for investment in appliances and conveyances in which these metals are used. In other words, volume sales for the preceding group of metals are merely barometers that automatically register the psychic state of the nation during the up-and-down swings of the cycles of prosperity and adversity constantly recurring.

Rare Metals

Discovery of samarskite and chromium ore were reported in the state during the past summer.

A subsequently reported shipment of 800 pounds of samarskite from Wyoming to a California point received wide notices in the press. The shipment was reported by a collegiate mineralogist, and so far he has not revealed the location of his discovery.

Several areas in this state are considered favorable for the deposition of limited quantities of samarskite, an exceedingly uncommon mineral, generally containing radium and a dozen or more of the rarer metals. Lately, it has also been looked upon as an inherent source for one of the two chemical elements that yet remain to be discovered within the Celestial Universe. Suffice to state that the report of the visiting mineralogist awakened much interest at widely separated seats of learning.

The new chrome ore find was reported in the huge serpentine dikes of the Atlantic City mining district. Chrome ore has long been known to occur in similar formations in the mountains a few miles south of Casper. Successful reduction and exploitation of the latter deposits must await development of local hydro-electrical resources.

CHAPTER V

SUPPLEMENT TO LIST OF KNOWN STRUCTURES OR ANTICLINES IN WYOMING AS SHOWN IN CHAPTER XI OF FIFTEENTH BIENNIAL REPORT

Alkali Butte

LOCATION: T. 33 and 34 N., R. 94 and 95 W., Central Wyoming, Fremont County.

SURFACE FORMATION: Mowry and Thermopolis. Pierre on sides.

STRUCTURE: Northward plunging, closely folded anticline.

REMARKS: Sands—Muddy, Dakota, Lakota and Lower sands.

The Apex Oil Company tested all sands in Sec. 2-33-95, dry and abandoned. Well reported to have oil showing in Morrison.

Myrin Oil Company had a hole full of water in the Second Wall Creek sand at 3,502 ft. on Sec. 26-34-95. A second test by this company on Sec. 10-36-94 was abandoned at 2,530 ft.

The Texas Production Company, drilling on NW¼ Sec. 1-33-95, got a 350-bbl. producer of 37° gravity oil in the Muddy sand at 3,952-3,983 ft. A total of 8,134 barrels was produced from this well in 1928 in making tests, all of which was trucked to the railroad at Riverton and shipped to the Texas Company's Casper refinery.

In July, 1931, the Texas Production completed a well on the SW¼ Sec. 36-34-95 at 4371 ft.-4394 ft. which showed a production of 13,000,000 cu. ft. of gas per day. This company started drilling a second well on this same quarter section in June, 1932.

Discovered 1928. Average gravity 37°.

1928	5,670	
1929	—	
1930	—	
1931	—	
1932		5,670

Badger Basin

LOCATION: T. 57 & 58 N., R. 101 & 102 W., Park County, Wyoming.

SURFACE FORMATION: Fort Union.

STRUCTURE: Gently dipping slightly east-west elongated dome with 250 feet of closure. 3,000 acres within the closure area.

REMARKS: Prior to 1931, the Atlas Oil Company drilled a test which did not reach the Frontier. Total depth and exact location unknown. Badger Basin is the only new oil field discovered during 1931. The field is entirely controlled, and the discovery well was drilled by the Resolute Oil Company of Great Falls, Montana. The well, No. 1 Northern Pacific, was located in the NE corner SW NE of Section 17, Township 57 North, Range 101 West, on the crest of the structure. This is the deepest well of any kind in the Rocky Mountain Region, being 8,723 feet deep. It was drilled with cable tools and is one of the deepest, if not the deepest, well in the world drilled by the churn drill method. The well was completed in June of 1931, having an initial production of 55 barrels per day of 49.5° gravity oil, carrying 65% gasoline. The well flows and since completion there has been no reduction in daily production. The producing horizon is the Frontier, topped at 8,190 feet, and the well is bottomed in the Mowry shale. There is no pipeline into the field and only the one well, but further development is planned for 1932.

Big Muddy

LOCATION: T. 32 & 33 N., R. 76 & 77 W., Converse & Natrona Counties, Wyoming.

SURFACE FORMATION: Pierre shale below the Parkman sandstone.

STRUCTURE: Dome five miles long, with approximately 4,500 acres of productive area.

REMARKS: This field is the third in the State in production, having a credit of 21,770,113 barrels to December 31, 1931. For the year 1931, the field produced 654,234 barrels, compared with 709,816 for the previous year and 802,740 for 1929.

The producing sands are the Shannon (not a factor in this field but found with some small production in some wells), First and Second Wall Creeks, Dakota and Lakota. Production has mainly been from the Wall Creeks from 2600 to 3300.

On December 31, 1931 this field was producing 1700 barrels of oil daily from 169 wells. The principal part of this production goes through the Continental Oil Company's 6" pipeline to their refinery at Glenrock.

The first well completed in the Lakota is located in the SE SW NE of Section 8, Township 33 North, Range 76 West. In this well, the Dakota sand was found at 4293 to 4312 feet and made 125 barrels of 36.4° gravity oil, flowing naturally. The Lakota sand was found at 4,343 to 4,400 feet and although a gauge of its possibilities could not be made, on account of its flowing with the Dakota sand oil, it was estimated to be good for 50 barrels of darker oil than that found in the Dakota sand. At 4,378 feet, water developed in the Lakota, was flowing from the sand at the rate of 600 barrels daily when drilling was stopped at 4,400 feet. All of the Lakota sand was plugged off before the water could be shut off.

In March, 1931, the Ohio Oil Company's deep test, No. 5 Jones, NW NE NE of Section 9, Township 33 North, Range 67 West, was completed in the Lakota sand at 4,364 feet with an initial production of 350 barrels of oil of 35.5 degrees gravity.

The Continental Oil Company deepened its No. 50 Whitesides to the Lakota sand at 4,370 to 4,400 feet for an initial production of 250 barrels, following completion of the No. 5 Jones well.

On January 2, 1932, the holders and operators of State oil and gas leases in the Big Muddy field, and the State of Wyoming, entered into a cooperative development agreement to protect and conserve their interests in the newly discovered Lakota sand horizon.

Field discovered 1915. No production until 1917. Average gravity 33.5°.

1917	551,293	1922	1,455,782	1927	1,071,240	
1918	3,069,374	1923	1,506,398	1928	980,021	
1919	3,198,276	1924	1,326,714	1929	802,740	
1920	2,127,454	1925	1,216,703	1930	709,816	
1921	1,893,452	1926	1,206,616	1931	654,234	21,770,113

Billy Creek

LOCATION: T. 48 N., R. 82 W., Northern Wyoming on the east side of the Big Horn Mountains, 15 miles south of Buffalo, Johnson County.

SURFACE FORMATION: Parkman and Steele.

STRUCTURE: Flat dome.

REMARKS: This field is operated jointly by the Carter Oil Company, Consolidated Royalty Company and Western Exploration Company. Nine wells were completed at the end of 1931, with an estimated gas production of 350 million cubic feet per day, one well being dry. Production is from the Niobrara sandy shale and the Wall Creek sand. Lower Frontier contained water at about 3,600 feet. The lower part of the main gas sand is saturated with oil in Wells No. 5 and No. 6. A test in 1928 by the Carter Oil Company, center SW¼ SW¼ Section 16-48-82 was completed for 100-barrel pumper of dead 20 gravity oil and shut in. The Carter Oil Company completed a deep test to the Muddy sand and found oil production estimated at about 200 barrels daily in its Belt No. 2 well, located on Sec. 36-48-82. This well was brought in on February 16, 1929 and it is considered that there is a narrow belt of oil between the water and gas production that occupies the central part of the field. This well has been shut in on account of no pipeline and no market for the oil. Gas was turned into an eight-inch pipeline, 55 miles long, laid by the Northwest Utilities Company, from the Billy Creek field to Buffalo and Sheridan, on September 24, 1930. This line provides an outlet for approximately 20,000,000 cu. ft. per month from this field.

Bunker Hill

LOCATION: T. 27 N., R. 89 W., Carbon County, Wyoming.

SURFACE FORMATION: Mesa Verde.

STRUCTURE: Dome, with about 500 feet of closure. 1,280 acres within closing contour.

REMARKS: The Kasoming Oil Company well, NW corner NW¼ Sec. 32-27-89, on the crest of the dome, was abondoned in the Steele shale at 827 feet.

The Prairie Oil & Gas Company abandoned their well No. 1, Sec. 29-27-89. This test was drilled to the

base of the Sundance at 6,791 ft. All sands from the Sundance back to the Frontier were tested by plugging back. The Frontier showed a little gas and oil at 2,100 ft., but not in commercial quantities.

Dutton Basin

LOCATION: T. 34 N., R. 90 W. About 12 miles east of Muskrat Gas field, Fremont County.

SURFACE FORMATION: ?

STRUCTURE: Dome.

REMARKS: The Ward Oil & Gas Company drilled a test hole and found good showings of gas and some light green oil, but lost the hole around 2,600 ft. The rig was then skidded about 100 ft. and this company is drilling at 3,680 ft. and expecting Frontier sands about 300 feet deeper.

Frannie

LOCATION: T. 58 N., R. 98 W. One mile west of Frannie, Northern Big Horn Basin, Big Horn County.

SURFACE FORMATION: Frontier.

STRUCTURE: Narrow anticline crossed by fault running northeast.

REMARKS: This field was discovered late in 1927 by Rosenberg and associates of Los Angeles, California. The discovery well was in the Northwest corner NE¼ NW¼ Section 25-58N-98W, was started in 1925 and after many changes of ownership and refinancing, was completed by Rosenberg and associates. The Embar from 2,583 to 2,600 made 190 barrels of 28 gravity asphalt base oil, the best black oil ever found in the State in the Embar formation.

Midwest and associates took over the operation and leases of the Rosenberg interests and drilled the second Embar producer in the Northeast corner NE¼ NE¼ Section 26-58N-98W, with an initial production of 260 barrels, sand 2,744-2,809. This was really in the bottom of the Embar and top of the Tensleep where the production was found.

Their third well in Southeast corner SE¼ SE¼ Section 23-58N-98W, made 104 barrels initial from 2,803-2,835. Characteristic of Embar production, there was

considerable water with the oil in all the wells, but it settled out quickly without necessity of treating.

Midwest drilled a test in the Southeast corner SE¼ NW¼ Section 25-58N-98W, one-half mile south of the discovery well. The Embar and Tensleep carried so much water that it would not have been profitable to produce the oil and the top of the Madison lime was reached at 2,982. The first break in the lime from 3,012 to 3,020 produced 2,510 barrels of crude the first 24 hours and it has a settled production of more than 500 barrels. The crude is heavier than that found in the Embar-Tensleep, having a gravity of about 22 degrees Baume.

The field was extended in 1931 by the Midwest Refining Company's No. 24 Rosenberg, NE SE NE of Section 26-58N-98W, which had an initial production in the Tensleep sand at 3,001 feet of 270 barrels.

The importance of finding oil in the first break in the Madison lime in the Big Horn Basin structures should not be regarded lightly, as all the producing fields in this sand now have possibilities in the lime. Contrary to the condition in the Embar where there is lots of water, the lime production is often free from water.

Field discovered 1927. No production until 1928. Average gravity 29°.

1928	28,027	1930	123,435	
1929	55,575	1931	285,022	492,059

Garland-Byron

LOCATION: T. 55 & 56 N., R. 96, 97 & 98 W., Big Horn County, Wyoming.

SURFACE FORMATION: Cody shale on the surface on both structures. Mesa Verde on flanks of Byron dome.

STRUCTURE: Garland is a northwest-southeast trending anticline eight miles long and one and a half miles wide. It is a highly faulted structure with 2,500 feet of closure. Byron is a dome lying east of and separated from Garland by a shallow syncline or saddle.

REMARKS: Oil production from the Frontier in a fault block on Garland and gas production from the Dakota. At South Byron, the second Wall Creek sand (Peay) is found at 700-900 feet and is oil bearing. Gas in the Dakota at 1,842 feet. At North Byron, in Section 27, Township 57 North, Range 98 West, gas was encountered in the Torchlight sand at 2,232 feet. Rated as an important oil and gas field. The daily average production of oil in 1930 was 10 barrels from eight wells. Light oil of 44.2° gravity. All producing oil wells on Lot 52, Section 34, Township 56 North, Range 97 West (Allen Oil Company). This area is highly faulted. Two gas wells gauged one hundred million cubic feet per day. Field supplies Lovell and Byron with gas, while the oil production goes to the Midwest Greybull refinery through the lines of the Illinois Pipe Line Co.

Late in 1930, the Ohio Oil Company discovered oil in the Embar sand at 3,887 feet in its No. 1 Easton, SW¼ NW¼ NW¼ Section 33, Township 56 North, Range 97 West. The hole was drilled to a total depth of 4,427 feet and the initial production approximated 2,500 barrels.

In 1931, the productive area of the black oil horizon was extended by the completion of two wells. The Utah Southern Oil Company's No. 3 Government, NE¼ NE¼ SW¼ Section 29, Township 56 North, Range 98 West, was completed in the Madison lime at 4,326 feet and had an initial production of 1,000 barrels of oil and 25,000,000 cubic feet of gas. The Portland Association's well on the SE¼ NE¼ SE¼ Section 29, Township 56 North, Range 97 West, was completed in the Madison lime at 4,304 feet and produced initially 1,800 barrels of oil and 30,000,000 cubic feet of gas.

Field discovered 1906. No production until 1919. Average gravity 42°.

1919	40,785	1923	41,056	1927	21,420	
1920	41,600	1924	20,805	1928	12,525	
1921	50,806	1925	19,489	1929	3,638	
1922	31,279	1926	13,875	1930	29,124	
				1931	20,600	347,002

LaBarge

LOCATION: T. 27 & 28 N., R. 113 & 114 W., Western Wyoming; about 80 miles north of Spring Valley.

SURFACE FORMATION: Adaville.

STRUCTURE: The Darby fault brings the upper Cambrian in contact with Montana shales. East of the fault lies the axis of a low anticline.

REMARKS: Oil is believed to come from sandy layers in the Tertiary.

Eighty-eight producing oil wells were making an average of 1,061 barrels a day on January 1, 1932. The oil is delivered to the railroad at Opal, 35 miles south of the field through a four-inch pipeline, completed in 1928 by the Midwest interests, and from Opal it is shipped by rail to the plant of the Utah Oil Refining Company at Salt Lake.

In 1931, a completion of the Calmonica Petroleum Company on the NE¼ of Section 17, T. 27 N., R. 113 W., extended the productive area of the field three miles north. This well had an initial production of 125 barrels from sand at 2,040 to 2,196 feet, the oil testing 46.4°.

Field discovered 1923. No production until 1924. Average gravity 32°.

1924	830	1928	450,022	
1925	32,117	1929	797,776	
1926	56,442	1930	735,124	
1927	149,820	1931	477,894	2,700,025

Lance Creek

LOCATION: T. 35 & 36 N., R. 65 & 66 W., Niobrara County.

SURFACE FORMATION: The lowest exposed rocks are 1,650 ft. below the top of Pierre.

STRUCTURE: Anticline 18 miles long, situated on the north side of Hartville Uplift. The axis is in the form of a double reverse curve; it pitches to north and east and closes to southeast.

REMARKS: The Wall Creek sands at 2,250 ft. are not generally productive. The principal productive sand is the Newcastle (Muddy) which is found at 3,300 ft. to 4,000 ft. It produces some gas. The first break in the Dakota at places in the field produces gas and some oil at very high gravity. Near the close of 1925 the Ohio Oil Company on the SW¼ Sec. 35-36-65 encountered oil in the second break in the Dakota from 3,630 ft. to 3,638 ft. The well had an initial production of 45 barrels per hour.

The productive area comprises approximately 4,500 acres, being controlled by the Ohio Oil Company, Continental and Associates, Argo Oil Company and Union Oil Company. The Continental Oil Company production goes to the Texas Casper refinery, while the balance goes to the Imperial Refinery at Regina. The Illinois Pipe Line Company serves this field.

The Continental Oil Company in their well on Sec. 32, T. 36, R. 65, found gas production in the Lakota.

This field was closed down in December, 1931.

Discovered 1918. No production until 1919. Average gravity 43.6°.

1919	436,450	1924	763,729	1929	85,273	
1920	349,900	1925	360,457	1930	60,075	
1921	333,165	1926	537,240	1931	94,509	
1922	291,225	1927	264,270			
1923	373,857	1928	200,872			4,151,020

Midway-Geary

LOCATION: T. 34 & 35 N., R. 77, 78 & 79 W., Natrona County.

SURFACE FORMATION: Fox Hills on Midway, Mesa Verde on Geary.

STRUCTURE: Three domes on a general line of folding.

REMARKS: The Inland Oil Company, Sec. 32-34-77, encountered water in the first Wall Creek sand at 4,878 feet. The well was abandoned at 4,897 feet. An attempt to redrill this hole in 1926 was unsuccessful.

A test was drilled on the NW¼ of Sec. 32-34-77 by the Midwest Refining Company, but the well was abandoned in February, 1932, after encountering 5,000 bbls. of water in the Muddy and Dakota sands. The total depth of the well is 6,192 feet.

The Midwest Refining Company drilled a well on the NE¼ Sec. 23-35-79 and in July, 1930 reached the lower Frontier sand at 5,200 ft., with an initial production of 600 bbls. oil and water. The well was later put on the pump,

after a water shut-off, with an estimated production of 400 bbls. oil. A recent test, after cleaning out, shows a production of 200 bbls. per day.

The Mutual Oil Syndicate, drilling on the SW¼ SE¼ Sec. 14-35-79, topped the Second Wall Creek sand at 5,233 ft. in May, 1932. The Wall Creek sands did not prove productive so the hole was carried deeper and found the Mowry sand at 5,926 to 5,932 feet, a saturated sand. Further drilling continued and the Muddy sand was encountered at 6,044. The top of the sand was dry but as 6,048 the core showed saturation and at 6,055 the bit showed black shale. The well is now getting ready to test the showings.

MIDWAY—Discovered 1930. Average gravity 32.5°.

1930	12,854	1931	1,880	14,734

Mule Creek

LOCATION: T. 39 & 40 N., R. 60 & 61 W., 18 miles west of Edgemont, South Dakota; Niobrara County.

SURFACE FORMATION: Muddy sand on western anticline; Carlile on eastern anticline and Niobrara on flank.

STRUCTURE: Two domes called the East Dome and West Dome. They lie on the axis of the Hartville uplift; between Old Woman Creek anticline and the Black Hills.

REMARKS: Oil was discovered in the Lakota sand on East Dome in the year 1919 by the Ohio Oil Company. Initial production of the first wells drilled was approximately 150 barrels per day. Forty-two wells on the East Dome have a total production of 650 barrels per day. Very little oil has been produced from the West Dome. The oil is 31.5 gravity and very low in gasoline content. The productive area comprises approximately 225 acres. Lakota is the producing horizon and is found at approximately 1,350 feet. For the year 1928 the field was operated part-time for six months, producing in that time 122,376 barrels, or a daily average of 335 barrels. This production was sent to the Imperial Refineries at Calgary and Regina. For 1929 a total of 135,410 barrels was produced which went to Midwest Refinery at Greybull. The 1930 production was 23,071 and for 1931 the field was shut in. The Illinois Pipe Line Company serves this field.

The Argo Oil Company has a deep test standing idle on the East Dome, No. 1 Wehopeso, SW¼ NW¼ Sec. 19-39-60.

The West Dome is being tested by the Interstate Oil & Refining Company and Fall River Royalties Company, on NW¼ NE¼ SE¼ Sec. 2-39-61. This well is being drilled to test the Minnelusa formation.

Discovered 1919. No production until 1920. Average gravity 31.5°.

1920	161,725	1925	119,070	1930	23,071	
1921	76,774	1926	0	1931	0	
1922	160,519	1927	186,130			
1923	0	1928	122,377			
1924	179,399	1929	135,410			1,164,475

Osage

LOCATION: T. 46 N., R. 63 and 64 W., Weston County.

SURFACE FORMATION: Graneros shale.

STRUCTURE: In the form of two terraces. Drilling depth is from 100 feet to 300 feet on one terrace and from 1,300 feet to 1,600 feet on the other. Is a westerly dipping monocline on the southwestern flank of the Black Hills uplift. The west and southwest limits of the field are not defined.

REMARKS: The Osage field was discovered in 1920 and at the end of the year 1931, a total of 180 wells had been drilled. The production is found in the Newcastle (Muddy) sand. Tests to the Dakota and other Cloverly formations have resulted in failures, all sands in this formation carrying water. Several small gas wells have been completed, but only of sufficient volume to supply small towns nearby and to operate leases and small refineries. The Illinois Pipe Line Company is connected to this field and handles the crude going to the Imperial Refineries at Calgary and Regina and the Midwest Greybull refinery. Other production has been shipped to Montana and the balance goes to small local refineries.

The west extension, discovered in 1931 centers around Section 15, T. 46 N., R. 64 W. and embraces a total of 1,200 acres. The discovery well, drilled by the Chadron-Osage Oil Company in the NE¼ NE¼ SW¼

of Sec. 14, T. 46 N., R. 64 W., had an initial production of 500 barrels in the Newcastle sand at 1,801 to 1,816 feet.

A well drilled by the Riggs Oil Company on SE¼ NE¼ Sec. 16, T. 46 N., R. 64 W., found production in the Newcastle sand at 3,200 feet, which extends the proved area of this field by approximately two miles.

In April, 1931, the Osage field operators made contracts for the delivery and sale of oil to refiners in Montana. This outlet enabled these producers to obtain a price of $1.00 per barrel for their oil, when all the other fields in the State were receiving only a very small amount.

Field discovered 1920. Average gravity 41.6°.

1920	10,065	1924	135,877	1928	149,846	
1921	167,526	1925	124,943	1929	238,602	
1922	141,707	1926	124,943	1930	454,773	
1923	122,161	1927	121,419	1931	353,228	2,162,571

Pilot Butte

LOCATION: T. 3 N., R. 1 W., of the Wind River Meridian, Fremont County.

SURFACE FORMATION: Pierre.

STRUCTURE: Dome four miles long and two miles wide with 600 feet of closure lying on both sides of Wind River. Field is faulted. About 2,560 acres within closure.

REMARKS: The Pilot Butte field was discovered in 1916. The producing sand is in the base of the Pierre about 2,000 feet above the Wall Creek. The field is on the Shoshone Indian Reservation and land is leased directly from the Indians through the agent at Fort Washakie.

Twenty-seven wells, producing from an average of 1,000 feet, make 30 barrels of oil per day. The gravity of the oil is 37.2 degrees. A three-inch pipeline, 29.3 miles long and belonging to the Illinois Pipe Line Company delivers Pilot Butte oil to a loading rack at Riverton, where it is shipped by rail to the Midwest Refining Company's plant at Casper. The Illinois Pipe Line Company has filed a petition with the Wyoming Public Service Commission for permission to abandon this line. The field is controlled by the Argo Oil Company.

Nelson, et al., in a deep test on SW¼ SE¼ NW¼ Section 27-3-1, encountered oil in a stray sand at 2,080 feet. On test, the well pumped 50 barrels in three hours.

The Kinney-Coastal Oil Company's deep test, SE¼ SW¼ Sec. 22-3-1, developed 63 million cubic feet of gas in the Muddy sand at 3,362 feet and was then drilled 135 feet into the Nugget sand to a total depth of 4,635 feet before plugging back to complete as a gas well.

The gas area was extended in 1931 by the Kinney-Coastal Oil Company's No. 1 Chatterton-Weeks, C. SW¼ NE¼ of Section 22-3-1, which had an initial production of two million cubic feet of gas in the Muddy sand at 3,465 to 3,631 feet.

Discovered in 1916. No production until 1918. Average gravity 37.2°.

1918	55,394	1923	36,876	1928	17,724	
1919	124,589	1924	23,667	1929	11,671	
1920	51,240	1925	24,399	1930	12,334	
1921	50,405	1926	26,507	1931	14,617	
1922	39,147	1927	17,240			
						495,720

GOVERNORS OF WYOMING—TERMS OF OFFICE

Territorial—Appointed by President of the United States
(Admitted a Territory July 25, 1868)

Republican	John A. Campbell	Apr. 15, 1869	Feb. 10, 1875
"	John M. Thayer	Feb. 10, 1875	Apr. 10, 1878
"	John W. Hoyt	Apr. 10, 1878	Aug. 3, 1882
"	Wm. Hale (Died in office)	Aug. 3, 1882	Jan. 13, 1885
"	Francis E. Warren	Feb. 27, 1885	Nov. 6, 1886
Democrat	Geo. W. Baxter	Nov. 6, 1886	Dec. 20, 1886
"	Thomas Moonlight	Dec. 20, 1886	Mch. 27, 1889
Republican	Francis E. Warren	Mch. 27, 1889	Oct. 11, 1890

Statehood (July 10, 1890)

Republican	Francis E. Warren	Oct. 11, 1890	Nov. 24, 1890
Acting	Amos W. Barber	Nov. 24, 1890	Jan. 2, 1893
Democrat	John E. Osborne	Jan. 2, 1893	Jan. 7, 1895
Republican	W. A. Richards	Jan. 7, 1895	Jan. 2, 1899
"	DeForest Richards (died)	Jan. 2, 1899	Apr. 28, 1903
Acting	Fenimore Chatterton	Apr. 28, 1903	Jan. 2, 1905
Republican	Bryant B. Brooks	Jan. 2, 1905	Jan. 2, 1911
"	Joseph M. Carey	Jan. 2, 1911	Jan. 4, 1915
Democrat	John B. Kendrick	Jan. 4, 1915	Feb. 26, 1917
Acting R.	Frank L. Houx	Feb. 26, 1917	Jan. 6, 1919
Republican	Robert D. Carey	Jan. 6, 1919	Jan. 1, 1923
Democrat	Wm. B. Ross (died in office)	Jan. 1, 1923	Oct. 2, 1924
Acting R.	Frank E. Lucas	Oct. 2, 1924	Jan. 5, 1925
Democrat	Nellie Tayloe Ross	Jan. 5, 1925	Jan. 3, 1927
Republican	Frank C. Emerson (died)	Jan. 3, 1927	Feb. 18, 1931
Acting R.	A. M. Clark	Feb. 18, 1931	Jan. 2, 1933

REFINERIES IN WYOMING
(Revised to September 1, 1932)

Operator	Location	Daily Crude Capacity 42 Gal. Bbls.	Type of Plant	Daily Cracking Capacity 42 Gal. Bbls.	Type of Cracking Plant	Status
Four C Syndicate	Big Muddy	50	Skimming			Operating
Ohio Oil Company	Big Muddy	10	Skimming			Operating
Eugene Jones	Byron	No data	Skimming			Operating
The Midwest Refining Co.	Casper	50,000	Skimming & lubricants			Operating
Standard Oil Co. (Indiana)	Casper		Cracking	30,000	Burton	Operating
The Texas Company	Casper	7,000	Skimming & Cracking	9,400	Holmes-Manley	Operating
White Eagle Oil Corporation	Casper	5,000	Skimming & Cracking	5,000	Holmes-Manley Jenkins White Eagle	Operating
G. F. Bock & Sons	Clay Spur	93	Skimming			Operating
The Texas Company	Cody	3,000	Black Oil	1,500	Holmes-Manley	Operating
Farmers Station	Cowley	No data	Skimming			Operating
Dote Ketchum	Deaver	No data	Skimming			Operating
J. B. Miner	Elk Basin	No data	Skimming			Operating
William Wamhoff	Emden	No data	Skimming			Operating
Gillette Refinery	Gillette	200	Skimming			Operating
Continental Oil Co.	Glenrock	10,000	Skimming & Cracking	3,600	Burton	Operating
Standard Oil Co. (Indiana)	Glenrock		Cracking	3,508	Burton	Operating
Connely-Wyomont Pro. & Ref'g. Co.	Glenrock	125	Skimming			Operating
Ohio Oil Company	Grass Creek	1,000	Skimming			Operating
Greybull Oil & Refining Co.	Greybull	No data	Skimming			Building
The Midwest Refining Co.	Greybull	13,000	Skimming			Operating
Standard Oil Co. (Indiana)	Greybull			4,680	Burton	Operating
Mountain Refining Co.	Kemmerer	No data	Skimming			Operating
California Petroleum Corporation	La Barge	No data	Skimming			Operating
Calmonica Oil Co.	La Barge	50	Skimming			Operating
Orena Oil Refining Co.	La Barge	50	Skimming			Operating
Argo Oil Company	Lance Creek	No data	Skimming			Operating
The Midwest Refining Co.	Laramie	5,000	Skimming			To be abandoned
Standard Oil Co. (Indiana)	Laramie		Cracking	3,100	Burton	To be abandoned

REFINERIES IN WYOMING
(Revised to September 1, 1932)

Operator	Location	Daily Crude Capacity 42 Gal. Bbls.	Type of Plant	Daily Cracking Capacity 42 Gal. Bbls.	Type of Cracking Plant	Status
A. J. Whiteman	Le Roy	No data	Skimming			Operating
The Lovell Refinery	Lovell	600	Skimming			Shut down
Lusk Oil & Refining Co.	Lusk	No data	Skimming			Shut down
Ohio Oil Company	Mc Fadden	10	Skimming			Operating
Pierce Producing & Refining Co.	Moorcroft	20	Skimming			Rebuilding
Consumers Oil & Refining Co.	Newcastle	No data	Skimming			Operating
Eclipse Oil & Refining Co.	Newcastle	No data	Skimming			Operating
C. H. Hansen Refinery	Newcastle	No data	Skimming			Operating
Egaso Operating Company	Osage	1,000	Skimming & Cracking	1,000		Opr. part time
B. H. Higgins	Osage	No data	Skimming			Operating
Holden & Lawrence	Osage	No data	Skimming			Operating
Kelso Oil Company	Osage	No data	Skimming			No data
Northwestern Petroleum Co.	Osage	300	Skimming			Operating
Osage Trust	Osage	No data	Skimming			Operating
Star Refining Co.	Osage	25	Skimming			Operating
Wyo Gas & Oil Co.	Osage	100	Skimming			Operating
Yellowstone Oil Co.	Osage	No data	Skimming			Operating
Producers & Refiners Corp.	Parco	8,000	Skimming & Cracking	4,000	Dubbs	Operating
Hole's Pedro Refinery	Pedro	500	Skimming			Operating
Orr & Royal	Powell	No data	Skimming			Operating
Midland Oil & Refining Co.	Riverton	2,000	Skimming			Shut down
Mosher Oil Company	Salt Creek	No data	Skimming			Operating
E. J. Treglown	Salt Creek	No data	Skimming			Operating
Connell Exploration Oil Co.	Spring Valley	No data	Skimming			Operating
No data	Thermopolis	No data	No data			Building
Goshen Oil & Refining Co.	Torrington	No data	Skimming			Operating
Interstate Oil & Refining Co.	West Mule Creek	50	Skimming			Operating
Wyoming Oil Product Company	Green River	40 tons	Shale Oils			Shut down

NATURAL GASOLINE PLANTS IN WYOMING
(Revised to September 1, 1932)

Operator	Location	Type of Plant	Daily Capacity Gallons
Producers & Refiners Corp.	Bairoil	Absorption	7,000
*Midwest Refining Co.	Elk Basin	Compression	10,000
Ohio Oil Company	Grass Creek	Compression	6,000
Ohio Oil Company	Lance Creek	Absorption	4,900
Ohio Oil Company	Rock Creek	Absorption	4,000
Midwest Refining Co.	Salt Creek	Compression	100,000
Ohio Oil Company	Salt Creek	Absorption	12,000
Continental Oil Co.	Salt Creek	Absorption	14,500
New York Oil Co.	Sand Draw	Absorption	1,500
**New York Oil Co.	Teapot Dome	Compression	2,000

*Used only in connection with gas drive in field.
**Abandoned since last report.

CARBON BLACK PLANTS IN WYOMING
(Revised to September 1, 1932)

Operator	Location	Daily Capacity Cubic Feet	Average Recovery per M. Cubic Feet
J. M. Huber Company of Louisiana, Inc.	Lance Creek	12,000,000	1.8 lbs.

OIL PIPE LINES IN WYOMING
(Revised to September 1, 1932)

Company	Address	Miles	Size	From	To
Atlantic-Pacific Oil Company of Wyoming	Lander, Wyo.	5.00	4″	Derby Dome	Dallas Field
		11.00	6″	Dallas Field	Wyopo
Bolton Oil Company	Denver, Colo.	32.00	6″	Bolton Creek	Casper
Continental Oil Company	Denver, Colo.	6.00	6″	Big Muddy Field	Glenrock
Egaso Operating Co.	Osage	3.00	2″	Osage Field	Osage
Egaso Operating Co.	Osage	6.25	3″	Osage Field	Osage
Egaso Operating Co.	Osage	4.50	4″	Osage Field	Osage
Fargo-Western Oil Co.	Casper	22.50	6″	So. Casper Creek	Casper
Frannie Oil Co.	Lewistown, Mont.	1.48	3″	Frannie Field	Frannie
Illinois Pipe Line Co.	Casper, Wyo.	41.76	3″	Bryon	Greybull
Illinois Pipe Line Co.	Casper, Wyo.	63.39	6″	Elk Basin	Greybull
Illinois Pipe Line Co.	Casper, Wyo.	(49.71	8″	Grass Creek	Greybull
		(29.10	6″		
		13.90	6″	Hamilton Dome	Grass Creek-Greybull Line Junction
Illinois Pipe Line Co.	Casper, Wyo.	15.41	8″	Oregon Basin	Cody
Illinois Pipe Line Co.	Casper, Wyo.	29.10	3″	Pilot Butte	Riverton
*Illinois Pipe Line Co.	Casper, Wyo.	30.46	8″	Salt Creek	Illco
*Illinois Pipe Line Co.	Casper, Wyo.	14.14	8″	Illco	Casper
Illinois Pipe Line Co.	Casper, Wyo.	25.20	6″	Lance Creek	Lusk
Illinois Pipe Line Co.	Casper, Wyo.	14.00	3″	Mule Creek	Dakoming
Illinois Pipe Line Co.	Casper, Wyo.	8.09	3″	Osage Field	Clay Spur
Illinois Pipe Line Co.	Casper, Wyo.	4.43	3″	Dutton Creek	Rock Creek-Laramie Line Junction
Illinois Pipe Line Co.	Casper, Wyo.	38.11	6″	Rock Creek	Laramie
Illinois Pipe Line Co.	Casper, Wyo.	7.57	6″	Rock Creek	Rock River
Illinois Pipe Line Co.	Casper, Wyo.	1.87	6″	Rex Lake	Hatton
Midwest Refining Co.	Casper, Wyo.	(44.50	6″ Water	Casper	Salt Creek
		(10.15	6″ Lines		
Midwest Refining Co.	Casper, Wyo.	38.00	4″	LaBarge	Opal
*Midwest Refining Co.	Casper, Wyo.	7.50	2″	Notches	Lox
Midwest Refining Co.	Casper, Wyo.	(25.80	8″	Salt Creek	Casper
		(16.60 db.	6″		

OIL PIPE LINES IN WYOMING—Continued
(Revised to September 1, 1932)

Company	Address	Miles	Size	From	To
Midwest Refining Co.	Casper, Wyo.	(25.80	8″	Salt Creek	Casper
		(16.60 db.	6″		
Midwest Refining Co.	Casper, Wyo.	(29.80	8″	Salt Creek	Casper
		(14.28 db.	6″		
Midwest Refining Co.	Casper, Wyo.	11.00	3″	Torchlight	Greybull
New York Oil Company (Central Pipe Line Co.)	Casper, Wyo.	10.40	8″	Casper	Texas and White Eagle Refineries
Northwestern Petroleum Company	Osage, Wyo.	1.50	2″	Osage Field	Osage
Ohio Oil Co.	Casper, Wyo.	7.73	3″	Bryon	Cowley
Producers and Refiners Corporation	Parco, Wyo.	6.00	4″	Ft. Steele	Prairie Storage
Producers and Refiners Corporation	Parco, Wyo.	(99.76	6″	Salt Creek	Parco
		(37.72	8″		
Producers and Refiners Corporation	Parco, Wyo.	6.25	6″	Casper	White Eagle Refinery
Producers and Refiners Corporation	Parco, Wyo.	10.00	3″	Simpson Ridge	Hanna
Producers and Refiners Corporation	Parco, Wyo.	19.62	6″	Lost Soldier	Ferris
Shaffer, C. B.	Thermopolis, Wyo.	9.00	6″	Warm Springs	Thermopolis
†Sinclair Pipe Line Co.	Casper, Wyo.	(90.26	12″	Teapot Dome	Nebraska-Wyoming State Line
		(37.58	10″		
		(34.97	8″		

*Abandoned since last report.
†Abandoned from Clayton to Nebraska-Wyoming Line.

GAS PIPE LINES IN WYOMING
(Revised to September 1, 1932)

Field	Market	Company	Use	Miles	Size	Total Mileage
Baxter Basin and Hiawatha	Salt Lake City, Utah	Western Pub. Service Corp. (The Ohio Oil Co.)	Domestic and Industrial	16.00 33.00 40.00 95.00	8" 10" 14" 16"	
Baxter Basin	Rock Springs, Wyo.	New York Oil Co. (Northern Utilities Co.)	(Complete System) Domestic	122.00 15.00	18" 6"	306.00 15.00
Billy Creek	Buffalo-Sheridan	Minn. Northern Power Co.	Domestic and Industrial	49.26	8"	49.26
Boone Dome	Casper	New York Oil Co. (Northern Utilities Co.)	Branch of Sand Draw-Casper Line	16.50	6" & 8"	16.50
Bryon	Bryon	Byron Gas Company	Domestic	1.50	2"	1.50
Bryon	Lovell	Rocky Mountain Gas Co. (The Ohio Oil Co.)	Domestic and Industrial (Sugar Factory)	8.00	6⅝"	8.00
Bryon (Branch Lovell Line)	Cowley	Rocky Mountain Gas Co. (The Ohio Oil Co.)	Domestic	6.00	2"	6.00
Bryon	Powell	Rocky Mountain Gas Co. (The Ohio Oil Co.)	Domestic	5.80 5.35	4" 6"	11.15
Eight Mile Lake Dome	Parco	Producers and Refiners Corp.	Domestic and Refinery	14.40	6"	14.40
Elk Basin	Billings, Montana	Gallatin Gas Company (The Ohio Oil Co.)	Domestic and Industrial (Complete System)	37.50 29.10	8" 10"	66.60
Golden Eagle	Thermopolis, Wyo.	Mountain States Power Co.	Domestic	20.00	6"	20.00
Hidden Dome	Basin and Greybull	Midwest-Wyoming Gas Co.	Domestic	34.30	8"	34.30
Little Buffalo Basin	Greybull	Big Horn Gas Co.	Standard-Midwest Refineries	.64 13.56 59.75	10" 12" 14"	73.95
Little Buffalo Basin (Branch of Greybull Line)	Grass Creek	Big Horn Gas Co.	Field Operations	2.26	3"	2.26
Little Buffalo Basin (Branch of Greybull Line)	Worland	Big Horn Gas Co.	Domestic and Industrial	11.10	8"	11.10
Little Dome	Golden Eagle Field	Mountain States Power Co.	For Thermopolis Line	13.80	4"	13.80
Mahoney-Wertz-Ferris	Casper	Producers and Refiners Corp. and Midwest Refining Co.	Standard-Midwest Refineries	17.90 23.20 48.60	10"db. 12" 14"	89.70
Mahoney	Parco	Prairie Oil and Gas Co.	P. and R. Refinery	32.60	8" & 10"	32.60
Mahoney	Rawlins	Rocky Mountain Gas Co. (The Ohio Oil Co.)	Domestic	24.31 3.87	6" 8"	28.18
*Mahoney (Branch Mahoney-Rawlins)	Parco	Producers and Refiners Corp.	P. and R. Refinery	7.60	8"	7.60

GAS PIPE LINES IN WYOMING—Continued
(Revised to September 1, 1932)

Field	Market	Company	Use	Miles	Size	Total Mileage
Oregon Basin	Cody	Rocky Mountain Gas Co. (The Ohio Oil Co.)	Domestic and Industrial	12.80	4"	12.80
*Salt Creek	Casper	Midwest Refining Co.	Refineries	41.30	10"	41.30
Sand Draw	Casper	New York Oil Co. (Northern Utilities Co.)	Domestic and Industrial	43.65 52.75	10" 12"	96.40
Sand Draw (Muskrat connection)	Casper	New York Oil Co. (Northern Utilities Co.)	Domestic and Industrial	2.00	4"	2.00
Sand Draw-Casper Line extension	Glenrock	New York Oil Co. (Northern Utilities Co.)	Domestic and Refineries	19.90	10"	19.90
Sand Draw-Casper Line extension	Douglas-Guernsey	New York Oil Co.	Domestic and Industrial	37.58	10"	
(Old Sinclair Oil Line)	Torrington-Nebraska Points	(North Central Gas Co.)		34.97	8"	72.55
Sand Draw	Riverton and Lander	New York Oil Co. (Northern Utilities Co.)	Domestic	10.00 35.80	4" 6"	45.80
†Teapot	Casper	Central Pipe Line Co. (New York Oil Co.)	Domestic and Industrial	35.40	6" & 8"	35.40
Colorado-Wyo. State Line (Amarillo-Denver extens'n)	Cheyenne	Colorado-Wyoming Gas Co.	Domestic and Industrial	10.40	6"	10.40
Cheyenne Extension	Ft. F. E. Warren	Colorado-Wyoming Gas Co.	Domestic	2.34	4"	2.34

*Idle.
†10.40 miles of this line carrying oil from Tank Farm near Casper to Texas and White Eagle Refineries at Evansville; balance of line idle.

GASOLINE PIPE LINES IN WYOMING

(Revised to September 1, 1932)

Field	Destination	Operator	Transports	Size	Miles
*Elk Basin	Frannie	Midwest Refining Company	Natural Gasoline	2"	11.85
Grass Creek	Chatham	The Ohio Oil Company	Natural Gasoline	3"	28.00
Lance Creek	Manville	The Ohio Oil Company	Natural Gasoline	2"	19.48
Rock Creek	Rock River	The Ohio Oil Company	Natural Gasoline	2"	10.50
*Salt Creek	Casper	Midwest Refining Company	Naptha	3"	39.45
Salt Creek	Casper	Midwest Refining Company	Natural Gasoline	4"	39.75
Salt Creek	Midwest Gas Plant	The Ohio Oil Company	Natural Gasoline	3"	3.00
*Salt Creek	Midwest Gas Plant	Continental Oil Company	Natural Gasoline	2"	3.00
Salt Creek	Salt Creek (Town)	Continental Oil Company	Natural Gasoline	2"	3.75

*Idle.

PRODUCTION OF CRUDE OIL IN WYOMING

(In barrels of 42 U. S. Standard Gallons)

FIELD	Year of Discovery	Kind of Oil	1883 1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	Accumulated Production
Alkali Butte	1927	Light																		7,720		2,058	863	10,641
Ant Hills	1927	Black																		9,350	592	Shut In	Shut In	9,942
Badger Basin	1931	Light																					10,016	10,016
Baxter Basin	1924	Black														3,008								3,008
Big Muddy	1915	Light						30,639	551,293	3,038,984	3,219,258	2,097,013	1,925,703	1,493,131	1,406,625	1,326,760	1,207,601	1,159,591	1,076,553	978,413	805,631	708,486	647,800	21,673,481
Black Mountain	1928	Black																		516	2,808	Shut In	Shut In	3,324
Bolton Creek	1920	Black										20,000	Shut In	Shut In	2,790	3,320	18,282	Shut In	Shut In	2,694	Shut In	Shut In	Shut In	47,086
Byron	1906	Light								6,522	17,584	42,174	52,053	47,577	33,679	20,997	19,810	14,131	19,555	12,787	12,638	11,894	8,610	320,011
Cody Structure	1927	Black																		1,613	1,097	7,470	448	10,628
Dallas-Derby	1883	Black	(1883 to 1913)		150,000	27,395	27,660	Shut In	Shut In	Shut In	Shut In	109,500	126,276	131,237	51,774	43,039	54,193	43,571	58,950	86,518	72,735	123,494	219,153	1,325,495
Dry Piney	1928	Light																		484				484
Dutton Creek	1927	Light																	7,390	13,851	11,945	21,457	28,625	83,268
Elk Basin	1915	Light						720,988	1,530,264	1,066,836	829,113	829,380	755,398	697,469	652,055	448,072	339,140	301,510	370,986	386,056	284,138	259,883	229,862	9,701,150
Ferris-G. P. Dome	1918	Light									4,465	12,743	18,702	15,975	58,729	33,628	27,028	24,097	22,123	21,002	14,215	13,490	10,004	276,201
Four Bear	1928	Black																			2,606	1,530	Shut In	4,136
Frannie	1927	Black																		25,451	49,697	120,934	253,006	449,088
Garland	1929	Light																				29,855	18,997	48,852
Grass Creek	1914	Light					84,265	1,369,307	2,756,402	2,948,251**	2,038,793	1,500,098	1,465,356	1,768,922	1,574,593	1,088,415	1,221,501	1,015,726	966,373	858,860	772,849	727,817	741,174	22,898,702
		Black										(Black Oil) 18,687	10,051 24,138	32,074 15,519	172,478 13,885	283,402 10,602	281,723 9,225	Shut In 7,220	Shut In 6,313	Shut In 4,220	Shut In 3,015	Shut In 2,988	Shut In 4,267	780,523 240,933
Greybull	1907	Light					5,776	55,765	19,281	18,844	21,188	75,359	53,164	105,712	199,067	248,101	261,055	290,442	323,160	295,059	329,479	250,910	90,106	2,527,769
Hamilton Dome	1913	Black		Shut In		Shut In	Shut In	Shut In	Shut In	230	5,925	44,589	57,477	41,053	65,798	43,034	51,558	63,100	113,130	104,700	104,907	103,126	132,142	1,154,460
Hudson (Lander)	1914	Black				825	5,027	62,564	49,797	48,154	63,479								8,944			Shut In	1,660	10,604
Iron Creek	1926	Black														1,129	32,117	77,339	338,322	501,995	807,017	744,715	460,214	2,962,848
La Barge	1924	Light																7,222	1,962					9,184
Lake Creek	1926	Black																						
Lance Creek	1918	Light									456,457	349,086	347,562	290,737	356,764	736,725	384,160	537,248	236,623	200,877	85,276	59,596	93,937	4,135,048
Lost Soldier	1915	Light						870	2,683	100,410	174,435	206,916	290,557	674,999	1,600,780	1,678,828	1,848,909	1,900,633	1,326,030	1,416,646	1,261,516	1,224,334	1,318,491	15,027,037
Mahoney Dome	1929	Light																		191		1,706	1,474	3,371
Maverick Springs	1926	Black																885	85	2,298		Shut In	Shut In	3,268
Mule Creek	1919	Light										162,355	72,124	161,962	Shut In	179,398	122,540	Shut In	186,132	141,287	135,410	23,171	Shut In	1,184,379
North Casper Creek	1929	Black																				1,264	7,700	8,964
Notches	1923	Black													48,092	23,828	39,656	33,605	24,110	Shut In	Shut In	Shut In	Shut In	169,291
Oregon Basin	1927	Black																	4,175	829,467	1,511,381	1,247,579	392,838	3,985,440
Osage	1920	Light										10,329	320,632	232,058	207,433	183,000	142,424	124,943	116,937	147,422	232,518	335,504	351,778	2,404,978
Pedro	1926	Black																68	50		350	249		717
Pilot Butte	1916	Light								49,057	120,985	66,072	46,852	37,278	26,792	23,667	21,292	18,815	17,238	15,988	11,671	15,622	13,338	484,667
Pine Mountain	1920	Black										7												7
Poison Spider	1920	Black										Shut In	Shut In	Shut In	Shut In	37,030	47,512	2,945	22,805	38,247	80,983	84,775	73,153	387,450
Powder River	1925	Black															95							95
Rex Lake	1923	Light														33,344	12,544	53,967	43,546	17,676	36,125	5,580	Shut In	202,782
Rock Creek	1918	Light									243,548	1,363,635	1,680,382	1,682,167	1,422,050	1,166,504	1,072,363	1,020,296	979,118	935,475	845,708	769,910	675,883	13,857,039
Salt Creek	1908	Light	51,798	1,157,899	2,254,946	3,379,329	3,936,328	4,000,433	3,840,502	5,512,992	6,208,716	10,255,410	12,378,689	19,261,117	35,301,608	30,831,703	21,590,607	17,974,624	14,352,792	14,041,030	11,312,094	10,505,886	8,834,346	236,982,850
Shannon	1889	Light					55,441	Abandoned																55,441
Shoshone Anticline	1927	Black																		1,399	1,408	422	218	3,447
Simpson Ridge	1924	Black															30,600	57,560	32,205	32,779	34,944	16,990	4,994	210,072
South Casper Creek	1922	Black													62,549	169,654	179,606	253,122	197,160	332,577	326,109	180,191	120,223	1,821,191
South Sunshine	1926	Black																	5,123	2,849	Shut In	Shut In	Shut In	7,972
Sunshine	1927	Black																		3,015	Shut In	Shut In	Shut In	3,015
Spring Valley	1903	Light	(1903 to 1913)		50,000	14,477	6,038	6,234	4,234	Shut In	926	2,053	2,788	1,147	1,215	2,289	2,191	2,427	1,754	910	810	695		100,188
Teapot Dome	1922	Light												37,243	1,136,948	1,003,757	632,702	425,685	313,892			Shut In	Shut In	3,550,227
Teapot (Outside)	1927	Light															608	654	4,683	6,728	12,841	9,150	7,220	41,884
Torchlight	1915	Light					13,402	74,682	18,619	8,497	5,612	3,783	3,004	1,560	Shut In	Shut In	Shut In	Shut In	500	1,452	2,130	1,051	783	135,075
Warm Springs	1917	Black									89,409	Shut In	36,034	45,000	Shut In	Shut In	Shut In	Shut In	Shut In	5,500	13,891	30,470	4,809	225,113
West Mule Creek	1928	Light																		382		2,399	6,478	9,259
Total Production by years			51,798	1,157,899	2,454,946	3,422,026	4,133,937	6,321,482	8,773,075	12,798,778	13,499,893	17,169,189	19,666,942	26,773,937	44,395,704	39,623,234	29,651,042	25,411,426	21,178,719	21,485, 84	19,180,534	17,647,446	14,764,610	349,562,101

GROSS PRODUCTION OF CRUDE OIL ON STATE LAND, BY FIELDS

(In barrels of 42 U. S. Standard Gallons)

FIELD	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921
Baxter Basin											
Big Muddy						15,324.38	389,506.00	1,767,722.42	1,480,538.47	998,802.88	987,165.42
Black Mountain											
Elk Basin							341.80	6,754.28	10,546.72	7,275.15	6,011.73
Ferris									1,473.70	14,342.15	33,190.82
Four Bear											
Grass Creek					45,766.75	452,941.78	1,045,737.00	1,003,506.67	678,484.06	518,329.44	697,097.41
Lance Creek								540.00	249,488.83	49,713.92	266.05
Oregon Basin											
Osage										2,732.59	8,353.80
Pine Mountain										7.00	
Rock Creek									79,782.94	378,126.76	525,412.62
Salt Creek (36-40-79)	973.00	438,304.00	511,933.00	483,638.00	497,368.00	435,724.00	647,845.00	781,611.61	654,062.89	1,348,413.13	1,917,483.88
Salt Creek (16-40-79) (16-39-78)				2,694.00	3,632.50	2,245.00	1,576.00	2,061.97	12,778.50	40,880.89	57,827.05
Warm Springs								31,418.70	46,658.35	16,508.41	14,099.04
Totals	973.00	438,304.00	511,933.00	486,332.00	546,767.25	906,235.16	2,085,005.80	3,593,615.65	3,213,814.46	3,375,132.32	4,246,907.82

Production figures submitted to Commissioner of Public Lands upon which royalty settlements were made.

GROSS PRODUCTION OF CRUDE OIL ON STATE LAND, BY FIELDS
(In barrels of 42 U. S. Standard Gallons)

FIELD	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	Total 1911-1931
Baxter Basin			3,008.00								3,008.00
Big Muddy	669,678.41	624,737.82	524,579.36	452,390.47	464,083.86	494,408.54	474,161.47	385,958.41	341,848.72	313,888.31	10,384,794.94
Black Mtn.			3,217.39	10,131.53	11,220.72	5,349.48	432.00	648.50			30,999.62
Elk Basin	5,521.85	4,646.45	5,221.74	5,449.68	5,727.43	4,158.05	3,853.54	3,754.50	3,767.84	3,807.24	76,838.00
Ferris	14,239.64	15,086.29	12,505.17	14,299.89	9,189.05	6,718.36	3,406.73	1,076.32	1,901.38	724.69	128,154.19
Four Bear								2,606.00	1,530.00		4,136.00
Grass Creek	835,728.55	552,072.12	371,029.57	444,833.42	345,022.26	287,442.59	267,969.23	245,394.14	241,988.55	257,673.69	8,291,017.23
Lance Creek											300,008.80
N. Casper Creek									1,264.38	6,000.00	7,264.38
Oregon Bsn.							32,778.71	34,944.32	51,889.49		119,612.52
Osage	9,019.97	16,669.49	10,839.10	11,261.16	11,645.32	11,724.07	9,817.73	15,695.79	125,922.76	128,674.00	362,355.78
Pedro									305.00	789.00	1,094.00
Pine Mtn.											7.00
Rock Creek	331,509.44	258,163.95	213,013.68	177,277.51	133,849.11	123,658.30	103,678.07	99,373.06	94,768.84	86,394.92	2,605,009.20
Salt Creek (36-40-79)	1,643,936.04	1,960,916.28	2,307,101.43	1,012,444.25	734,040.40	441,670.92	447,805.14	386,781.52	362,980.95	272,181.14	17,287,214.58
Salt Creek (16-40-79) (16-39-78)	61,099.86	57,716.62	42,157.37	25,202.61	15,213.46	11,849.49	11,308.21	9,087.08	7,963.40	7,791.42	373,085.43
Warm Spgs.	9,689.46	2,466.34				1,197.74					122,038.04
W. Mule Cr.									2,178.00	3,126.00	5,304.00
Totals	3,580,423.22	3,492,475.36	3,492,672.81	2,153,290.52	1,729,991.61	1,388,177.54	1,355,210.83	1,185,319.64	1,238,309.31	1,081,050.41	40,101,941.71

Production figures submitted to Commissioner of Public Lands upon which royalty settlements were made.

OIL PRODUCED IN WYOMING DURING YEAR 1930, BY FIELDS
(In barrels of 42 U. S. Standard Gallons)

FIELD	COUNTY	Production on State Land		Production on Pat'd Land		Production on Gov't Land		Gross Production
		Black Oil	Light Oil	Black Oil	Light Oil	Black Oil	Light Oil	
Alkali Butte	Fremont						2,058.29	2,058.29
Big Muddy	Converse		327,951.29		330,668.96		49,865.28	708,485.53
Byron	Big Horn				11,894.28			11,894.28
Cody Structure	Park			7,470.38				7,470.38
Dallas-Derby Dome	Fremont			89,996.00		33,498.00		123,494.00
Dutton Creek	Carbon				21,457.04			21,457.04
Elk Basin	Park		3,767.84		215,838.12		40,276.70	259,882.66
Ferris-G. P. Dome	Carbon		1,901.38		11,588.43			13,489.81
Four Bear	Park	1,530.00						1,530.00
Frannie	Park			25,566.77		95,367.63		120,934.40
Garland	Big Horn				29,854.63			29,854.63
Grass Creek	Hot Springs		241,988.55	795.12	419,431.51		66,397.11	728,612.29
Greybull	Big Horn				2,988.48			2,988.48
Hamilton Dome	Hot Springs					250,909.94		250,909.94
Hudson	Fremont					92,028.34		92,028.34
La Barge	Lincoln						385,697.20	
	Sublette						359,017.46	744,714.66
Lance Creek	Niobrara				26,177.11		33,419.22	59,596.33
Lander	Fremont			8,208.31		2,889.45		11,097.76
Lost Soldier	Sweetwater				1,108,741.98		115,592.12	1,224,334.10
Mahoney Dome	Carbon						1,705.86	1,705.86
Mule Creek	Niobrara				23,170.95			23,170.95
North Casper Creek	Natrona	1,264.38						1,264.38
Oregon Basin	Park	16,945.17				1,230,633.74		1,247,578.91
Osage	Weston		125,428.40		187,337.24		22,738.32	335,503.96
Pedro	Weston	124.00		125.00				249.00
Pilot Butte	Fremont						15,622.18	15,622.18
Poison Spider	Natrona					84,775.25		84,775.25
Rex Lake	Albany				4,329.49		1,250.18	5,579.67
Rock Creek	Carbon		94,768.84		536,658.12		138,483.05	769,910.01
Salt Creek	Natrona		370,944.35		697,955.09		9,436,986.55	10,505,885.99
Shoshoni Anticline	Park				421.98			421.98
Simpson Ridge	Carbon			16,989.54				16,989.54
South Casper Creek	Natrona					180,191.04		180,191.04
Spring Valley	Uinta						695.00	695.00
Teapot (Outside)	Natrona						9,150.14	9,150.14
Torchlight	Big Horn				1,051.02			1,051.02
Warm Springs	Hot Springs			30,469.63				30,469.63
West Mule Creek	Niobrara		2,178.00				221.00	2,399.00
Totals		19,863.55	1,168,928.65	179,620.75	3,629,564.43	1,970,293.39	10,679,175.66	17,647,446.43

OIL PRODUCED IN WYOMING DURING YEAR 1930, BY COUNTIES
(In barrels of 42 U. S. Standard Gallons)

COUNTY	FIELD	Production on State Land		Production on Pat'd Land		Production on Gov't Land		Gross Production
		Black Oil	Light Oil	Black Oil	Light Oil	Black Oil	Light Oil	
Albany	Rex Lake				4,329.49		1,250.18	5,579.67
Big Horn	Byron				11,894.28			
	Garland				29,854.63			
	Greybull				2,988.48			
	Torchlight				1,051.02			45,788.41
Carbon	Dutton Creek				21,457.04			
	Ferris-G. P. Dome		1,901.38		11,588.43			
	Mahoney Dome						1,705.86	
	Rock Creek		94,768.84		536,658.12		138,483.05	
	Simpson Ridge			16,989.54				823,552.26
Converse	Big Muddy		327,951.29		330,668.96		49,865.28	708,485.53
Fremont	Alkali Butte						2,058.29	
	Dallas Derby Dome			89,996.00		33,498.00		
	Hudson					92,028.34		
	Lander			8,208.31		2,889.45		
	Pilot Butte						15,622.18	244,300.57
Hot Springs	Grass Creek		241,988.55	795.12	419,431.51		66,397.11	
	Hamilton Dome					250,909.94		
	Warm Springs			30,469.63				1,009,991.86
Lincoln	La Barge						385,697.20	385,697.20
Natrona	North Casper Creek	1,264.38						
	Poison Spider					84,775.25		
	Salt Creek		370,944.35		697,955.09		9,436,986.55	
	South Casper Creek					180,191.04		
	Teapot (Outside)						9,150.14	10,781,266.80
Niobrara	Lance Creek				26,177.11		33,419.22	
	Mule Creek				23,170.95			
	West Mule Creek		2,178.00				221.00	85,166.28
Park	Cody Structure			7,470.38				
	Elk Basin		3,767.84		215,838.12		40,276.70	
	Four Bear	1,530.00						
	Frannie			25,566.77		95,367.63		
	Oregon Basin	16,945.17				1,230,633.74		
	Shoshoni Anticline				421.98			1,637,818.33
Sublette	La Barge						359,017.46	359,017.46
Sweetwater	Lost Soldier				1,108,741.98		115,592.12	1,224,334.10
Weston	Osage		125,428.40		187,337.24		22,738.32	
	Pedro	124.00		125.00				335,752.96
Uinta	Spring Valley						695.00	695.00
Totals		19,863.55	1,168,928.65	179,620.75	3,629,564.43	1,970,293.39	10,679,175.66	17,647,446.43

OIL PRODUCED IN WYOMING DURING YEAR 1931, BY FIELDS
(In barrels of 42 U. S. Standard Gallons)

FIELD	COUNTY	Production on State Land		Production on Pat'd Land		Production on Gov't Land		Gross Production
		Black Oil	Light Oil	Black Oil	Light Oil	Black Oil	Light Oil	
Alkali Butte	Fremont						862.87	862.87
Big Muddy	Converse		313,984.79		300,743.99		33,071.20	647,799.98
Byron	Big Horn				8,609.85			8,609.85
Badger Basin	Park				10,015.98			10,015.98
Cody Structure	Park			447.60				447.60
Dallas-Derby	Fremont			162,792.00		56,361.00		219,153.00
Dutton Creek	Carbon				28,624.59			28,624.59
Elk Basin	Park		3,807.24		196,509.56		29,545.68	229,862.48
Ferris-G. P. Dome	Carbon		724.69		9,279.26			10,003.95
Frannie	Park			60,680.41		192,326.04		253,006.45
Garland	Big Horn			18,997.47				18,997.47
Grass Creek	Hot Springs		257,673.69		422,686.48		60,814.11	741,174.28
Greybull	Big Horn				4,266.89			4,266.89
Hamilton Dome	Hot Springs					90,105.61		90,105.61
Hudson	Fremont			27,806.84		87,382.12		115,188.96
Iron Creek	Natrona					1,660.11		1,660.11
La Barge	Lincoln						266,540.17	
	Sublette						193,673.72	460,213.89
Lance Creek	Niobrara				26,391.25		67,546.22	93,937.47
Lander	Fremont					16,953.22		16,953.22
Lost Soldier	Sweetwater				1,219,524.88		98,966.51	1,318,491.39
Mahoney Dome	Carbon						1,474.47	1,474.47
North Casper Creek	Natrona	6,000.00				1,700.00		7,700.00
Oregon Basin	Park					392,838.46		392,838.46
Osage	Weston		122,065.81		143,921.38		85,790.76	351,777.95
Pilot Butte	Fremont						13,337.71	13,337.71
Poison Spider	Natrona					73,152.76		73,152.76
Rock Creek	Carbon		86,394.92		449,021.23		140,467.19	675,883.34
Salt Creek	Natrona		279,972.40		543,304.85		8,011,068.92	8,834,346.17
Shoshoni Anticline	Park				217.50			217.50
Simpson Ridge	Carbon			4,994.08				4,994.08
South Casper Creek	Natrona					120,223.45		120,223.45
Teapot (Outside)	Natrona						7,219.96	7,219.96
Torchlight	Big Horn				782.80			782.80
Warm Springs	Hot Springs			4,809.07				4,809.07
West Mule Creek	Niobrara		3,126.00				3,352.00	6,478.00
Totals		6,000.00	1,067,749.54	280,527.47	3,363,900.49	1,032,702.77	9,013,731.49	14,764,611.76

OIL PRODUCED IN WYOMING DURING YEAR 1931, BY COUNTIES

(In barrels of 42 U. S. Standard Gallons)

COUNTY	FIELD	Production on State Land		Production on Pat'd Land		Production on Gov't Land		Gross Production
		Black Oil	Light Oil	Black Oil	Light Oil	Black Oil	Light Oil	
Big Horn	Byron				8,609.85			
	Garland			18,997.47				
	Greybull				4,266.89			
	Torchlight				782.80			32,657.01
Carbon	Dutton Creek				28,624.59			
	Ferris-G. P. Dome		724.69		9,279.26			
	Mahoney Dome						1,474.47	
	Rock Creek		86,394.92		449,021.23		140,467.19	
	Simpson Ridge			4,994.08				720,980.43
Converse	Big Muddy		313,984.79		300,743.99		33,071.20	647,799.98
Fremont	Alkali Butte						862.87	
	Dallas-Derby			162,792.00		56,361.00		
	Hudson			27,806.84		87,382.12		
	Lander					16,953.22		
	Pilot Butte						13,337.71	365,495.76
Hot Springs	Grass Creek		257,673.69		422,686.48		60,814.11	
	Hamilton Dome					90,105.61		
	Warm Springs			4,809.07				836,088.96
Lincoln	La Barge						266,540.17	266,540.17
Natrona	Iron Creek					1,660.11		
	Poison Spider					73,152.76		
	North Casper Creek	6,000.00				1,700.00		
	Salt Creek		279,972.40		543,304.85		8,011,068.92	
	South Casper Creek					120,223.45		
	Teapot (Outside)						7,219.96	9,044,302.45
Niobrara	Lance Creek				26,391.25		67,546.22	
	West Mule Creek		3,126.00				3,352.00	100,415.47
Park	Badger Basin				10,015.98			
	Cody Structure			447.60				
	Elk Basin		3,807.24		196,509.56		29,545.68	
	Frannie			60,680.41		192,326.04		
	Oregon Basin					392,838.46		
	Shoshoni Anticline				217.50			886,388.47
Sublette	La Barge						193,673.72	193,673.72
Sweetwater	Lost Soldier				1,219,524.88		98,966.51	1,318,491.39
Weston	Osage		122,065.81		143,921.38		85,790.76	351,777.95
Totals		6,000.00	1,067,749.54	280,527.47	3,363,900.49	1,032,702.77	10,679,175.66	14,764,611.76

GAS PRODUCED IN WYOMING DURING YEAR 1930, BY FIELDS

FIELD	COUNTY	Production on State Land	Production on Pat'd Land	Production on Gov't Land	Gross Production
		Cubic Feet	Cubic Feet	Cubic Feet	Cubic Feet
Baxter Basin	Sweetwater	331,833,000	573,618,000	371,043,000	1,276,494,000
Big Muddy	Converse	8,103,000			8,103,000
Billy Creek	Johnson		30,937,000		30,937,000
Boone Dome	Natrona		1,227,000		1,227,000
Byron	Big Horn		867,814,000		867,814,000
Eight Mile Lake Dome	Carbon		89,444,000		89,444,000
Elk Basin	Park		943,434,000		943,434,000
Ferris	Carbon		215,143,000	7,321,100,000	7,536,243,000
Grass Creek	Hot Springs	121,169,000	69,745,000		190,914,000
Hiawatha Dome	Sweetwater			1,310,443,000	1,310,443,000
Hidden Dome	Washakie		279,850,000		279,850,000
Lance Creek	Niobrara		1,486,614,000	2,099,626,000	3,586,240,000
Little Buffalo Basin	Park	87,703,113	147,502,538	1,359,415,257	1,594,620,908
Little Dome	Hot Springs			132,813,000	132,813,000
Mahoney Dome	Carbon	268,070,000		3,919,023,000	4,187,093,000
Muskrat	Fremont			256,551,000	256,551,000
Oregon Basin	Park		68,672,700	284,716,900	353,389,600
Rock Creek	Carbon	58,390,927	611,723,331	14,864,362	684,978,020
Salt Creek	Natrona	675,553,950	1,604,413,000	13,075,419,352	15,355,366,302
Sand Draw	Fremont			2,569,897,000	2,569,897,000
Wertz	Carbon			4,821,791,000	4,821,791,000
Totals		1,550,802,990	6,990,137,569	37,536,702,871	46,077,643,430

GAS PRODUCED IN WYOMING DURING YEAR 1930, BY COUNTIES

COUNTY	FIELD	Production on State Land	Production on Pat'd Land	Production on Gov't Land	Gross Production
		Cubic Feet	Cubic Feet	Cubic Feet	Cubic Feet
Big Horn	Byron		867,814,000		867,814,000
Carbon	Eight Mile Lake Dome		89,444,000		
	Ferris		215,143,000	7,321,100,000	
	Mahoney Dome	268,070,000		3,919,023,000	
	Rock Creek	58,390,927	611,723,331	14,864,362	
	Wertz			4,821,791,000	17,319,549,620
Converse	Big Muddy	8,103,000			8,103,000
Fremont	Muskrat			256,551,000	
	Sand Draw			2,569,897,000	
Hot Springs	Grass Creek	121,169,000	69,745,000		2,826,448,000
	Little Dome			132,813,000	323,727,000
Johnson	Billy Creek		30,937,000		30,937,000
Natrona	Boone Dome		1,227,000		
	Salt Creek	675,533,950	1,604,413,000	13,075,419,352	15,356,593,302
Niobrara	Lance Creek		1,486,614,000	2,099,626,000	3,586,240,000
Park	Elk Basin		943,434,000		
	Little Buffalo Basin	87,703,113	147,502,538	1,359,415,257	
	Oregon Basin		68,672,700	284,716,900	2,891,444,508
Sweetwater	Baxter Basin	331,833,000	573,618,000	371,043,000	
	Hiawatha Dome			1,310,443,000	2,586,937,000
Washakie	Hidden Dome		279,850,000		279,850,000
Totals		1,550,802,990	6,990,137,569	37,536,702,871	46,077,643,430

GAS PRODUCED IN WYOMING DURING YEAR 1931, BY FIELDS

FIELD	COUNTY	Production on State Land	Production on Pat'd Land	Production on Gov't Land	Gross Production
		Cubic Feet	Cubic Feet	Cubic Feet	Cubic Feet
Baxter Basin	Sweetwater	380,351,000	981,320,000	1,790,706,500	3,152,377,500
Big Muddy	Converse	8,103,000			8,103,000
Billy Creek	Johnson		89,277,000		89,277,000
Boone Dome	Natrona		938,000		938,000
Byron	Big Horn		677,147,000		677,147,000
Eight Mile Lake Dome	Carbon		50,842,000		50,842,000
Elk Basin	Park		1,212,064,667		1,212,064,667
Ferris	Carbon			160,522,000	160,522,000
Grass Creek	Hot Springs	147,596,000	155,837,000	24,557,000	327,990,000
Hiawatha	Sweetwater			1,368,247,500	1,368,247,500
Hidden Dome	Washakie		286,288,000		286,288,000
Lance Creek	Niobrara		764,477,000	3,235,003,000	3,999,480,000
Little Buffalo Basin	Hot Springs			42,149,366	
	Park	64,513,155	47,000,397	1,631,016,881	784,679,799
Little Dome	Hot Springs			121,001,000	121,001,000
Little Pole Cat	Park			104,195,000	104,195,000
Mahoney Dome	Carbon	52,870,000		2,971,548,000	3,024,418,000
Muskrat	Fremont			379,450,000	379,450,000
Oregon Basin	Park		158,973,000		158,973,000
Rock Creek	Carbon	753,993,000	508,982,000	714,702,000	1,977,677,000
Salt Creek	Natrona	893,728,000	1,425,828,000	14,163,235,000	16,482,791,000
Sand Draw	Fremont			2,137,027,000	2,137,027,000
Wertz	Carbon			4,446,388,000	4,446,388,000
Totals		2,301,154,155	6,358,974,064	33,289,748,247	41,949,876,466

COUNTY	FIELD	Production on State Land	Production on Pat'd Land	Production on Gov't Land	Gross Production
		Cubic Feet	Cubic Feet	Cubic Feet	Cubic Feet
Big Horn	Byron	.....	677,147,000	.....	677,147,000
Carbon	Eight Mile Lake Dome	.....	50,842,000	.....	.....
	Ferris	.....	.....	160,522,000	
	Mahoney Dome	52,870,000		2,971,548,000	.....
	Rock Creek	753,993,000	508,982,000	714,702,000	
	Wertz	.....	.....	4,446,388,000	9,659,847,000
Converse	Big Muddy	8,103,000	.....	.....	8,103,000
Fremont	Muskrat	.....	.....	379,450,000	
	Sand Draw	.....	.....	2,137,027,000	2,516,477,000
Hot Springs	Grass Creek	147,596,000	155,837,000	24,557,000	.....
	Little Buffalo Basin	.....	.....	42,149,366	
	Little Dome	.....	.....	121,001,000	491,140,366
Johnson	Billy Creek	.....	89,277,000	.....	89,277,000
Natrona	Boone Dome	.....	938,000	.....	
	Salt Creek	893,728,000	1,425,828,000	14,163,235,000	16,483,729,000
Niobrara	Lance Creek	.....	764,477,000	3,235,003,000	3,999,480,000
Park	Elk Basin	.....	1,212,064,667	.....	.....
	Little Buffalo Basin	64,513,155	47,000,397	1,631,016,881	.....
	Little Pole Cat	.....	.....	104,195,000	
	Oregon Basin	.....	158,973,000	.....	3,217,763,100
Sweetwater	Baxter Basin	380,351,000	981,320,000	1,790,706,500	
	Hiawatha Dome	.....	.....	1,368,247,500	4,520,625,000
Washakie	Hidden Dome	.....	286,288,000	.....	286,288,000
Totals		2,301,154,155	6,358,974,064	33,289,748,247	41,949,876,466

SALT CREEK FIELD

(In barrels of 42 U. S. Standard Gallons)

Comparison of Gross Production of Crude Oil from State Owned Lands with Gross Production of Entire Field, Based on Pipe Line Runs.

Salt Creek Field		Section 36, Township 40, Range 79				Section 16, T. 40, R. 79 Section 16, T. 39, R. 78		All State Owned Lands	
Year	Gross Production	Frontier Sands and Shale	Lakota Sand	Gross Production	Percent of Gross Field Production	Frontier Sands and Shale	Percent of Gross Field Production	Gross Production	Percent of Gross Field Production
1911	51,798.00	973.00	.....	973.00	1.88	.....	.....	973.00	1.88
1912	1,157,899.00	438,304.00	.....	438,304.00	37.85	.....	.....	438,304.00	37.85
1913	2,254,946.00	511,933.00	.....	511,933.00	22.70	.....	.....	511,933.00	22.70
1914	3,379,329.00	483,638.00	.....	483,638.00	14.31	2,694.00	00.08	486,332.00	14.39
1915	3,936,328.00	497,368.00	.....	497,368.00	12.64	3,632.50	00.09	501,000.50	12.73
1916	4,000,433.00	435,724.00	.....	435,724.00	10.89	2,245.00	00.06	437,969.00	10.95
1917	3,840,502.00	647,845.00	.....	647,845.00	16.87	1,576.00	00.04	649,421.00	16.91
1918	5,512,992.61	781,611.61	.....	781,611.61	14.18	2,061.97	00.04	783,673.58	14.22
1919	6,208,716.14	654,062.89	.....	654,062.89	10.53	12,778.50	00.21	666,841.39	10.74
1920	10,255,410.31	1,348,413.13	.....	1,348,413.13	13.15	40,880.89	00.40	1,389,294.02	13.55
1921	12,378,688.76	1,917,483.88	.....	1,917,483.88	15.49	57,827.05	00.47	1,975,310.93	15.96
1922	19,261,116.63	1,643,936.04	.....	1,643,936.04	8.53	61,099.86	00.32	1,705,035.90	8.85
1923	35,301,607.58	1,960,916.28	.....	1,960,916.28	5.56	57,716.62	00.16	2,018,632.90	5.72
1924	30,831,703.32	2,307,101.43	.....	2,307,101.43	7.48	42,157.37	00.14	2,349,258.80	7.62
1925	25,531,980.00	1,005,464.25	6,980.00	1,012,444.25	3.97	25,202.61	00.09	1,037,646.86	4.06
1926	17,978,320.16	731,093.51	2,946.89	734,040.40	4.08	15,213.46	00.08	749,253.86	4.16
1927	14,353,128.63	422,810.27	18,860.65	441,670.92	3.08	11,849.49	00.08	453,520.41	3.16
*1928	14,041,029.95	437,745.93	10,059.21	447,805.14	3.19	11,308.21	00.08	459,113.35	3.27
1929	11,312,094.09	386,548.99	232.53	386,781.52	3.42	9,087.08	00.08	395,868.60	3.50
1930	10,505,885.99	362,980.95	.....	362,980.95	3.46	7,963.40	00.08	370,944.35	3.53
1931	8,833,652.18	272,181.14	.....	272,181.14	3.08	7,791.26	00.08	279,972.40	3.17
Totals	240,932,561.35	17,248,135.30	39,079.28	17,287,214.58		373,085.27		17,660,299.85	

*Repressuring operations started.

SALT CREEK FIELD

(In barrels of 42 U. S. Standard Gallons)

Comparison of Gross Production of Crude Oil from State Owned Lands with Gross Production of Entire Field, with Increase or Decrease over Previous Year.

	SALT CREEK FIELD					STATE OWNED LANDS				
Year	Gross Production	Increase in Production		Decrease in Production		Gross Production	Increase in Production		Decrease in Production	
		Barrels	Percent	Barrels	Percent		Barrels	Percent	Barrels	Percent
1911	51,798.00					973.00				
1912	1,157,899.00	1,106,101.00				438,304.00	437,331.00			
1913	2,254,946.00	1,097,047.00	94.74			511,933.00	73,629.00	16.80		
1914	3,379,329.00	1,124,383.00	49.86			486,332.00			25,601.00	5.00
1915	3,936,328.00	556,999.00	16.48			501,000.50	14,668.50	3.02		
1916	4,000,433.00	64,105.00	1.63			437,969.00			63,031.50	12.58
1917	3,840,502.00			159,931.00	4.00	649,421.00	211,452.00	48.28		
1918	5,512,992.61	1,672,490.61	43.55			783,673.58	134,252.58	20.67		
1919	6,208,716.14	695,723.53	12.62			666,841.39			116,832.19	14.91
1920	10,255,410.31	4,046,694.17	65.18			1,389,294.02	722,452.63	108.34		
1921	12,378,688.76	2,123,278.45	20.70			1,975,310.93	586,016.91	42.18		
1922	19,261,116.63	6,882,427.87	55.60			1,705,035.90			270,275.03	13.68
1923	35,301,607.58	16,040,490.95	83.28			2,018,632.90	313,597.00	18.39		
1924	30,831,703.32			4,469,904.26	12.66	2,349,258.80	330,625.90	16.38		
1925	25,531,980.00			5,299,723.32	17.19	1,037,646.86			1,311,611.94	55.83
1926	17,978,320.16			7,553,659.84	29.59	749,253.86			288,393.00	27.79
1927	14,353,128.63			3,625,191.53	20.16	453,520.41			295,733.45	39.47
*1928	14,041,029.95			312,098.68	2.17	459,113.35	5,592.94	1.23		
1929	11,312,094.09			2,728,935.86	19.44	395,868.60			63,244.75	15.98
1930	10,505,885.99			806,208.10	7.67	370,944.35			24,924.25	6.72
1931	8,838,652.18			1,667,233.81	18.86	279,972.40			90,971.95	32.49
Totals	240,932,561.35					17,660,279.85				

*Repressuring operations started.

PRODUCTION, VALUE, MEN EMPLOYED, DAYS WORKED, AND OUTPUT PER MAN PER YEAR AT COAL MINES IN WYOMING IN 1931 [a]

(Exclusive of product of wagon mines producing less than 1,000 tons.)

County	NET TONS					VALUE		NUMBER OF EMPLOYEES						Average number of days worked	Average tons per man per year (b)
								Underground			Surface		Total		
	Loaded at mines for shipment	Sold to local trade and used by employees	Used at mines for power and heat	Made into coke at mines	Total quantity	Total (thousand dollars)	Average per ton	Miners, loaders, and shot firers	Haulage and track	All others	In strip pits	All others			
Big Horn and Park		3,429	200		3,629	$ 13	$ 3.58	5	1	1		2	9	182	403
Campbell and Converse	75,808	11,004	8,103		94,915	97	1.02	12	1	1	25	3	42	130	(c) 2,260
Carbon	423,343	14,809	16,532		454,684	1,158	2.55	124	38	46		84	292	185	(c) 1,557
Hot Springs	220,779	8,948	33,559		263,286	829	3.15	373	113	85		105	676	103	389
Johnson		12,314	579		12,893	26	2.02	14	3	3		5	25	120	516
Lincoln	575,100	5,686	25,537		606,323	1,564	2.58	421	58	35		111	625	184	970
Sheridan	515,679	47,235	2,073		564,987	988	1.75	216	82	28		84	410	129	(c) 1,378
Sweetwater	2,850,393	30,755	67,098		2,948,246	7,204	2.44	1,635	333	244		403	2,615	162	1,127
Teton		974			974	4	4.11	3	1	1		2	7	81	139
Other Counties (Fremont and Uinta)	29,299	10,132	4,318		43,749	113	2.58	35	6	5		12	58	146	754
Total 1931	4,690,401	145,286	157,999		4,993,686	$ 11,996	$ 2.40	2,838	636	449	25	811	4,759	154	1,049
Total 1930	5,779,128	120,303	188,702		6,088,133	15,133	2.49	3,007	750	559	900		5,216	188	1,167

(a) The figures relate only to active mines of commercial size that produced coal in 1931. The number of such mines in Wyoming was 66 in 1931; 60 in 1930; and 54 in 1929.

Size classes of commercial mines in 1931: There were 10 mines in Class 1B (200,000 to 500,000 tons) producing 53.8 per cent of the tonnage; 8 in Class 2 (100,000 to 200,000 tons) with 25.7 per cent; 8 in Class 3 (50,000 to 100,000 tons) with 13.7 per cent; 9 in Class 4 (10,000 to 50,000 tons) with 5.5 per cent; 31 in Class 5 (less than 10,000 tons) producing 1.3 per cent.

Methods of mining in 1931: The tonnage by hand was 498,911; shot off the solid, 762,410 (including some coal reported as "pillar coal," the method of mining which, of course, differs materially from solid shooting in rooms or entries); cut by machines, 3,640,108; mined by stripping, 92,257.

(b) The output per man per day, for the State as a whole, calculated by dividing the tonnage by the product of the number employed at each mine times the number of days worked by the mine, was 6.81 in 1931; and 6.20 in 1930.

(c) The large output per man is explained by the use of power shovel or loading machine.

By F. G. Tryon and L. Mann,
Statistics Section, Coal Division.
C. P. WHITE, HEAD, COAL DIVISION.

Department of Commerce,
Bureau of Mines,
October 5, 1932.

THE STATE OF WYOMING
Office of State Geologist.

POSTED FIELD PRICES FOR CRUDE OIL IN FIELDS SHOWN, WITH DATES EFFECTIVE

Compiled by Cyrus O. Wertz,
Mineral Production Supervisor.

Field	1914 Mar. 1	1915 Feb. 25	1915 Nov. 12	1916 Feb. 1	1916 Mar. 16	1916 Apr. 16	1916 May 19	1916 Aug. 4	1916 Aug. 25	1916 Dec. 2	1916 Dec. 13	1917 Jan. 2	1917 Jan. 8	1917 Jan. 30	1917 Mar. 23	1917 Jul. 6	1917 Jul. 12	1917 Aug. 21	1917 Dec. 30	1917 Dec. 31	1918 Feb. 9	1918 Mar. 21	1918 Jul. 1	1918 Oct. 1	1919 Nov. 21	1919 Dec. 23	1920 Jan. 13	1920 Feb. 3	1920 Mar. 1
Salt Creek	$ 50	$ 50	$ 50	$ 60	$ 60	$ 75	$ 75	$ 75	$ 75	$ 75	$ 75	$ 75	$ 85	$ 95	$ 95	$1 00	$1 05	$1 15	$1 15	$1 20	$1 30	$1 50	$	$1 50	$1 75	$2 00	$2 25	$2 25	$2 50
Mid-Continent	1 05	40	90	1 30	1 45	1 55	1 55	1 25	1 00	1 00	1 10	1 40	1 60	1 70	1 70	1 70	1 70	2 00	2 00	2 00	2 00	2 25	2 25	2 25	2 50	2 75	3 00	3 00	3 50
Big Muddy	....	....	....	....	....	....	....	....	75	75	75	85	95	95	95	1 00	1 05	1 15	1 20	1 20	1 30	1 50	....	1 50	1 75	2 00	2 25	2 25	2 50
Elk Basin	....	75	75	75	1 00	1 00	1 10	1 00	90	1 00	1 10	1 20	1 30	1 35	1 40	1 45	1 50	1 70	1 70	1 70	1 70	1 85	....	1 85	2 10	2 35	2 60	2 60	2 85
Grass Creek	....	75	75	75	1 00	1 00	1 10	1 00	90	1 00	1 10	1 20	1 30	1 35	1 40	1 45	1 50	1 70	1 70	1 70	1 70	1 85	....	1 85	2 10	2 35	2 60	2 60	2 85
Greybull	....	....	1 00	1 00	1 00	1 00	1 10	1 00	90	1 00	1 10	1 20	1 30	1 35	1 40	1 45	1 50	1 70	1 70	1 70	1 70	....	....	1 85	2 10	2 35	2 60	2 60	2 85
Lance Creek	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1 80	2 05	2 30	2 60	2 55	2 80
Mule Creek	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1 00	1 00	1 00	1 00	1 32	....	1 80	2 05	1 80	1 80	1 80	1 80
Pilot Butte	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1 12½	1 37½	1 62½	1 87½	1 87½	2 12½
Rock Creek	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1 50	1 75	2 00	2 25	2 35	2 50
Torchlight	....	1 05	1 05	1 05	1 05	1 05	1 10	1 00	90	1 00	1 10	1 20	1 30	1 35	1 40	1 45	1 50	1 70	1 70	1 70	1 70	1 85	.85	1 85	2 10	2 35	2 60	2 60	2 85
**Warm Springs	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.85	.85	.85	.85	.85	.85

(CONTINUATION OF ABOVE)

Field	1920 Mar. 16	1920 Sep. 16	1921 Jan. 25	1921 Feb. 1	1921 Feb. 5	1921 Feb. 10	1921 May 3	1921 May 21	1921 Jun. 14	1921 Jun. 17	1921 Jun. 27	1921 Oct. 4	1921 Oct. 8	1921 Nov. 8	1922 Jul. 18	1922 Jul. 19	1922 Aug. 4	1922 Sep. 14	1922 Dec. 22	1923 Jan. 15	1923 Jan. 18	1923 Jan. 29	1923 Feb. 2	1923 Feb. 10	1923 Feb. 17
Salt Creek	$2 75	$2 75	$2 25	$1 90	$1 65	$1 40	$1 15	$1 00	$ 75	65	$ 50	$ 75	$ 90	$1 40	$1 15	$ 90	$ 70	....	$1 05	$1 15	$1 25	$1 35	$1 45	$1 55	$1 65
*Mid-Continent	3 50	3 50	3 00	2 50	2 00	1 75	1 25	1 00	1 00	1 00	1 00	2 00	1 75	1 75	1 25	1 25	1 25	$1 25	1 60	1 70	1 70	1 70	1 80	1 90	2 00
Big Muddy	2 75	2 75	2 25	1 90	1 65	1 40	1 15	1 00	75	65	50	75	90	1 40	1 15	90	70	....	1 05	1 15	1 25	1 35	1 45	1 45	1 55
Elk Basin	3 10	3 10	2 60	2 25	2 00	1 75	1 50	1 50	1 25	1 15	1 00	1 25	1 45	1 90	1 65	1 40	1 20	90	1 50	1 60	1 70	1 80	1 90	1 90	2 00
Ferris-G. P. Dome	3 10	3 10	2 60	2 25	2 00	1 75	1 50	1 50	1 25	1 15	1 00	1 25	1 45	1 90	1 65	1 40	1 20	....	1 50	1 60	1 70	1 80	1 90	2 00	2 10
Grass Creek	3 10	3 10	2 60	2 25	2 00	1 75	1 50	1 50	1 25	1 15	1 00	1 25	1 45	1 90	1 65	1 40	1 20	70	1 50	1 60	1 70	1 80	1 90	2 00	2 10
Greybull-Torchlight	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	70	1 25	1 25	1 35	1 45	1 55	1 65
Hamilton Dome	3 05	3 05	2 55	2 20	1 95	1 70	1 45	1 45	1 20	1 10	95	1 20	1 40	1 90	1 65	1 40	1 20	....	1 50	1 60	1 70	1 80	1 90	2 00	2 10
Lance Creek	....	....	....	....	....	....	....	....	....	....	....	....	....	.87¼	.87¼	37½	17½	41¾	70	90	90	1 00	1 10	1 20	Contract
Lander	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	Cont	ract
Lost Soldier	2 05	2 05	1 80	1 45	1 20	95	95	80	80	70	45	70	85	1 35	1 05	80	60	....	90	1 00	1 10	1 20	1 30	1 40	1 50
Mule Creek	....	2 05	2 55	2 20	1 95	1 70	1 45	1 45	1 20	1 10	95	1 20	1 40	1 90	1 65	1 40	1 20	....	1 20	1 40	1 60	1 70	1 90	2 00	2 10
Osage	2 37½	2 37½	1 8666	1 5166	1 2666	1 0166	.7666	.6166	3666	2666	1166	40	.5156	1 0156	9014	6514	4514	....	8014	9014	1 0014	7514	1 1014	1 3014	1 4014
Pilot Butte	2 75	2 75	2 35	2 00	1 75	1 50	1 25	1 10	85	75	60	85	1 00	1 50	1 25	1 00	80	....	1 15	1 25	1 35	1 45	1 55	1 65	1 75
Rock Creek	.85	.85	.85	.85	.85	.85	.35	.35	.35	.35	.35	.35	.35	.35	.35	.35	.35	....	.35	.35	.35	.35	.35	.35	.35
**Warm Springs	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
GASOLINE PRICES	(First t	ank wag	on price	s for Roc	ky Moun	tain Dis	trict wer	e made u	nder dat	e of May	2, 1921;	prior to	that date	, all quo	tations	were bas	ed on C	hicago ta	nk wago	n prices)					
CASPER																									
Tank Wagon	....	....	....	....	....	....	$ 22	22	22	22	18	18	18	18	22½	22½	20½	20½	14½	14½	14½	15½	15½	16½	16½
State Gas Tax	....	....	....	....	....	....	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
Service Station Charge	....	....	....	....	....	....	02	02	01	01	03	03	03	03	02	02	02	02	02	02	02	02	02	02	02
Service Station Price							$ 24	24	23	23	21	21	21	21	24½	24½	22½	22½	16½	16½	16½	17½	17½	18½	18½
CHEYENNE																									
Tank Wagon	....	....	....	....	....	....	$ 23½	23½	23½	23½	20	20	20	20	24	24	23	23	17	17	17	18	18	19	19
State Gas Tax	....	....	....	....	....	....	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
Service Station Charge	....	....	....	....	....	....	02	02	02	02	03	03	03	03	02	02	02	02	02	02	02	02	02	02	02
Service Station Price							$ 25½	25½	25½	25½	23	23	23	23	26	26	25	25	19	19	19	20	20	21	21

(CONTINUATION OF ABOVE)

Field	1923 Apr. 24	1923 May 3	1923 May 7	1923 May 14	1923 Jul. 31	1923 Aug. 10	1923 Sep. 21	1923 Oct. 20	1923 Nov. 9	1923 Nov. 20	1924 Jan. 10	1924 Jan. 21	1924 Feb. 4	1924 Feb. 5	1924 Mar. 10	1924 Jul. 18	1924 Jul. 29	1924 Jul. 30	1924 Sep. 19	1925 Jan. 23	1925 Jan. 31	1925 Feb. 13	1925 Feb. 18	1925 Mar. 10
Salt Creek	$1 55	$1 45	$1 35	$1 25	$1 25	$1 25	$ 90	$ 90	$ 90	$ 60	$1 00	$1 20	$1 45	$1 45	$1 60	$1 35	$1 10	....	$ 85	$1 10	$1 30	$1 55	$1 60	$1 60
*Mid-Continent posted by Prairie Oil and Gas Co.	1 90	1 80	1 70	1 60	1 60	1 60	1 30	1 30	1 00	1 00	1 40	1 60	1 85	1 85	2 00	1 75	1 50	$1 50	1 25	1 50	1 70	2 00	2 00	2 00
Big Muddy	1 55	1 45	1 35	1 25	1 25	1 10	75	75	45	45	85	1 10	1 10	1 35	1 50	1 25	1 10	1 00	75	1 00	1 30	1 55	1 60	1 60
**Black Mountain	....	....	....	....	....	....	....	....	....	....	....	....	1 25	1 25	1 25	1 25	1 25	1 25	85	85	85	85	85	85
Byron	....	....	....	....	....	....	1 50	1 50	1 10	1 10	1 55	1 70	1 70	1 95	2 10	1 80	1 55	....	1 30	1 55	1 55	2 10	2 10	2 25
Elk Basin	2 00	1 90	1 80	1 70	1 70	1 70	1 35	1 35	95	95	1 40	1 55	1 55	1 80	1 95	1 70	1 45	....	1 20	1 45	1 65	2 00	2 00	2 15
Ferris—G. P. Dome	1 75	1 65	1 55	1 45	1 45	1 45	1 10	1 10	80	80	1 20	1 40	1 40	1 65	1 80	1 55	1 30	....	1 05	1 30	1 30	1 30	1 30	1 30
Grass Creek—Light	2 00	1 90	1 80	1 70	1 70	1 70	1 35	1 35	95	95	1 40	1 55	1 55	1 80	1 95	1 70	1 45	....	1 20	1 45	1 65	2 00	2 00	2 15
Heavy	....	....	....	....	....	....	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90
Greybull	2 00	1 90	1 80	1 70	1 70	1 70	1 35	1 35	95	95	1 40	1 55	1 55	1 80	1 95	1 70	1 45	1 45	1 20	1 45	1 45	2 00	2 00	2 15
Hamilton Dome	1 55	1 45	1 35	1 25	1 25	1 17½	82½	82½	52½	52½	92½	1 15	1 15	1 40	1 55	1 30	1 10	1 05	80	1 05	1 05	1 55	1 60	1 80
Lander	Contrac	t F. O.	B. Land	er	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	85	85
Lance Creek	2 00	1 90	1 80	1 70	1 70	1 70	1 20	1 20	80	90	1 35	1 50	1 50	1 75	1 90	1 65	1 50	1 40	1 15	1 40	1 60	1 95	1 95	2 15
Lost Soldier	Contrac	t for ent	ire field				67																	
Mule Creek	1 25	1 15	1 05	95	95	95	75	75	45	45	70	70	70	95	1 10	85	70	60	60	1 00	1 25	1 25	1 25	1 50
Notches	....	....	....	....	....	....	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65
Osage	2 00	1 90	1 80	1 70	1 70	1 70	1 35	1 20	80	90	1 35	1 50	1 50	1 75	1 90	1 65	1 40	....	1 15	1 40	1 60	1 95	1 95	2 15
Pilot Butte	1 3014	1 2014	1 1014	1 0014	1 0014	8514	5014	5014	40	40	6014	8514	8514	1 1014	1 2514	1 0014	8514	7514	5014	7514	7514	1 3014	1 3514	1 3514
Rock Creek	1 65	1 55	1 45	1 35	1 25	1 25	90	90	60	60	1 10	1 30	1 30	1 55	1 70	1 45	1 30	1 20	95	1 20	1 40	1 65	1 70	2 00
Torchlight	2 00	1 90	1 80	1 70	1 70	1 70	1 35	1 35	95	95	1 40	1 55	1 55	1 80	1 95	1 70	1 45	....	1 20	1 45	1 45	2 00	2 00	2 15
**Warm Springs	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	....	35	35	35	35	35	35
GASOLINE PRICES																								
CASPER																								
Tank Wagon (Less Tax)	$ 19	$ 19	$ 19	$ 18	$ 18	$ 17	$ 13	$ 13	$ 13	$ 13	$ 16	$ 16	$ 17	$ 17	$ 19	$ 17	$ 17	$ 17	$ 14	$ 14	$ 14	$ 17	$ 19	$ 19
State Gas Tax	00	00	00	00	00	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
Service Station Charge	02	02	02	02	02	02	02	02	02	02	02	02	02	02	02	02	02	02	02	02	02	02	02	02
Service Station Price	$ 21	$ 21	$ 21	$ 20	$ 20	$ 20	$ 16	$ 16	16	16	19	19	20	20	22	20	20	20	17	17	17	20	22	22
CHEYENNE																								
Tank Wagon (Less Tax)	$ 21	$ 21	$ 21	$ 20	$ 20	$ 19	$ 14½	$ 15½	$ 14½	$ 14½	$ 17½	$ 17½	$ 18½	$ 18½	$ 20½	$ 18½	$ 18½	$ 18½	$ 15½	$ 15½	$ 15½	$ 18½	$ 20½	$ 20½
State Gas Tax	00	00	00	00	00	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
Service Station Charge	02	02	02	02	02	02	02	01	02	02	02	02	02	02	02	02	02	02	02	02	02	02	02	02
Service Station Price	$ 23	$ 23	$ 23	$ 22	$ 22	$ 22	$ 17½	$ 17½	$ 17½	$ 17½	$ 20½	$ 20½	$ 21½	$ 21½	$ 23½	$ 21½	$ 21½	$ 21½	$ 18½	$ 18½	$ 18½	$ 21½	$ 23½	$ 23½

*Gravity schedule of prices adopted and posted by Prairie Oil and Gas Company, November 23, 1922; prices shown above subsequent to that date are for 36° gravity oil. Price posted Nov. 23, 1922 for 36° gravity oil was $1.25.
**No posted field price—basis of settlement for State's royalty oil.

THE STATE OF WYOMING
Office of State Geologist.

POSTED FIELD PRICES FOR CRUDE OIL IN FIELDS SHOWN, WITH DATES EFFECTIVE

Compiled by Cyrus O. Wertz,
Mineral Production Supervisor.

Field	1925 Aug. 1	1925 Aug. 28	1925 Sep. 10	1926 Feb. 2	1926 Apr. 29	1926 May 17	1926 Nov. 17	1927 Feb. 22	1927 Mar. 5	1927 Mar. 12	1927 May 7	1928 Feb. 21	1928 Jul. 12	1928 Jul. 26	1928 Jul. 27	1929 Jan. 25	1929 Feb. 1	1929 May 20	1929 May 21	1930 Feb. 15	1930 Feb. 16	1930 Apr. 10	1930 Apr. 11	1930 May 1	1930 Oct. 15	1930 Oct. 27	1930 Oct. 28	1930 Nov. 1	1930 Dec. 2
Salt Creek (Mid-Continent prices posted by Prairie O. and G. Co.	(The M	idwest R	efining C	ompany	posts the	Mid-Con	tinent sc	hedule f	rom 29°	to 37° an	d above	only.)																	
29°—29.9° Gravity	$1.48	$1.23	....	$1.48	....	$1.73	$1.55	$1.39	$1.26	$1.14	....	$1.01	....	$ .95	....	$ .90	....	$1.10	....	$ .90	....	$1.00	....	....	....	$ .69	....	....	....
30°—30.9° "	1.56	1.31	....	1.56	....	1.81	1.60	1.43	1.29	1.16	....	1.06	....	1.02	....	.96	....	1.15	....	.96	....	1.05	....	....	....	.73	....	....	....
31°—31.9° "	1.64	1.39	....	1.64	....	1.89	1.65	1.47	1.32	1.18	....	1.11	....	1.09	....	1.02	....	1.20	....	1.02	....	1.10	....	....	....	.77	....	....	....
32°—32.9° "	1.72	1.47	....	1.72	....	1.97	1.70	1.51	1.35	1.20	....	1.16	....	1.16	....	1.08	....	1.25	....	1.03	....	1.15	....	....	....	.81	....	....	....
33°—33.9° "	1.80	1.55	....	1.80	....	2.05	1.75	1.55	1.38	1.22	....	1.19	....	1.21	....	1.11	....	1.30	....	1.11	....	1.185	....	....	....	.85	....	....	....
34°—34.9° "	1.88	1.63	....	1.88	....	2.13	1.80	1.59	1.41	1.24	....	1.22	....	1.26	....	1.14	....	1.35	....	1.14	....	1.22	....	....	....	.89	....	....	....
35°—35.9° "	1.96	1.71	....	1.96	....	2.21	1.85	1.63	1.44	1.26	....	1.25	....	1.31	....	1.17	....	1.40	....	1.17	....	1.255	....	....	....	.92	....	....	....
36°—36.9° "	2.04	1.79	....	2.04	....	2.29	1.90	1.67	1.47	1.28	....	1.28	....	1.36	....	1.20	....	1.45	....	1.20	....	1.29	....	....	....	.95	....	....	....
37° and above	2.12	1.87	....	2.12	....	2.37	1.95	1.71	1.50	1.30	....	1.31	....	1.41	....	1.23	....	1.50	....	1.23	....	1.325	....	....	....	.98	....	....	....
Balance of Mid-Continent Schedule																													
37°—37.9° Gravity	2.12	1.87	....	2.12	....	2.37	1.95	1.71	1.50	1.30	....	1.31	....	1.41	....	1.23	....	1.50	....	1.23	....	1.325	....	....	....	.98	....	....	....
38°—38.9° "	2.20	1.95	....	2.20	....	2.45	2.00	1.75	1.53	1.32	....	1.34	....	1.46	....	1.26	....	1.55	....	1.26	....	1.36	....	....	....	1.01	....	....	....
39°—39.9° "	2.28	2.03	....	2.28	....	2.53	2.05	1.79	1.56	1.34	....	1.37	....	1.51	....	1.29	....	1.60	....	1.29	....	1.395	....	....	....	1.04	....	....	....
40° and above	2.36	2.11	....	2.36	....	2.61	2.10	1.83	1.59	1.36	....	1.40	....	1.56	....	1.32	....	1.65	....	1.32	....	1.43	....	....	....	1.07	....	....	....
40°—40.9° Gravity	2.36	2.11	....	2.36	....	2.61	2.10	1.83	1.59	1.36	....	1.40	....	1.56	....	1.32	....	1.65	....	1.32	....	1.43	....	....	....	....	....	....	....
41°—41.9° "	2.44	2.19	....	2.44	....	2.69	2.15	1.87	1.62	1.38	....	1.43	....	1.61	....	1.35	....	1.70	....	1.35	....	1.465	....	....	....	....	....	....	....
42°—42.9° "	2.52	2.27	....	2.52	....	2.77	2.20	1.91	1.65	1.40	....	1.46	....	1.66	....	1.38	....	1.75	....	1.38	....	1.50	....	....	....	....	....	....	....
43°—43.9° "	2.60	2.35	....	2.60	....	2.85	2.25	1.95	1.68	1.42	....	1.49	....	1.71	....	1.41	....	1.80	....	1.41	....	1.535	....	....	....	....	....	....	....
44° and above	2.68	2.43	....	....	....	....	....	....	....	....	....	....	....	1.76	....	1.44	....	1.85	....	1.44	....	1.57	....	....	....	....	....	....	....
44°—44.9° Gravity	....	....	....	2.68	....	2.93	2.30	1.99	1.71	1.44	....	1.52	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
45°—45.9° "	....	....	....	2.76	....	3.01	2.35	2.03	1.74	1.46	....	1.55	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
46°—46.9° "	....	....	....	2.84	....	3.09	2.40	2.07	1.77	1.48	....	1.58	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
47°—47.9° "	....	....	....	2.92	....	3.17	2.45	2.11	1.80	1.50	....	1.61	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
48°—48.9° "	....	....	....	3.00	....	3.25	2.50	2.15	1.83	1.52	....	1.64	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
49°—49.9° "	....	....	....	3.08	....	3.33	2.55	2.19	1.86	1.54	....	1.67	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
50°—50.9° "	....	....	....	3.16	....	3.41	2.60	2.23	1.89	1.56	....	1.70	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
51°—51.9° "	....	....	....	3.24	....	3.49	2.65	2.27	1.92	1.58	....	1.73	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
52° and above	....	....	....	3.32	....	3.57	2.70	2.31	1.95	1.60	....	1.76	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
*Alkali Butte	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
*Badger Basin	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
*Baxter Basin	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Big Muddy	$2.00	$1.75	....	$2.00	....	$2.25	$1.85	$1.62	$1.42	$1.25	....	....	....	....	1.33	1.28	....	....	1.43	1.33	....	....	$1.38	....	....	....	$1.00	....	.85
**Black Mountain	.85	....	....	.85	....	....	....	.85	....	....	....	.85	....	....	....	.85	....	....	.85	....	....	....	....	....	....	....	....	....	....
*Byron	2.25	2.00	....	2.25	....	2.50	2.10	1.85	1.65	1.43	....	....	....	1.58	....	1.46	....	....	....	1.55	....	1.65	....	....	....	1.35	....	....	....
Dallas-Derby	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1.25	....	....	1.35	....	....	....	1.01	....	....
Dutton Creek	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1.48	1.36	....	....	1.65	1.45	....	....	1.55	....	....	....	1.25	....	....
Elk Basin	2.15	1.90	....	2.15	....	2.40	2.00	1.75	1.55	1.33	....	....	....	....	....	....	....	....	....	....	....	....	1.60	....	....	....	....	....	....
Ferris—G. P. Dome	1.60	....	1.70	1.95	....	2.20	1.80	1.60	....	Mid-Co	ntinent s	chedule f	rom Ma	rch 7, 19	27, as po	sted by	Prairie O	il and G	as Comp	any	....	....	....	....	....	....	....	....	....
**Four Bear	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	$0.85	$0.85	....	....	....	....	....	....	....	....	....	....
*Frannie—Light	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Heavy	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Grass Creek—Light	2.15	1.90	....	2.15	....	2.40	2.00	1.75	1.55	1.33	....	....	....	....	1.48	1.36	....	....	1.65	1.45	....	....	1.55	....	....	....	1.25	....	....
Heavy	....	....	....	.90	....	....	....	....	....	....	....	....	....	....	.90	.90	....	....	....	....	....	....	....	....	....	....	.90	....	....
Greybull	2.00	....	....	2.15	1.90	2.40	2.00	1.75	1.55	1.33	....	....	....	....	1.48	1.48	....	....	1.65	1.65	....	....	1.65	....	....	....	1.25	....	....
Hamilton Dome	1.60	1.55	....	1.35	....	73	1.35	.85	....	....	....	....	....	....	.85	.85	....	....	....	....	....	....	....	....	....	....	.85	....	....
Hudson (Lander)	.85	....	....	....	....	1.00	....	.80	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
La Barge	Mid-Co	ntinent s	chedule	as poste	d by Pr	airie Oil	and Gas	Compan	y.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Lance Creek	2.15	1.90	....	2.15	....	2.40	2.00	1.75	1.55	1.33	....	....	....	....	1.48	1.38	....	....	1.68	1.53	....	....	1.63	....	....	....	1.33	....	....
Lost Soldier	1.35	....	1.10	1.35	1.10	1.60	1.35	1.15	1.05	.95	....	....	....	....	1.00	....	$ .95	....	1.05	....	$ .95	....	1.00	....	....	....	.80	....	....
Mule Creek	1.50	1.25	....	1.50	....	1.75	1.45	1.30	....	....	1.10	....	....	....	1.10	1.10	....	....	1.20	....	....	....	....	1.10	....	....	1.20	....	....
Notches	....	....	....	....	....	.65	....	....	....	....	....	....	....	....	....	.45	....	....	....	....	....	....	....	....	....	....	....	....	....
‡Oregon Basin	....	....	....	....	....	....	....	....	....	....	....	....	.85	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Osage	2.15	1.90	....	2.15	....	2.40	2.00	1.75	1.55	1.33	....	....	....	....	1.48	1.38	....	....	1.65	1.53	....	....	1.63	....	1.25	....	1.00	.85	1.17
Pilot Butte	....	1.50	....	1.7514	....	....	....	....	....	....	....	....	....	....	....	....	....	1.63	....	1.53	....	....	....	....	....	....	....	....	....
**Pitchfork	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Poison Spider	....	....	....	....	....	....	....	70	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Rex Lake	1.20	....	....	....	....	1.45	1.25	1.10	....	....	....	....	....	....	....	1.10	....	....	....	....	....	....	....	....	....	....	....	....	....
Rock Creek	2.00	1.75	....	2.00	....	2.25	1.85	1.62	1.42	1.25	....	....	....	....	1.33	1.18	....	....	1.40	1.25	....	....	1.35	....	....	....	1.01	....	....
Simpson Ridge	.80	....	....	....	....	1.00	....	.80	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
South Casper Creek	....	....	....	....	....	....	....	.70	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
*South Sunshine	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
*Sunshine	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Torchlight	2.00	....	....	2.15	1.90	2.40	2.00	1.75	1.55	1.33	....	....	....	....	1.48	1.48	....	....	1.65	1.65	....	....	1.65	....	....	....	1.25	....	....
**Warm Springs	.35	....	....	....	....	....	....	....	....	....	.40	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
†West Mule Creek	....	....	....	....	....	....	....	....	....	....	....	1.25	....	....	....	....	....	....	1.35	....	....	....	....	1.25	....	....	1.35	....	....

*No posted field price.
**No posted field price—basis of settlement for State's royalty oil.
‡No posted field price—price shown established by U. S. G. S. for Government royalty oil.
†No posted field price—price for field established by U. S. G. S. at 15c above posted price for Mule Creek and adopted by Board of Land Commissioners for oil produced on state owned lands in field.

GASOLINE PRICES CASPER																													
Tank Wagon (Less Tax)	$ .20	$ .18	$ .17	$ .17	$ .18	$ .19	$ .19	$ .17½	$ .17	$ .17	$ .15	$ .14	$ .15	.15	.15	.16	.15	.17	.17	.14	.14	.15	.15	.15	.13	.13	.13	.13
State Gas Tax	.02½	.02½	.02½	.02½	.02½	.02½	.02½	.02½	.03	.03	.03	.03	.03	.03	.03	.03	.03	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04
Service Station Charge	.02	.02	.02	.02	.02	.02	.02	.02½	.02	.02	.02	.02	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03
Service Station Price	$ .24½	$ .22½	$ .21½	$ .21½	$ .22½	$ .23½	$ .23½	$ .22½	$ .22	$ .22	$ .20	$ .19	$ .21	.21	.21	.22	.21	.24	.24	.21	.21	.22	.22	.22	.20	.20	.20	.20	.20
CHEYENNE																													
Tank Wagon (Less Tax)	$ .21½	$ .19½	$ .18½	$ .18	$ .19	$ .20	$ .20	$ .19	$ .18	$ .18	$ .15	$ .15	$ .16	.16	.16	.17	.16	.18	.18	.15½	.15½	.16½	.16½	.16½	.14	.14	.14	.14	.14
State Gas Tax	.02½	.02½	.02½	.02½	.02½	.02½	.02½	.02½	.03	.03	.03	.03	.03	.03	.03	.03	.03	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04
Service Station Charge	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03
Service Station Price	$ .26	$ .24	$ .23	$ .22½	$ .23½	$ .24½	$ .24½	$ .23½	$ .23	$ .23	$ .20	$ .20	$ .22	.22	.22	.23	.22	.25	.25	.22½	.22½	.23½	.23½	.23½	.21	.21	.21	.21	.21

THE STATE OF WYOMING
Office of State Geologist

POSTED FIELD PRICES FOR CRUDE OIL IN FIELDS SHOWN, WITH DATES EFFECTIVE

Compiled by Cyrus O. Wertz
Mineral Production Supervisor

Field	1931 Jan. 1	1931 Mar. 5	1931 May 14	1931 May 19	1931 June 1	1931 June 2	1931 July 9	1931 July 10	1931 July 24	1931 July 25	1931 Aug. 1	1931 Aug. 18	1931 Aug. 22	1931 Aug. 24	1931 Aug. 25	1931 Sept. 3	1931 Nov. 2	1931 Nov. 3	1932 Jan. 1	1932 Apr. 11	1932 May 11	1932 June 1	1932 June 24					
Salt Creek (Mid-Continent prices posted by Stanolind C. O. P. Co.		Prior to posted th field.	January 1, 1931, Mid-Co		The Mid schedule o	west Refi f the Sta	ning Co. nolind Cr	posted th ude Oil P	e Mid-C urchasin	ontinent g Co. O	schedule n August	of the Pr 22, 1931,	airie Oil they an	& Gas C nounced	o. for Sal they wou	t Creek F ld no lon	ield on gr ger post	avities fr prices for	om 29° to Salt Cre	37° and ek, and t	above on hat the p	ly, excep revailing	t for con prices po	tract cru sted by t	de, since he Stanol	which ti ind woul	me they d govern	have that
29°—29.9° Gravity	$0.69	.45			.26		.11		.31				.48				.63			.78								
30°—30.9° "	.73	.47			.27		.12		.32				.50				.65			.80								
31°—31.9° "	.77	.49			.28		.13		.33				.52				.67			.82								
32°—32.9° "	.81	.51			.29		.14		.34				.54				.69			.84								
33°—33.9° "	.85	.53			.30		.15		.35				.56				.71			.86								
34°—34.9° "	.89	.55			.31		.16		.36				.58				.73			.88								
35°—35.9° "	.92	.57			.32		.17		.37				.60				.75			.90								
36°—36.9° "	.95	.59			.33		.18		.38				.62				.77			.92								
37° and above	.98	.61			.34		.19		.39				.64															
37°—37.9° Gravity	.98	.61			.34		.19		.39				.64				.79			.94								
38°—38.9° "	1.01	.63			.35		.20		.40				.66				.81			.96								
39°—39.9° "	1.04	.65			.36		.21		.41				.68				.83			.98								
40° and above	1.07	.67			.37		.22		.42				.70				.85			1.00								
40°—40.9° "																												
41°—41.9° "																												
42°—42.9° "																												
43°—43.9° "																												
44° and above																												
44°—44.9° "																												
45°—45.9° "																												
46°—46.9° "																												
47°—47.9° "																												
48°—48.9° "																												
49°—49.9° "																												
50°—50.9° "																												
51°—51.9° "																												
52° and above																												
*Alkali Butte																												
*Badger Basin																												
*Baxter Basin																												
Big Muddy	$1.00	.65				.40		.25		.45		.60		.68				.83		.98								
*Billy Creek																												
‡**Black Mountain	$0.85																											
Byron	$1.35													1.35														
Dallas-Derby																												
Dutton Creek	$1.01	.66	.58			.40		.25		.45				.60				.75		.82								
Elk Basin	$1.25	.90				.62		.47		.65		.80		.90				1.05		1.20		1.10						
Ferris-G. P. Dome	$1.60					.90																						
‡**Four Bear	$0.85																											
Frannie—Light	$0.85					.35		.20		.40				.53				.61										
—Heavy						0.25		.10		.30				.43				.51										
Grass Creek—Light	1.25	.90				.62		.47		.65		.80		.90				1.05		1.20		1.10						
—Heavy	.90	.90				.90		.90		.90		.50		.50				.50					.45					
Greybull	1.25	.90				.60		.65		.65				.90				1.05		1.20								
Hamilton Dome	.85															.45												
La Barge	Mid-Co	ntinent s	chedule a	s posted	by Stano	lind Cru	de Oil Pu	rchasing	Compan	y.																		
Lance Creek	1.33	.98				0.75		.60		.80		.95		1.05				1.05		1.15								
Lander-Hudson Oil Co.						0.65				.65																		
Woodson Oil Co.						.35				.35								.45										
Lost Soldier	.80	.55				.30					.35				.54			.69										
‡Mule Creek	1.20	1.20				1.20				1.20		1.20		1.20				1.20		1.20								
‡Notches	.45																											
***Oregon Basin	.70		.60									.60					.70		.75		.90							
†Osage	.85	1.05				1.10										1.05												
Pilot Butte	1.53	.7514					1.58							.50														
‡**Pitchfork																												
Poison Spider	.70																											
‡Rex Lake	1.10	1.10				1.10		1.10		1.10		1.10		1.10				1.10		1.10		.90						
Rock Creek	1.01	.66				.45		.30		.50		.65		.70				.85										
Simpson Ridge	0.80																											
South Casper Creek	0.70		**																									
‡*South Sunshine																												
‡*Sunshine																												
Torchlight	1.25	.90				.60		.65		.65				.90				1.05		1.20								
‡**Warm Springs	.40																											
††West Mule Creek	1.12	.77			.52		.37		.57					.80				.95		1.10								

*No posted field price—field with potential production.
**No posted field price—basis of settlement for State's royalty oil.
***No posted field price—price established by Secretary of Interior for Government royalty oil.
†Field price posted by Montana refineries; not posted by any Wyoming purchasing agencies.
††No posted field price; effective January 1, 1931, Board of Land Commissioners established price of 20c above Mid-Continent in settlements for State's royalty oil. (Average gravity for field 35.4° A. P. I.)
‡Field shut in.

GASOLINE PRICES CASPER																												
Tank Wagon (Less Tax)	.13	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.10	.10	.11	.11	.12	.12	.13					
State Gas Tax	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04
Service Station Charge	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03					
Service Station Price	.20	.18	.18	.18	.18	.18	.18	.18	.18	.18	.18	.18	.18	.18	.18	.18	.17	.17	.18	.18	.19	.19	.20					
CHEYENNE																												
Tank Wagon (Less Tax)	.14	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12½	.12½	.12½	.12½	.12½	.10	.10	.07	.10	.11	.11	.14					
State Gas Tax	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04
Service Station Charge	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.00	.00	.00	.03	.03	.03	.03					
Service Station Price	.21	.19	.19	.19	.19	.19	.19	.19	.19	.19	.19	.19½	.19½	.19½	.19½	.19½	.14	.14	.14	.17	.18	.18	.21					

THE STATE OF WYOMING,
Office of State Geologist.

Cyrus O. Wertz,
Mineral Production Supervisor

SCHEDULE OF PIPE LINE TARIFFS EFFECTIVE IN WYOMING AS OF FEBRUARY 1, 1932, AS SHOWN BY THE FILES OF THE PUBLIC SERVICE COMMISSION, WITH CERTAIN COMPUTATIONS IN CONNECTION THEREWITH

Company	Date Effective	Service	Point of Origin	Destination	Posted Tariff per barrel of 42 U. S. Standard Gallons	Rate per Gallon	Kind of Oil	Average Gravity	Miles of Pipe Line	Rate per mile per barrel	Rate per mile per gallon
Illinois Pipe Line Company	August 9, 1929	Gather and Transport	Big Muddy Field	Big Muddy	$ .15	$ .00357	Light	35.5°			
Producers and Refiners Corporation	July 1, 1930	Gather and Transport	Lost Soldier Field	Casper	.40	.00952	Light	31.4°	90.20	$ .0044345	$ .0001055
Producers and Refiners Corporation	July 1, 1930	Gather and Transport	Salt Creek Field	Casper	.25	.00595	Light	38.2°	37.72	.0066278	.0001578
*Illinois Pipe Line Company	June 20, 1923	Gather and Transport	Salt Creek Field	Casper	.25	.00595	Light	38.2°	44.90	.0055679	.0001325
Central Pipe Line Company	October 6, 1922	Gather and Transport	Salt Creek Field	Casper	.25	.00595	Light	38.2°	37.75	.0066225	.0001576
Fargo Western Oil Company	July 1, 1929	Transport	South Casper Creek	Casper	.30	.00714	Black	17.0°	22.50	.0133333	.0031733
Illinois Pipe Line Company	June 20, 1928	Gather and Transport	Grass Creek Field	Chatham	.20	.00476	Light	44.0°	24.01	.0083298	.0001983
Illinois Pipe Line Company	September 10, 1920	Gather and Transport	Osage Field	Clay Spur	.15	.00357	Light	39.0°	8.09	.0185414	.0004412
Illinois Pipe Line Company	October 20, 1928	Gather and Transport	Oregon Basin Field	Cody	.15	.00357	Black	21.0°	15.41	.0097339	.0002316
Illinois Pipe Line Company	May 1, 1920	Gather and Transport	Mule Creek Field	Dakoming	.25	.00595	Light	31.4°	14.00	.0178571	.000425
Illinois Pipe Line Company	May 7, 1924	Gather and Transport	Byron Field	Greybull	.25	.00595	Light	44.2°	41.76	.0059865	.0001424
Illinois Pipe Line Company	April 1, 1921	Gather and Transport	Elk Basin Field	Greybull	.35	.00833	Light	43.0°	63.39	.0055213	.0001314
Illinois Pipe Line Company	September 1, 1917	Gather and Transport	Grass Creek Field	Greybull	.25	.00595	Light	44.0°	78.81	.0031721	.0000754
Illinois Pipe Line Company	June 1, 1926	Gather and Transport	Hamilton Dome Field	Greybull	.25	.00595	Black	26.3°	77.08	.0032433	.0000772
Illinois Pipe Line Company	July 1, 1925	Gather and Transport	Rex Lake Field	Hatten	.15	.00357	Light	35.0°	1.87	.0802139	.0019091
*Illinois Pipe Line Company	May 15, 1923	Gather and Transport	Salt Creek Field	Illco	.20	.00476	Light	38.2°	30.46	.0065659	.0001561
Illinois Pipe Line Company	May 2, 1927	Gather and Transport	Dutton Creek Field	Laramie	.25	.00595	Light	33.0°	34.34	.0072801	.0001762
Illinois Pipe Line Company	June 24, 1926	Gather and Transport	Rock Creek Field	Laramie	.25	.00595	Light	35.3°	38.11	.0065599	.0001561
Illinois Pipe Line Company	March 10, 1919	Gather and Transport	Lance Creek Field	Lusk	.25	.00595	Light	43.6°	25.20	.0099206	.0002361
Midwest Refining Company	August 15, 1928	Gather and Transport	La Barge Field	Opal	.35	.00833	Light	32.0°	38.00	.0092105	.0002192
Egaso Operating Company	January 13, 1932	Gather and Transport	Osage Field	Osage	.15	.00357	Light	39.0°	13.75	.0109091	.0002596
Producers and Refiners Corporation	July 1, 1930	Gather and Transport	Casper	Parco	.40	.00952	Light	38.2°	102.40	.0039062	.000093
Producers and Refiners Corporation	July 1, 1930	Gather and Transport	Ferris Field	Parco	.25	.00595	Light	31.0°	32.20	.0077639	.0001847
Producers and Refiners Corporation	July 1, 1930	Gather and Transport	Lost Soldier Field	Parco	.30	.00714	Light	31.4°	52.20	.0057471	.0001367
Producers and Refiners Corporation	July 1, 1930	Gather and Transport	Salt Creek Field	Parco	.55	.01309	Light	38.2°	136.90	.0040175	.0000956
*Illinois Pipe Line Company	September 5, 1918	Gather and Transport	Pilot Butte Field	Riverton	.20	.00476	Light	37.2°	29.10	.0068728	.0001635
Illinois Pipe Line Company	June 25, 1931	Gather and Transport	Dutton Creek Field	Rock River	.25	.00595	Light	33.0°	20.06	.0124626	.0002966
Illinois Pipe Line Company	September 25, 1924	Gather, transport and load into cars	Rock Creek Field	Rock River	.20	.00476	Light	35.3°	7.57	.0264201	.0006287
Illinois Pipe Line Company	November 5, 1920	Transfer from Storage tanks to cars	Rock River	Rock River	.15	.00357	Light	35.3°			
Atlantic Pacific Oil Co. of Wyoming	May 23, 1923	Transport	Derby Dome Field	Wyopo							
			Per day - 250 bbls. or less		.20	.00476	Black	21.2°	11.00	.0181818	.0004327
			Per day - 250-500 bbls.		.175	.00417	Black	21.2°	11.00	.0159091	.0003791
			Per day - 500 bbls. or more		.15	.00357	Black	21.2°	11.00	.0136363	.0003245
			Averages, All Oils		.2517	.00718	All	34.9°	40.31	.0116073	.0002762
			Averages, Light Oils		.2341	.00609	Light	37.0°	41.78	.0116879	.0002781
			Averages, Black Oils		.225	.00536	Black	21.4°	31.50	.0111231	.0002397

*Petition to abandon line pending.

March 26, 1932, Application on Pilot Butte Line withdrawn.
March 26, 1932, Application to abandon Salt Creek-Ilco line approved.

FOR TRANSPORTING NATURAL GAS

New York Oil Company	February 28, 1927	Transport	Sand Draw Field	Casper	$ .09	Rate per 1,000 cubic feet.
			Sand Draw Field	Glenrock	.11	4% deduction to cover line losses.

TENTATIVE CORRELATION OF GEOLOGIC FORMATIONS IN WYOMING

Compiled by M. Grace Wilmarth, Secretary of Committee on Geologic Names, U.S. Geological Survey, August 1930
with additions by the State Geological Department

Age	Yellowstone Park	Southwestern Wyoming	Southern Wyoming: Rock Springs uplift	Southern Wyoming: Hanna Basin region	Southeastern Wyoming	Northeastern Wyoming	Central Wyoming	Wind River Mtns near Lander	Bighorn Mtns (east side)	Bighorn Basin	Elk Basin
Recent	Alluvium and hot spring fm Lacustrine deposits	Alluvium, etc. 0-250 Terrace deposits 0-400	Alluvium Terrace gravels	Alluvium	Alluvium, etc.	Alluvium, etc.	Alluvium	Alluvium Terrace gravel	Alluvium Terrace deposits	Alluvium 0-40 Hot springs deposits 0-20 Terrace gravels 40-90	Alluvium Terrace gravel
Pleistocene	Glacial drift	Glacial drift 0-150		Terrace gravels 0-50 ft.	Glacial drift, terrace deposits, etc.	Terrace deposits		Glacial drift	Glacial drift		
Pliocene	Lava flows, breccia and intrusives 11,000 Tower Creek ("Canyon") cgl			N. S. Geog. Bd.	~~Ogalalla~~ Ogallala fm. 0-300 (clay, sand, gravel, with calc. cement)				Tertiary (?) sand and gravel 30		
Miocene			Bishop cgl. 0-200 (Miocene?)	North Park fm. (Miocene ?) 0-400 ± (whitish sand and sh., volcanic ash, some ls.; cgl. at base).	Arikaree fm. 0-700 (sand, gravel, boulder beds; locally ls. lens).						
Oligocene					White River group: Brule limey Clay 0-300 (pinkish sandy clay, gravely streaks); Chadron fm. 0-100 (gray to brown ss., sh., sand, gravel).	White River fm. 0-200 (light-colored sand and sh., soft cross-bedded sss., limey coarse cgl)	White River fm. 0-1500 (light-colored limey sand, arkose, cgl.)				
Eocene							Uinta (?) fm. 0-90 (Beaver Divide).				
		Bridger fm. 0-1800 (greenish sand and sh., largely volcanic ash; white beds)	Bridger fm. 0-2000 (gray and greenish sh., ss., white marl, ls., chert, cgl.)				Bridger (?) fm. 0-185 (Beaver Divide).			Later Eocene barren beds 600	
		Green River fm. 0-2000: Thin-bedded calc. sh., some ss.; light colored 1200 Light-colored ls. 800	Green River fm. 1350-1500: Morrow Creek memb. 0-600± Tower ss. lentil 0-240 Laney sh. memb. 0-1200 Tipton sh. memb. 0-325 Cathedral Bluffs tongue of Wasatch fm 0-1500								
	Pinyon cgl.	Wasatch group: Knight fm. 500-1750 (red and yellow sandy sh. and sss; some concretionary ls.) Fowkes fm. 0-2500± (volcanic ash or white beds; ls. layers) Almy fm. 2100-2500: Red and yellow sss; sh.; Cgl. at base	Wasatch fm. (main body) 1000-5600 (variegated sh., gray, buff, and pink sss., grit, cgl., coal).	Hanna fm. 7000± (dark-gray, yellow, and carbonaceous sh.; white, gray, brown sss, some cross bedded; cgls and conglomeratic sss.; ss. at base).		Wasatch fm. 0-2400 (soft gray sh., thin grayish white sss., and coal beds)	Wind River fm. 0-2900 (soft, variegated sh., coarse brown ss., arkose, and cgls.) Wasatch fm. 0-2500 (yellow sss., gray sh., and coal)	Wind River fm. 0-2000+ (vari-colored sh., shaly ss.; cgl. at base).	Wasatch fm.: Light-gray sh. and ss. and somber-colored sh. Kingsbury cgl. memb. 0-2500 (cgl. of pebbles from Madison ls., Bighorn and Deadwood fms.)	Wasatch fm. 100-3000 (variegated sh., and sss.; thin cgls. and coals; conglomeratic ss. at base). Wind River fm. (red and gray sh., sandy sh., and gray sss.).	Wasatch fm. 3200± (variegated sh., coarse sss., in places conglomeratic).
	Early acid breccias and lavas	Evanston fm. 0-9500 (gray, yellow and black sh. and yellow sss.; some coal) (Tert. or Cret.)	Post-"Laramie" fm. 0-9400 (gray, brown, and white sss.; drab, brown, and black sh.; coal; cgl. at base)	Ferris fm. 6500± (light to dark-gray carbonaceous sh.; buff to brown cross-bedded ss.; 1000 feet of cgl. at base).	(In part Upper Cretaceous)	Fort Union fm. 0-2000: Tongue River member 250-400 (gray sh. and thin bluish white sss., few coal beds) Lebo sh. member 250-400 (gray to black sh., ferruginous concretions; thin coals).	Fort Union fm. 0-2430 (bluish white sss. and sand, gray sh., ferruginous sss., and coals)	Fort Union fm. probably present	Fort Union fm (drab, bluish, and brown sh., sss, coal beds).	Fort Union fm. 0-6000 (vari-colored sh., white, gray, buff, and dark sss., some cgl. and coal).	Fort Union fm. 4330 (sh. and sss., some ls. and conglomeratic sh.).
Eocene (?)		(?)	"Laramie" fm. 1000-3900 (white, yellow, and gray sss. and sh.; some coal).	Medicine Bow fm. 6200± (gray carbonaceous sh.; gray to brown cross-bedded and ripple-marked ss.; cgl., and thin coals) **	Lance fm. 0-10,000(?). (friable sss., sh., and locally coal beds)	Lance fm. 0-3220±: Tullock member 400-600 (yellowish sand and sh., hard calc. sss., thin coals). Hell Creek member 800 (gray and brown sandy sh., dark-gray gritty sh., massive buff sss)	Lance fm. 0-3200: Concretionary buff sss. and darker sh Shale and thin sss.; some thin coals		Lance fm. 2000± Piney fm 1500 to 3000	Lance fm. 0-2630 (yellow and gray sss, sandy sh., some coal).	Lance fm 690 (sss., sh., ls.)
Upper Cretaceous	Montana group undivided. Thick (sss. above; sh. below)	(?)	Lewis sh. 750-1600 (gray and drab sh.; some shaly ss.; concretions).	Lewis sh. 500-3300± (dark-gray sh., shaly sss., coal beds).	Lewis sh. Fox Hills ss. 0-700± (friable sss., sandy sh.; locally coal)	Fox Hills ss. 75-250± (light-gray to brown sss., concretionary sss., sandy sh. and carbonaceous sh).	Lewis sh. 0-1400 (white to brown ss, gray sh.) Fox Hills ss. 700 (white and brown sss. and sandy sh.)	Montana group undivided.	Fox Hills ss. 200	Meeteetse fm. 250-1400 (drab, gray, and brown sh. and argill. sss; sandy sh., bentonite, and coal)	Bearpaw fm. 225 (sh. and ss., some ls. toward base).
		Adaville fm. 2800-4000+: Sh., sss., and many coal beds. Lazeart ss. memb. 0-200	Mesaverde group: Almond fm. 700-950 † Ericson ss. 800-1100 † Rock Springs fm. 600-1400 † Blair fm. 1000-1800	Mesaverde fm. 1250-3600: Pine Ridge ss. memb. 80-450 XXX	Mesaverde fm. 2000-2700±: Teapot ss. memb. Gray sh. and coals Parkman ss. memb. Pierre sh. 1200-5000 (dark sh. and thin, friable, buff to brown sss.; calc. concretions).	Pierre sh.: XXX 150-250 Monument Hill bentonitic memb. 150± XXX 500-800 Mitten black sh. memb. 150-200 Kara ferruginous memb. 800-1000: XXX Thin; Groat ss. bed 0-150; Pedro bentonite bed 0-20	Mesaverde fm. 0-1200: Teapot ss. memb. 0-200 Sh., sss, thin coals. Parkman ss. memb. 350 Sss., sh., thin coals 200 Massive buff ss. 150	Mesaverde fm. 200+ (massive light-buff ss. and sandy sh.).	Mesaverde fm.: (?) (?) Parkman ss. memb. 350-400± Pierre sh. 1500 to 3500	Mesaverde fm. 120-1450 (massive buff, gray, and white sss., thin gray and brown sh., some coal).	Judith River fm. 580 (light to variegated sss. and sh., some carbonaceous beds and bentonite). Claggett fm.: Parkman ss memb. 540; Sandy sh. 190 Eagle ss. 350-400: Sandstones, some sh. 200; Marine sh., 100-160; Elk Basin ss. memb. 10-40 (brown, thin-bedded).
		Hilliard fm 3000-6800 (gray to black sandy sh.; shaly white sss.)	Baxter sh. 3350-3600 (gray and drab sh., thin-bedded sss.; many zones of calc. concretions) †	Steele sh. 3000-4000± (dark-gray sandy concretionary sh., with sss. and shaly sss.).	Steele sh. 2500-3000 (dark-gray sh., thin sss. and sands).		Steele sh. 0-2500±: Gray sh. 1100 Shannon ss. memb. 0-175 Gray sh. 1000-1045	Cody sh. 4350 (dark-colored sh. and sandy sh., ss. near middle). Mancos sh. 720-6110 (upper part very rusty sandy sh.; lower part drab sandy sh.).	Steele sh.: Gray sh. 1100± Shannon ss. memb. 130-175 Gray sh. 1045	Cody sh. on west side of basin Steele sh.	
				Niobrara fm. 370-850 (dark calc. sh.).	Niobrara sh. (or ls.) 100-500± (gray to buff calc. sh., some sandy sh., and soft fissile sh.; in places chiefly gray ls. and chalky ls.).	Niobrara fm.: Beaver Creek chalky memb. 125-200 Sage Breaks sh. memb. 250-325	Niobrara sh. 0-1750 (light-colored sh., in places aren.; some thin lss.).		Niobrara sh. 200± (gray sh.)	Niobrara sh.	Niobrara sh. 1600 (calc. sh., ls., and ls. concretions).
				Carlile sh. 150-200 (dark-gray to black sh.; some sandy layers).	Carlile sh. 100-425 (dark sh., thin sss., ls., concretions).	Carlile sh.: Turner sandy memb. 150-200 XXX 75-125	Carlile sh. 150-250 (dark sh.; some concretionary beds).		Carlile sh. (gray; concretions).	Frontier fm. on west side of basin Carlile sh.	Carlile sh. 100 (sh., limy masses, vein calcite, some sand).
Cretaceous	Colorado group undivided 2000 (sh. with some lss.)	Frontier fm. 2200-3800: Coal-bearing beds 400 Oyster Ridge ss. memb. (coarse ss., in places conglomeratic). Sh., sss. and coals.	Frontier fm. 70-160 (gray and white sss. and sandy sh.).	Frontier fm. 400-800 (thick sss. and thin shales above: dark-gray sh. below).	Frontier fm. 100-800 (sss. and sh). Greenhorn ls. 0-50	Greenhorn fm. 40-350 (sh. and impure concretionary lss.; in places chiefly ls). Belle Fourche sh. memb. 500-850 (dark-gray to black clayey sh., sandy sh., large calc. concretions; some bentonite).	Frontier fm. 800-1000: Wall Creek ss. memb. 150 Gray sh and buff to white sss. 800 Torchlight ss memb. Peay ss. memb. Peay ss. memb. Dark sh 250	Frontier fm. 400-500 (chiefly gray coarse-grained ss.). Colorado group undivided.	Frontier fm. (sss. and sh). Benton sh. 1150	Frontier fm. on east side of basin: 0-7 Torchlight ss. memb. 15-48 250 Peay ss memb. 100-167	Frontier fm. 450-545: Absent Torchlight ss memb. 30-115 Sh. and ss. 175-280 Peay ss. memb. 82-100 Sh. and hard sss.
		Aspen fm. 1200-2000 (gray and black sh., shaly sss., compact sss.; fish scales).	Aspen sh. 320-480 (dark-gray to black fissile platy sh.; fish scales).	Mowry sh. 300-750 (fissile dark-brown to black sh.; weathers white or light gray; fish scales).	Mowry sh. 75-175 (hard bluish gray sh.; fish scales). Graneros sh. 120-800 (gray flaky sh. with concretions; massive ss. at top).	Graneros sh. 800-1250: Mowry: Mowry sh. memb. 115-150± (hard light-gray sandy sh.; fish scales; bentonite). Nefsy sh. memb. 10-50 (dark-gray sh. and sandy sh.). Newcastle ss. memb. 0-75 (reddish to light-yellow ss.; some carbonaceous sh., bentonite, and coal). Skull Creek sh. memb. 175-300 (dark-gray to black clayey sh; concretions; some ss.)	Mowry sh. 250-300 (light-colored fissile sh.; fish scales).	Mowry sh (hard gray sh.; fish scales).	Mowry sh. 280-300 (hard sh., slabby sss.; fish scales).	Mowry sh. 160-400 (hard gray to white sh. with fish scales, some ss. and bentonite).	Mowry sh. 160-190 (aren. sh. and thin sss.).
				Thermopolis sh. 140 (dark-gray sh.; sandy layers).	Thermopolis sh. 200-610		Thermopolis sh. 150-485 (soft dark to black sh.).		Thermopolis sh.	Thermopolis sh. 400-800 First Muddy sand near middle; "Rusty beds" at base 100±	Thermopolis sh. 470± (dark sh., thin sss., bentonite). ("Rusty beds" at base)
		Bear River fm. 500-5000± (black sh., shaly sss. and lss., some coal). *	Dakota(?) ss. 110-150 (gray ss., in part conglomeratic; some gray sh.).	(?)	(?) Dakota(?) ss. 60-300 (gray to buff and reddish massive ss.). (Hartville uplift)	(?)	(?) Dakota(?) ss. 0-60	(?) Dakota(?) ss. 0-60	(?) (?)	(?)	(?)
Lower Cretaceous	Kootenai fm. 250± (sh., qtzite, ss.). (Mapped under Cloverly color on Wyoming State map.)	(?)		Cloverly fm. 231-275 (usually two sss. separated by sh.; lower ss. conglomeratic).	Cloverly fm. 50-236 (two to four gray sss., clay or sh.; cgl. in lower part) (?) Fuson(?) fm. 60+ (sh. and sandy sh., with ss. locally). (Hartville uplift) Minnewaste(?) ls. 0-5 (Hartville uplift) Lakota(?) ss. 100 (light-colored massive ss.). (Hartville uplift)	Inyan Kara group: Fall River ss. 40-160 Fuson fm. 10-100 Lakota ss. 25-350	Cloverly fm. 150+: Shaly ss. or ss.; Dark sh.; Cgl. with ss. layers; Thin coal at base. Lower Cret. gray sh. 100-600 Lower Cret. cgl. 8-60	Cloverly fm. Lower Cret. sh. and sss., cgl. locally 400-410	Cloverly fm. 30-300 (massive coarse gray ss., in part conglomeratic, and variegated clay). (?) Fuson fm. (gray to purple sh.). Lakota ss. (coarse ss.)	Cloverly fm. 0-300: Greybull ss. memb 10-25 (massive buff ss) At top Gray or bright-colored clay or sh., massive buff ss.; conglomeratic beds at base.	Cloverly fm. 480: Greybull ss. memb. 1-40± At top Shale and sss. Thick cgl. at base.
Cretaceous (?)		Beckwith fm. 900-5500 (vari-colored sh. and sss.; some dark-gray or black sh., ls. and cgl.). (Correlation of upper part uncertain.)	Morrison fm. 500 (variegated sh.; thin lenses of ss.; cgl.).	Morrison fm. 200-350 (variegated sh., sandy sh. and sss.).	Morrison fm. 100-430± (vari-colored sh., thin sss. and lss., some limy concretions).	Morrison fm. 40-160 (variegated sh., thin white sss., nodular light-gray ls).	Morrison fm. 100-250 (maroon and greenish sh., with several hard sss.).	Morrison fm. 225-650 (variegated sandy sh., sss., cgl., thin lss.)	Morrison fm. 100-300 (massive variegated sh. and thin gray sss.)	Morrison fm. 130-580 (varicolored sh., soft sss.).	Morrison fm. 190 (variegated sandy and clayey sh. and sss.).
Jurassic	Ellis fm. 500± (lss., marl, sh.). (Upper Jurassic)	Twin Creek ls. 1600-3800 (black and gray sh., shaly lss.; some yellow ss.).	Twin Creek ls. 125 (gray thin-bedded ls. above; gray sh. below).	Sundance fm. 85-100 (green, olive, drab sh., with some thin sss.). (Upper Jurassic)	Sundance fm 0-300 (gray, blue, and pink calc. sh., thin lss., lower part largely buff to reddish sss.).	Sundance fm. 300-400 (light-gray to dark greenish gray and pinkish sandy sh.; ss. at top and near middle).	Sundance fm. 150-300 (dark-gray to green sh.; several beds of argill. ls.; white ss. in lower part).	Sundance fm. 200-350 (olive green or gray ls. and calc. sh.).	Sundance fm. 250-450 (green sh. and soft buff and gray sss).	Sundance fm. 200-530 (glauconitic green and gray sh., calc. sss., gypsum, some ls.)	Sundance fm. 400-550 (sh., sss., thin lss.; thick gypsiferous member at base).
	Lias	Nugget ss. 500-1300 (red and light-colored sh and sss.; dark sss. and lss.).	Nugget ss. 950 (white and gray cross-bedded ss., red sandy sh. in upper part).		Lias 50		Lias fm. 150		Lias 50		
Triassic	Teton fm. 200-400 (sh., sss., some ls. and chert): (?) Limestone like Thaynes 60 Red sandy sh. Shaly brown ls. (Dinwoody fossils). 800	Ankareh sh. 500-1000± (brown to dark-red sss. and sh.). (Triassic?) Thaynes ls. 1000-2600 (yellow, gray, blue cherty lss.; some yellow sss). Woodside sh. ~~400-500~~ (red and brown shaly sss. and sh.).	Ankareh (?) sh. 200 (red and gray sandy sh., ss., grit). Thaynes (?) fm. (red ss. and sh., thin and thick lss). Woodside sh. (red to greenish sh., drab calc. sh., thin sss.). 760	Chugwater fm. ("Red Beds") 1000-1100 (red sh., with vari-colored sss. and several beds of gypsum).	Jelm fm 250 (red beds including ls. cgl. with wood fragments and Triassic vertebrates) Chugwater fm 550-1250 (red sh, soft sss., thin lss., gypsum). ("Red Beds") (?) Spearfish fm. 450 (dark reddish brown thin-bedded ss., ls. lenses; thin beds of gypsum in lower part). (Triassic ? "Red Beds") Bunter S.S.	(?) Spearfish fm. 450-650 (alternating red sh., sandy sh., red sss., and gypsum). (Triassic ? "Red Beds") Bunter S.S.	Chugwater fm ("Red Beds") 800-1200 (red sss., sandy sh., gypsum; ls. near top to east and near middle to west). (Alcova ls. memb. at top) Bunter S.S.	Jelm ("Popo Agie") fm. 300± (variegated sh. and sss.; gypsum at top). (Upper Triassic vertebrates in lower part.) Chugwater fm. 900-1200 (red sandy sh., massive sss., thin lss., and gypsum). Dinwoody fm. 30-254 (greenish gray sh. and shaly lss.). (Lower Triassic)	Chugwater fm. ("Red Beds") 600-1400± Bunter S.S. (red sh., soft sss., thin lss., and gypsum).	Chugwater fm. ("Red Beds") 600-1300 (red sandy sh. and sss., some gypsum and ls.). Dinwoody fm. 50-60 (calc. sh., ss., gypsum). (Lower Triassic)	Chugwater fm. ("Red Beds") 400-530 (red sh. and sss., thick gypsum near top). (?)
Permian	Phosphoria fm. 100-340 (ss., qtzite, chert, and phosphate rock).	Park City fm. 700-1400 (gray sandy ls.) Phosphoria fm. 450-1200: Rex chert mem. 250-300; Phosphatic sh. and phosphate rock	Park City fm. 115 (white and gray lss., chert, sss., sh. and phosphate beds).	Embar fm.	Forelle ls. 0-30 (bluish gray compact ls., much gypsum). Satanka sh. 0-240 (sandy red sh., thin lss. and sss., some gypsum) Minnekahta ls. 0-20 (Permian?). (gray to purplish thin-bedded platy ls.). Opeche fm. 60 (Permian ?). (bright-red sss. and red sandy sh.).	Minnekahta ls. 30-50 (light-gray to pinkish or purplish thin-bedded ls.). (Permian ?) Opeche fm. 50-80 (red sss. and sandy sh.; purplish at top in some areas).	Embar fm. 220-300 (light-gray ls., sh., chert, gypsum, and phosphate).	Embar group: Phosphoria fm. 200-300 (lss, phosphatic sh., some chert and dol.) ("Spiriferina pulchra ls." at top.)		Embar group 80-480: Phosphoria fm. 200+ (thin sss, red sh., ls.).	Embar fm. 50±
Pennsylvanian	(?) Quadrant qtzite 200-425 (qtzite, ss., some ls. and sh.).	Wells fm. 2000-5200: Limestone 200; Qtzite 1000; Cherty ls. and ss. 4000 Weber qtzite 1000 (gray to white qtzitic ss., in places calc. and brecciated). (?)	Weber qtzite 1000 (white) Older Pennsylvanian 1000 Dark-blue ls. Sh., ss., coals	(?) Vespertine Tensleep ss. Amsden fm. 350	Casper fm. 500 to 1240: (?); Hard gray ss (Tensleep ?). Light-gray ls. or dol. 200-500; Ss. or qtzite 60-100 Hartville fm. 650: Massive gray ls., some chert nodules; thin, vari-colored sss.; Red sh. and gray ls.; Red qtzite streaked with white.	(?) Minnelusa ss. 300-1000 (light-gray to buff calc. sss., massive and thin bedded; sandy sh.; some dolomitic ls. and concretions). (?)	(?) Vespertine Tensleep ss. 200-500 (fine-grained, white, cross-bedded quartzose ss). Amsden fm 350±	(?) Vespertine Tensleep ss. 250-550 (fine-grained friable ss., white, buff, pink, cross bedded). Amsden fm. 250-385: Sh., ss., thin dol., and lss.; Darwin ss. memb. 20-70 (cream-colored ss., cross bedded).	(?) Tensleep ss. 30-350 (white to buff ss., massive and cross bedded). Amsden fm. 150-350 (red sh. and sss., and white lss., some cherty).	(?) Tensleep ss. 30-250 (massive buff to gray cross-bedded ss., some thin lss.) Amsden fm. 90-300 (red sh. and sss., thin lss., and chert).	(?) Tensleep ss. 150 Amsden fm. 160
Mississippian	-(?)- -(?)- Madison ls. 1300-1600 (white or cream-colored ls. above; dark-colored ls. below)	Brazer ls. 1500± (massive gray light-colored ls.). Madison ls. 1300-2500± (massive dark-blue or brownish gray ls.)	Massive white and blue lss. 1000	-(?)- Madison ls.	Guernsey fm. 75-200: Massive gray ls.; Sandstone; Conglomeratic qtzite	Pahasapa ls. 300-700 (white, pale buff, pinkish and gray ls. in massive beds) Englewood ls. 0-50 (thin-bedded pinkish ls. or dol.).	Madison ls. 100-700 (gray to light-gray massive ls.).	Madison ls. 250-800 (dark-gray lss, some dol. and calc. sh.).	Madison ls. 600-1000 (chiefly massive light-colored lss., some slabby beds).	Madison ls. 550-1000 (massive gray ls.)	Madison ls. 1000
Upper Devonian	Threeforks ls. 170-250 (gray, cherty ls.) Darby fm. in Teton Range	Threeforks(?) sh. 80 (drab sh. and ls.)	Devonian Cadent				Devonian 150 (sh. and thin lss.) Cadent	Limestone Cadent 118ft		Ponant and Cadent 82ft.	
Middle Devonian	Jefferson ls. 110-300 (dark to black crystalline ls.)	Jefferson ls. 600-1000 (buff to gray ls.; much mag. ls in upper part).									
Lower Devonian	(?)	(?)								(?)	
Silurian	Absent	Silurian (?) in Labarge Ridge.					Meridal 40ft.				
Upper Ordovician	(?)	Upper Ordovician in Labarge Ridge				Whitewood ls. 0-80 (massive hard ls. or dol., mottled pink).	Bighorn dol.	Bighorn dol. 100-300: Leigh dol. memb. 0-115 (slabby milk-white dol.) Cream to buff dol. Coarse ss locally.	Bighorn dol. 250-300 (chiefly hard, massive white to buff lss.; white or gray ss. at base).	Bighorn dol. 40-300 (massive hard gray siliceous dol. and ls).	Bighorn dol. 350
Middle Ord	Represented	(?)									
Lower Ord.	Absent	(?)									
Upper Cambrian	Gallatin ls 110-400: Massive lss., shaly layers and brecciated beds. Calc. and argill. sh Mottled ls 100-150 (black, gray)	Limestone and green sh	Shale, calc. sh., sss., and pinkish qtzite			Deadwood fm. 50-300 (green sh., brown ss. and qtzite, some ls. and breccia).	Cambrian ls., sh., qtzite.	Gallatin ls 200-250± (chiefly ls.; sh. and ss. in middle).	Deadwood fm. 800-1500: Gray slabby ls. with flat-pebble ls. cgl. 200 Greenish sh. and sss Brown ss., mostly coarse 20-400	Gallatin ls. 150 Deadwood fm. 700-1500 (ss, sh., cgl., ls). -(?)-	Deadwood fm. 800
Middle Cambrian	Gros Ventre fm (sh.; thin lss. toward top). 700 to 750 Flathead qtzite (ss. or qtzite; cgl. at base in places).	(?)	Reddish qtzite or ss	-(?)- Quartzite				Gros Ventre fm. 450-580 (green and gray sh., lss.; calc. cgl. and ls. cgl.) Flathead ss. 300 (gray or brown shaly ss., sandy sh., brown ss. or cgl.).		Gros Ventre fm. 600 Flathead ss. 250	
Lower Cambrian		(?)									
Algonkian	Sheridan qtzite 0-	(?)	Reddish sss and cgls	Greenstone schist (Archean ?) Seminoe fm. (iron bearing) 0-350± (Probably Archean	Sherman granite and other igneous rocks. Whalen group (qtzite, schist, siliceous ls. and gneiss).	Schist and granite.	Pre-Cambrian schist 1000±	Quartzite, slate, schist, granite, and gneiss		Granite, schist, and gneiss	
Archean	Granite and gneiss	Gneiss and granite	White qtzite, schist, etc.	Greenstone schist			Archean granite, etc.		Granite		Granite

*Probably includes considerably more than equivalent of Dakota ss.

†Fully defined in forthcoming report by J. D. Sears, Bull. 781.

**Includes some marine Upper Cretaceous.

Waved lines indicate unconformities.