

ANNUAL REPORT OF THE STATE NATURAL GAS SUPERVISOR.

OFFICE OF STATE NATURAL GAS SUPERVISOR,
MARION, IND., February 15, 1905.

Prof. W. S. Blatchley, State Geologist:

DEAR SIR: I have the honor to submit to you herewith my second annual report as State Natural Gas Supervisor, covering the calendar year of 1904, and being the thirteenth annual report from this department. The gas field has undergone a series of changes in the past year, and new conditions are confronting the producers. It has been impossible for me to collect and compile a report containing all the data regarding the field as it exists at the present time. In view of this, I have dwelt upon those conditions which will be of most importance to those in the preservation of the natural gas industry.

I trust the report will receive your approval and be found worthy of consideration by the public.

BRYCE A. KINNEY,
State Natural Gas Supervisor.

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All persons interested in the production of natural gas throughout the State of Indiana are more or less familiar with the laws governing the production and consumption of this natural product, as well as the law enacted by the State Legislature creating the office of State Natural Gas Supervisor and defining his duties.

Laws are made to conform to and govern existing conditions. As conditions change they necessitate the extension, modification or conformation of the laws applicable. Likewise the change of conditions has caused the attention of this office to be directed in somewhat different channels than formerly. Former reports from this office have undoubtedly given in a general way the exact conditions of the field. Owing to the radical change in conditions, such reports will be cited only by way of comparison. It shall be my purpose in this report to give more of the data regarding the condition of the field; also, the dangers which threaten to lessen, if not make it impossible, to produce this great natural resource.

The law provides that it shall be the duty of the State Natural Gas Supervisor to make a personal inspection of all gas wells of the State as far as practicable; to see that every precaution is taken to insure the health and safety of the workmen engaged in opening gas wells, laying mains and pipes, and also the safety of those who in any manner use natural gas for mechanical, manufacturing, domestic or other purposes. Today only skilled workmen are employed by contractors, gas companies and manufacturers; hence these duties require little attention from this office.

This office is also required to incorporate in this annual report to the State Geologist complete and tabulated statistics of the number of gas wells, with their location and record of geological strata passed through in drilling them, the volume of gas pro-

duced, the rock pressure, the increase or decrease in rock pressure and volume flow, the number of miles, capacity and cost of mains laid; the cost of gas as fuel; the number of persons employed in the production of gas. Much of this information is published by the Bureau of Statistics; besides, some of it is not relevant to the demands of today. I inspect a sufficient number of wells to gain correct ideas as to the condition of the gas supply. The inspection of pipe lines once each year, or as often as the State Geologist may require, is only partially necessary, since all of the larger gas companies employ men to inspect their lines regularly. In general the public realize the limitation of our gas supply, and less of the supervisor's time is demanded in the enforcement of this branch of the law, although there are some who have no conception of the value or supply of gas, and seem to think it inexhaustible. The general public must come to the realization of the fact that the natural gas must be husbanded, or the supply will soon be exhausted. As a means towards this saving, the introduction of the meter system has been a great factor. The most important duties required of this office at present are to see that laws of the State pertaining to the drilling and plugging of wells and the consumption of gas are enforced. As the field develops and the territory extends the duties of this office become greater in proportion with this development. Wells that five years ago were considered worthless and plugged are now considered good, and every precaution is taken to preserve and prolong their life. Much trouble is caused by the rusting and decay of mains and the iron in these old wells. This office has given constant attention to wastes of this nature. Five years ago four good wells would supply a city of twelve thousand with fuel; today it requires fifty wells, and then the supply is limited, although the consumers are more careful than formerly.

Oil and gas interests are in a way opposed to each other, yet the same dangers threaten both, as will be shown in another chapter of this report. Certain oil operators have shown a disposition to disregard the laws provided for the production of the gas product, and the number of prosecutions against oil operators for waste of gas have been greater than last year. Other operators conform strictly to the law, and realize that they have barely

enough gas to provide fuel for the leases, and although a heavy gas pressure interferes with the production of oil, there is no necessity of wasting the gas to enhance the oil production, for the reason that the gas can be turned into the mains of the gas companies, who are always ready to purchase it at a fair price. It is now the opinion of experienced oil and gas men that if the supply is as carefully husbanded in the future as during the last year that we will have gas for several years to come.

One year ago gas waste threatened to exhaust the gas supply. Today it is the introduction of fresh water into the gas rock that menaces both the oil and gas industry. If the existing laws prescribing the manner in which wells shall be plugged are complied with, it is a sufficient protection against this evil as from the wells that are now abandoned. There has been a disposition on the part of some to disregard this law, and it has been impossible for the Supervisor or his deputies to be present at all times when wells were plugged for the reason that they had no notice of the intention of the operator to abandon the well. In the main prosecutions for a failure to comply with the provisions of this law have been against people who have no permanent interest in the field. Those who have producing properties understand the necessity of properly plugging abandoned wells, and exercise great care in this regard for the preservation of their own property. The attention of this office has been earnestly directed to this portion of its duties. I have endeavored to do that which would be of most importance to oil and gas interests under present conditions.

CONDITION OF THE GAS FIELD.

Today the condition of the gas field is so varied and so constantly changing that to make an intelligent report is very difficult. During the early history of the field the conditions were almost uniform, and examination of one or more sections gave an idea of the condition of the entire field. To gain any knowledge of all of the field and of the gas supply at this time it is necessary to visit and examine each section of the field, as well as to understand the general character and location of the gas rock. In this field Trenton limestone is referred to as gas rock, while in truth

only a small part of Trenton limestone is gas rock. Only the porous part of Trenton limestone is gas rock, as it alone has the textural formation necessary to a gas reservoir. It is found within the Trenton formation, cropping out on either surface. It is usually found from one to fifteen feet below the upper surface of the Trenton rock and is from one to fifty feet thick. In a few instances the vein has been found deeper, but there is rarely over fifty feet of continuous gas rock. Both surfaces of the rock are very irregular, and in no instance has the surface been found level for any considerable distance. A relief map of the surface, as shown in Prof. Blatchley's report of 1903, would show many elevations and depressions.

The early history of the field showed similar conditions throughout the entire gas area, which remained the same until the advancing salt water met the lower portions of the overlying strata of hard limestone, permeating and completely occupying the lowest parts of the gas rock. The higher parts of the gas rock have been completely shut off from each other as the gas has been consumed and as the salt water has advanced. Thus instead of being one immense gas reservoir, as there was for years, there are numerous independent reservoirs, each completely sealed by the salt water. The life of the gas in each independent reservoir depends upon the height and breadth of the elevation, the porosity of the rock and the consumption of gas. As the supply of gas diminishes and the salt water advances, the reservoirs from which we now obtain our gas will be divided and subdivided into smaller reservoirs, until the supply is exhausted. If, in drilling, one of these elevations or small reservoirs is struck, a "gusher" is reported, and, conversely, if a depression is struck, the result is obvious.

The above explains the reason for the great difference in the life, rock pressure and volume of gas produced by wells located in the same field. Often wells on the same farm show a great variation in the rock pressure and volume of flow. One may produce gas in commercially valuable quantities for six months, while another may fill up with salt water within a week.

Another element with which the gas field has to contend is the oil industry. The progress of this industry and its effect upon the gas industry will be treated in another chapter of this report.

As stated in former reports, the last few years have developed peculiarities and differences from previous years in the history of natural gas. For the first few years after the discovery of gas there was little systematic drilling. Wells were drilled when and where they were needed; no attention was paid to waste, and every city and town was supplied with an abundance of gas. Within a few years after its discovery pipe line companies entered the field and the drilling and development became systematic. The different parts of the field were connected. Pipe line companies, gas companies and manufacturers soon realized that they would have to lease territory to hold as a reserve for future development, and also to plan their field of operation. The larger gas companies endeavored to gain control of the entire field. This failed because the highways could not be pre-empted, and wherever a gas company could gain a right of way for a pipe line enough well sites could be acquired without much trouble. From the beginning pipe lines have been extended, year after year, toward what was considered the center of the field. When possible, wells were drilled one-half mile apart, although the distance has never been uniform; sometimes small areas contiguous to pipe lines were undeveloped. After this nothing remained but for the companies to re-drill their territory. With only a few exceptions the drilling done during the year was on locations between old wells, nearly all of which had been drilled years ago. The per cent. of failures is increasing yearly, and when gas is found the flow is seldom over 500,000 cubic feet, and frequently below this. Today wells are considered good that a few years ago, when the production was at its highest point, would have been considered failures.

Although the wells obtained today are small, still, they are profitable. Gas today sells for five times as much as it did ten years ago. The cost of a well is rarely more than the cost of drilling, as all the iron is generally taken from abandoned wells. Much of the gas territory is becoming oil territory, and the wells are not a loss, although gas is not discovered.

ABANDONED TERRITORY.

Many of the larger gas companies have abandoned much of their territory, pulled their wells and disposed of their leases to oil companies, as much of the abandoned gas territory is now producing oil. The Lafayette Gas Company has done no drilling in the past year. They have pulled twenty-five or more wells, and their pressure has depreciated in the last year from an average of from seven to twenty pounds to from three to zero at the present time.

The Logansport and Wabash Valley Gas Company have pulled about forty wells, and have entirely abandoned the Logansport division of their company, having taken up all pipe lines and abandoned all the wells.

The Indiana Gas Company has pulled fifteen wells, has made no extension and has done no drilling in the past year. The best pressure that they have is from three to three and one-half pounds, with the exception of three or four wells being located in what is known as the Sheridan field, which is in the southern edge of Tipton County. These wells have a comparatively high pressure, but a great amount of water and very little gas.

The Consumers' Gas Company, whose properties were located near Fairmount, and between Alexandria and Indianapolis, have practically abandoned all of their wells and sold their properties to oil companies for oil development.

NEW TERRITORY.

The Barnes Gas Company, of Marion, have drilled fifteen wells in the last year, with an average rock pressure of one hundred pounds and an average volume of 200,000 cubic feet to each well. The best well was drilled during the month of December, 1903, on the Edward Goldthwaite farm, one mile east of Marion. This well started with a volume of 500,000 cubic feet, and is now making 50,000 cubic feet. The following is the record of this well:

Drive pipe	160 feet.
Casing	420 feet.
Top of Trenton.....	873 feet.
Total depth	887 feet.

A deep well was drilled on the William Amsden farm, located in Center Township, Grant County, in which gas was struck at a depth of 280 feet in the Trenton. A volume of water came into the hole before reaching this depth. As yet they have been unable to exhaust the water, and consequently the well is not producing gas at this time. The gas coming up through 600 feet of water showed a pressure of several pounds; however, no correct test of the well has been made. The record of this well is as follows:

Drive pipe	140 feet.
Casing	440 feet.
Top of Trenton	900 feet.
Total depth	1,297 feet.

Four good gas wells were drilled on the William Boxwell lease, located four miles northeast of Marion, in Washington Township, Grant County. These wells were drilled into the Trenton to a depth of about sixty-five feet, showing an average rock pressure of one hundred pounds and a volume of 250,000 cubic feet.

On December 8, 1904, a well was completed on the Flora Evans lease, located in the southwest quarter of section 14, in Bear Creek Township, Jay County, showing a rock pressure of 350 pounds. No correct test has been made of the volume. The record of this well is as follows:

Drive pipe	303 feet.
Casing	387 feet.
Top of Trenton	933 feet.
Total depth	1,060 feet.

About thirty wells have been drilled in the vicinity of Knightstown during the past year. These wells have been drilled by local companies, and show a rock pressure of about 70 pounds, with an average volume of about 200,000 cubic feet. The average record of these wells is as follows:

Drive pipe	85 feet.
Casing	390 feet.
Total depth	950 feet.

GIBSON COUNTY OIL AND GAS FIELD.

During the year 1904 there have been about forty-five gas and oil wells drilled in the vicinity of Princeton, in Patoka Township, Gibson County. The average record of these wells is as follows:

Drive pipe	100 feet.
Casing	600 feet.
Total depth	870-910 feet.

One of these wells was completed on the Dixon lease during the month of July, 1904, by the Ohio Oil Company, and developed a rock pressure of 310 pounds, with a volume of 600,000 feet when completed. It now shows a rock pressure of 260 pounds and a volume of 100,000 feet. This well was drilled to the depth of 872 feet. Another well was drilled in the same vicinity on the Miller lease, which developed a rock pressure of 300 pounds and a volume of 800,000 feet. The rock pressure of this well is now about 260 pounds and the volume 100,000 cubic feet. Two wells were drilled on the Knight lease by the Southern Oil Company. No. 1 developed a volume of 600,000 cubic feet and No. 2 a volume of 400,000 cubic feet.

All of the foregoing wells are located in the vicinity of Princeton, which city has been faring well in the way of gas. Their glass factory is being operated at its full capacity, and its residents are well supplied with gas for fuel. Almost all of the oil wells produce more or less gas. The gas product from the oil wells is used for operating the leases, and the balance, if any, is turned into the gas mains of the gas companies. While the gas product in the vicinity of Princeton is very satisfactory at the present time, the history of the field will, in all probability, be a repetition of that at Loogootee, where the conditions were practically the same.

THE CONSUMPTION OF GAS.

The consumption of natural gas has not decreased as much during the past year as it did during the year of 1903. While it is true that a number of gas companies have abandoned their properties and ceased operating, other companies have done considerable drilling and have succeeded in keeping their production from ma-

terial depreciation. All the gas companies sell their gas by meter measurement. Under this system of measurement the companies receive about five times as much for their gas as they did under the flat rate system. In general the consumers do not rely wholly upon gas as a fuel during the colder months, yet they still continue to use it in connection with other fuel. Thus the use of natural gas for domestic purposes is about the same as it was during the year 1903.

It is impossible to say how much gas is used for manufacturing purposes. A number of the factories have not shut off the gas entirely, but continue to use it during the summer months. But few factories will leave the gas field for the reason that the supply is becoming less. The majority of the more substantial factories in the field are supplementing the limited supply of gas with other fuel. It is impossible to say how long the gas supply will last. It is the opinion of experienced gas men that under the present system of measurement and consumption it will last for a considerable length of time. All the cities that were using gas during the year 1903 have continued the use of same with one exception. The city of Indianapolis has entirely abandoned the use of natural gas as a fuel.

WASTE OF GAS.

It is hardly necessary to say anything about this subject, for the reason that it has been thoroughly gone over in the report of 1903 and the conditions are now practically the same as during that year. Most of the waste can be charged to carelessness in the way of imperfect fittings and improper burners. While it is true that it is difficult to produce oil from a well with a high gas pressure without wasting gas, the present pressure is at a point where oil can be produced with little difficulty. There are numerous localities in the oil field where the gas is so scarce that the operator has trouble in obtaining sufficient gas with which to operate the leases. If there is a surplus, it can be turned into low-pressure gas mains of gas companies at a fair compensation. By experience I have ascertained the sections where the disposition to waste gas seems greatest, and, by constant attention, I have re-

duced the waste of gas to a minimum. Of course, it is only by constant attention that waste of gas can be prevented as long as any remains in the mains.

PLUGGING OF ABANDONED GAS AND OIL WELLS.

Another element with which the gas industry has had to contend is the introduction of fresh water into the oil and gas rock from wells that have been improperly plugged, or, as is often the case, not plugged at all. This is an evil which, at the present time, seriously threatens the oil and gas industry throughout the State. Much has been done to enforce the law regarding the plugging of gas and oil wells. The condition of the field at the present time shows that this subject needs constant attention. This condition, although new to the Indiana field, is not new to old and experienced operators, for the same conditions have developed in the Eastern fields, after a failure to plug the numerous abandoned wells. Valuable properties have been rendered valueless in this way. As far as I have been able, together with my assistants, I have constantly directed the attention of this office to this phase of its duties. It has been impossible, under existing conditions, for a representative from this office to be present in person at all times when wells are plugged. While the more responsible operators have vigorously complied with the provisions of the law, still, there are numerous wells throughout the State that have been improperly plugged or not plugged at all, as is evidenced by the vast amount of fresh water which is being pumped from oil wells in certain localities in the field.

COMPRESSING STATIONS.

The annual report from this office for the year 1901 says: "With the decrease in the rock pressure in the field came the necessity for using compressors on pipe lines. The pressure required to transport natural gas depends primarily upon the consumption. With no consumption, and the pipe line perfectly tight, the pressure at the outlet of the line must be the same as at the wells, and with the line wide open at the point of consumption the loss of pressure is at a maximum. The amount of natural

gas that can be transported in any pipe line a given distance depends upon the size of the line and the pressure in the same, the former governing the volume of gas and the latter the velocity. Thus, as the field pressure decreases the question presented to both gas companies and manufacturers is whether to build compressing stations or increase their pipe line capacity. Some have adopted the former, others the latter, while occasionally it has been necessary to resort to both." Some of the gas companies have installed compressors during the year 1904, while others have either reduced the capacity of their compressors or abandoned the gas industry altogether.

The Huntington Light and Fuel Company have established a new compressing station near Upland. This station was started in the month of November, 1904. They obtained their gas supply from the Upland, Matthews, Gas City and Marion fields, and have a capacity capable of supplying 20,000 people. The station at Upland is one of the best in the field.

The Ft. Wayne Gas Company has established a new compressing station near Anderson. This station draws its gas supply from the territory south and southeast of Anderson and from the territory near Frankton and Pendleton. This station possesses a capacity equal to that of the Huntington Light and Fuel Company, but it is doubtful if their supply is as great as that of the former company.

The Chicago Gas Company has removed about one-half of their compressors at their Fairmount and Greentown stations. The Lafayette Gas Company has reduced the capacity of their station, located at Summitville, in the same proportion. The reduction of the capacity at the above-mentioned stations has been due to the fact that their gas supply has been considerably diminished.

The Princeton Natural Gas Company and the Petersburg Natural Gas Company have not, as yet, established compressing stations. They continue to rely on the rock pressure to furnish a sufficient supply of gas to the consumers. Their supply, as stated by Prof. Blatchley, in his annual report of 1903, is obtained from the Huron sandstone, and the wells are not as long-lived as those of the Trenton limestone field. The above-named companies will, in all probability, be compelled to establish compressing stations

within the next year. The production from the Loogootee field, in Martin County, has diminished considerably. The area of the field remains practically the same as in the year 1903.

I have tested the pressure in all of the lines transporting gas from the larger and more powerful compressors, and have not found the pressure to be above 200 pounds at any time.