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IN AND BY THE STATE OF OKLAHOMA.

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AN EVALUATION OF WATER POLLUTION CONTROL

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WALTER DERBY JOHNSON

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AN EVALUATION OF WATER POLLUTION CONTROL
IN AND BY THE STATE OF OKLAHOMA

APPROVED BY

Jim E. Reese
A. J. Karolowski
J. L. Robinson
David Morgan

DISSERTATION COMMITTEE

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AN EVALUATION OF
WATER POLLUTION CONTROL
IN AND BY THE STATE OF OKLAHOMA

CHAPTER I

INTRODUCTION

Sporadic outcries against the increasing pollution of America's waterways have echoed throughout this century but it was not until the post war period that concerted efforts were directed towards this problem. World War Two and the ensuing reconstruction period acted as a catalyzing and intensifying force for the arguments against indiscriminate dumping of wastes into America's rivers and streams.

The growing industrial complex, necessitated by the war effort, and the population boom of the post war years resulted in mass movements of men and machinery into the countryside. Water, the once abundant resource became caught up in the development paradox.

Water was needed in its purer forms for drinking, cleaning and cooking by individuals. Industries utilized it for manufacturing and processing. Farmers irrigated their crops with it. Its abundance in the form of lakes and streams furnished recreation facilities.

Water also served another purpose. It was the transporter of our wastes, a need second only to that of domestic consumption.¹ It was counted on to wash the country clean. As population continued to grow and per capita income rose, production processes were increased to meet the growing demand for goods and services. At the same time the uses and needs for water grew. It was becoming increasingly apparent that a serious conflict was arising between waste removal and domestic and industrial consumption.

In the early stages America's waters were able to purify themselves through their own biological, chemical and physical properties. As the nation grew and people and industry began to concentrate, the quantity of wastes dumped into the waters outdistanced their ability of self-purification. Cities and towns turned to basic forms of water treatment to satisfy the demands of their populace. Urbanization continued to increase the waste load at the same time it increased demand for clean water. New industrial processes based on technological advances in the war and post war years resulted in new residues being emptied into our waters with unheard of resistance to normal treatment methods. The balance between potable water supplies and

¹Shirley W. Allen, Conserving Natural Resources (New York: McGraw-Hill, 1955), p. 66.

effluent transportation was being radically altered in many areas of the United States.

Unfortunately, rather than being treated as a depletable natural resource water has been considered as an inextinguishable free good. Nothing could be further from the truth. The water cycle on earth makes up what is called a closed ecological system, from evaporation to condensation to rain to rivers and streams and eventually evaporation again. The existence of water in many diverse forms does not alter the fact that its total supply is fixed. While man has not reduced the quantity of water he has affected its quality. His actions have caused a very large proportion of the earth's water supply to become unusable.

The cause of this dilemma may be traced to the market's inability to equate private and social costs in cases involving external diseconomies. As stated by Allen V. Kneese:

It has long been evident that economic institutions on which we customarily rely to balance costs and returns -- the interaction of market forces in a private enterprise system -- do not perform this function satisfactorily for waste disposal. Aesthetic nuisance in a stream destroys public values that are not marketable. In deciding how to dispose of its wastes, an upstream firm or city is not forced to take into account the costs imposed upon downstream water users or the value of water use opportunities foreclosed by its effluent discharge.²

²Allen V. Kneese, The Economics of Regional Water Quality Management (Baltimore: Johns Hopkins Press, 1964), p. 4.

Even in cases where businessmen realize the social cost associated with their sewage release they are hesitant to install treatment facilities. They argue that investment of this type will leave them with a competitive disadvantage unless others in their industry are required to follow suit. This failure of the market to consider all costs or ignore them in the apportionment of a resource such as water, forms the basis for intervention by an outside force.

Several state governments in the heavily urbanized areas of the eastern seaboard initiated legislation aimed at water quality control in the early 1940's. Their impact was limited, however, due to the inability to impose standards along the total length of the water course. This intra-state limitation severely handicapped efforts to improve a given state's waterways. Very few streams start and end within the boundaries of one state. If a water quality program is to be effective it cannot be limited to certain stretches of the river. It must be applied throughout.

There were two alternative solutions to this dilemma. First, the individual states could attempt to set up inter-state compacts among themselves. Second, they could request the federal government to intervene utilizing its authority over interstate waters. Needless to say, the concept of states rights prevailed and the first alternative was chosen. The federal government stated its willingness to assist the states in the Pollution Control Act of 1948 but it refrained

from direct controls until 1965.³ By this time several things had become evident. Not all the states were pursuing the goal of clean water with the same vigor. The interstate compacts were not working out as had been hoped. Although some progress had been made, notably in New England and the Ohio River Valley, stream quality had generally continued to deteriorate. Clean water was becoming a major issue in political circles. The result was the Water Quality Act of 1965 (P.L. 89-234), amending the 1948 legislation.⁴

The Water Quality Act placed the burden of water quality control squarely on the states. They were given eighteen months to establish water quality criteria for interstate streams and tributaries within their boundaries. To assure coordination of a nationwide program these criteria were subject to approval by the federal government. If a state failed to comply with this directive the federal government would establish standards for the state. The new direct approach taken by the federal government forced the states to reappraise their efforts in the area of water quality control.

The problems faced by the various states differ considerably and depend to a large extent upon their relative state of economic development and rate of growth. It has

³33 U.S.C. §466 (1964).

⁴33 U.S.C. §466 (Supp. V, 1970).

become clear that water can no longer be treated as an unlimited resource. Positive steps must be taken to assure the availability of adequate supplies for future economic growth. Control efforts must be flexible rather than static if they are to cope with the rapid changes forecast for the coming decade. Clearly the quality of water rather than its quantity is the issue of the 1970's.

Purpose and Scope

The purpose of the proposed research is to evaluate water pollution control in and by the State of Oklahoma in the light of the state's continued economic growth. Although the historical perspective will be researched, emphasis will be focused upon the 1960-70 time period. In analyzing Oklahoma's ability to meet present and future water quality problems four basic questions must be answered:

One: What procedures has the state provided for controlling the pollution of its water ways? This entails a study of the legal and organizational framework set up by the government as well as the water quality standards. In order to determine the success or failure of the system it is first necessary to establish the objectives sought and the structure devised to attain the stated goals.

Two: What is the record of financial support accorded to pollution control? An examination of the varied

sources and amounts of funds will provide an indication of the seriousness of the state in this project and the possibilities for expanding the program.

Three: What is the manpower commitment accorded water quality control in Oklahoma? The answer to this question does not lie in numbers alone. The ability to perform depends upon training and experience. Personnel requirements must reflect these traits.

Four: Given the legal framework, financial status and manpower commitment to pollution control, what is the state's record with respect to surveillance and enforcement? Are municipalities, industries, and individuals within the state complying with the pollution statutes? If not, what have the regulating bodies imposed in the way of penalties?

Where deficiencies exist in the present system, alternative solutions to the problem of water pollution control in Oklahoma will be advanced. It is imperative that a strong and viable control program exist within the state. Without sufficient water Oklahoma's growth will be severely limited.⁵

⁵The realization of this fact is highlighted by the widespread interest in this study and its resulting recommendations. The Governor's staff, members of the State Legislature, the Industrial Development and Park Department and numerous other state agencies have continuously requested opinions on water quality control questions based on the findings in this evaluation. The Industrial Development and Park Department is publishing the study for distribution to state agencies and other interested parties. Perhaps the most satisfactory result was the drafting of new legislation on environmental control.

On the other hand, in areas where water pollution control in the state is adequate the system will certainly have value as a model to other areas encountering similar problems.

Format

The first five chapters will examine the present status and effectiveness of Oklahoma's water quality control program. This first chapter serves as the introduction. Chapter Two centers on the evolution of water pollution control within the state. In order to grasp the full meaning of the current statutory authority in the area of water quality management it was necessary to trace its development from the days when Oklahoma was still a territory. The Annotated Statutes of Oklahoma and The Oklahoma Session Laws were invaluable in researching this particular aspect of the study. Federal laws applicable in this instance were found in the Annotated United States Code.

An evaluation of the state's record of financial support of the water quality program is found in Chapter Three. The separation of expenditures for water pollution control in the budget reports of the five state agencies engaged in this project is a relatively recent innovation. In most cases it was not initiated until 1968. This necessitated a comprehensive and detailed study of the files of these agencies. Where agency records were incomplete or

missing the archives in the State Capitol Library were relied on. Once derived, these figures were checked against the totals maintained by the State Budget office. Direct appropriations and income from an excise tax on oil and gas production are the two most significant sources. The state also receives some federal assistance.

The search for financial data was combined with an analysis of the manpower commitment of the state. The results are contained in Chapter Four. In addition to the records search, extensive interviews with personnel in the five agencies were conducted to gain insight into their responsibilities and duties. Job descriptions, along with the dates the various positions were established, were furnished by the State Merit Board.

The state's surveillance network and resulting enforcement record comprises the subject of Chapter Five. The ultimate objective of the program is the assurance of compliance by all potential pollution sources. Gaps in the surveillance system may result in excessive damage to the state's water resources. Enforcement actions must be handled with minimum delay and maximum efficiency. Time is the crucial element in water pollution prevention and abatement.

Through the years the State Legislature has apportioned water pollution control among five state agencies on the basis of the effluent source. Each of these agencies has developed

its own surveillance network. In order to understand the different systems and evaluate their efficiency it was necessary to examine each one separately. The actual surveillance procedures were then compared to those which had been stated in annual reports to the federal government.

Chapter Six is reserved for recommendations concerning the restructuring of the present water quality control program. These recommendations are predicated on the basis of the analysis contained in the first five chapters. Alternative solutions to problems in financing, manpower, surveillance and enforcement are advanced.

THE ESTABLISHMENT OF WATER
QUALITY CONTROL IN OKLAHOMA

CHAPTER TWO

Oklahoma's current water quality system is a product of both the pre- and post-1965 efforts to cope with the problem. The state of Oklahoma had embarked upon a water pollution control program prior to the passage of the Federal Water Quality Act of 1965. Many of the requirements of Public Law 89-234 were satisfied by extensions of or revisions in existing laws and policies. A full understanding of the final product necessitates an examination of the accomplishments of both periods.

Organizational Evolvment Prior to 1965

The authority to control water pollution at the state level is normally founded in the adoption of a doctrine of water law by the state government. In the United States two such doctrines have evolved, riparian right and appropriation.

The riparian doctrine is the older of the two. Like many of our early laws it is a product of the immigration of men and ideas from the continent. This explains its predominance in the eastern states. The basis of riparian right is the ownership of land abutting a water supply. Property owners are acknowledged the right to a "reasonable

use" of water flowing over, under or beside their land.

The appropriative doctrine makes no reference to the position of property in relation to water. Its basic tenet is "first in time, first in right." Appropriation evolved in the 19th century goldfields where water was an essential tool of the mining process. Claims were often some distance from the water source, necessitating the construction of canals or other means of conveyance. Disputes over water rights were settled according to who initiated the first use. It is a system of priorities. Most of the gold rush states adopted the appropriation principle. As a result, it has become known as the western doctrine of water law. Oklahoma is one of the few states that passed both riparian and appropriative laws. The contributions of each to modern day pollution control requires examination.

Riparian was the first of the two ideologies adopted in Oklahoma. The First Territorial Legislative Assembly passed a statute establishing riparian rights in 1890. This statute was based upon a then existing section of the Laws of the Territory of Dakota.¹ It began with the following provision:

The owner of the land owns water standing thereon, or flowing over or under its surface, but not forming a definite stream. Water running in a definite stream, formed by nature over or under the surface may be used by him as long as it remains there; but he may not prevent the natural flow of the stream, or of the natural

¹Wells A. Hutchins, The Oklahoma Law of Water Rights, (Oklahoma City: Oklahoma Planning and Resources Board, 1955), p. 17.

spring from which it commences its definite course, nor pursue nor pollute the same.²

When Oklahoma was admitted to the Union this statute was carried over into the new state laws.³

In subsequent years this passage was referred to by the Supreme Court of Oklahoma in decisions concerning injuries to riparian users stemming from pollution of their water by upstream proprietors. The earliest and most famous case is *Markwardt v. Guthrie*.⁴ The court directed the city of Guthrie to pay Markwardt for damages he incurred when the water flowing past his farm became polluted from sewage discharges released upstream by the city. The court held that the township was creating a nuisance and thereby effectively reducing the value of downstream property. The nuisance criteria became the basis of decisions in pollution cases brought before the State Supreme Court under the law of riparian rights.⁵ It established the right of individuals to sue stream polluters for damages.

²Terr. Okla. Stat. § 4162 (1890).

³Rev. Laws of Okla. § 6634 (1910).

⁴*Markwardt v. Guthrie*, 18 Okla. 32, 90 P. 26 (1907).

⁵Among others see *City of Cushing v. Luke*, 82 Okla. 189, 199 P. 578 (1921). *City of Edmond v. Billen*, 170 Okla. 37, 38 P. 2d 564 (1935); *City of Moore v. Central Oklahoma Master Conservancy Dist.*, 441 P. 2d 452 (1968).

In 1897, only seven years after the provision for riparian water rights, the Territorial Legislature enacted a separate statute setting forth the appropriative doctrine. It made no direct reference to pollution or its control. It simply stated:

That the unappropriated waters of the ordinary flow or underflow of every running stream or flowing river, and the storm or rainwaters of every river or natural stream, canon, ravine depression or watershed within those portions of the Territory of Oklahoma in which by reason of the insufficient rain-fall, or by reason of the irregularity of the rain-fall, irrigation is beneficial for agricultural purposes, are hereby declared to be the property of the public, and may be acquired by appropriation for the uses and purposes and in the manner as hereinafter provided.⁶

The significance of this statute is found in its identification of water as a public good. The embodiment of this concept of public ownership is the cornerstone of further statutory law aimed at the protection of this valuable commodity.

The Territorial Engineer was appointed administrator of the appropriative procedure in 1905.⁷ In the Revised Laws of 1910 the term "Territorial Engineer" was changed to "State Engineer",⁸ but the process for attaining appropriative rights remained. This was the earliest in a series of

⁶Sess. Laws of Terr. Oklahoma Ch. 19, art. I § 1 (1897).

⁷Sess. Laws of Terr. Oklahoma Ch. 21, art. I § 1 (1905).

⁸Rev. Laws of Okla. § 3643 (1910). Also see Notes 39 and 40.

of steps leading to an extension of the state's power over water. Others came in the form of agencies created to monitor particular aspects of water use. These agencies were given legal recourse for combating water pollution.

Department of Wildlife Conservation

It is somewhat amusing to note that the state's earliest specific attempts to control water pollution were initiated to protect wildlife and agricultural interests rather than her citizenry. In setting out the duties of the State Game and Fish Warden in 1909 the Legislature made it illegal to deposit deleterious substances in state waters for the purpose of poisoning fish.⁹ Except for a slight expansion in coverage this law remains as the basis of the State Wildlife Conservation Department's involvement in water quality control today.¹⁰

Corporation Commission

In the same year the state enacted specific legislation against the contamination of fresh water supplies used

⁹Sess. Laws of Okla. Ch. 19, art. V § 3 (1909). (Repealed 1951.)

¹⁰29 Okla. Stat. § 409 (1961).

for watering stock by the oil and gas industry.¹¹ Specifications were also set out for the plugging of abandoned oil and gas wells.¹² In 1917 the Legislature conferred exclusive power to regulate the oil and gas industry on the Corporation Commission.¹³ The position of Chief Oil and Gas Conservation Agent was created to oversee these regulations.¹⁴

Although the oil and gas industry grew rapidly in the ensuing years the legal scope of the Commission's pollution surveillance remained the same. Not until the passage of House Bill 569 in 1955 was the Commission's statutory base broadened and its authority clarified.¹⁵ The first paragraph of this act summarized its intent.

The Corporation Commission of Oklahoma, referred to in this Act as the "Commission," is hereby vested with jurisdiction, power and authority, and it shall be its duty, to make and enforce such rules,

¹¹Sess. Laws of Okla. Ch. 26 art. II § 6 (1909); 52 Okla. Stat. § 296 (1961).

¹²Sess. Laws of Okla. Ch. 207 § 2 (1917); 17 Okla. Stat. § 52 (1961).

¹³Sess. Laws of Okla. Ch. 207 § 1 (1917); 17 Okla. Stat. § 51 (1961).

¹⁴Sess. Laws of Okla. Ch. 207 § 3 (1917); 17 Okla. Stat. § 53 (1961).

¹⁵Sess. Laws of Okla. Ch. 9a §1-8 (1955); 52 Okla. Stat. §§ 139-145 (1961).

regulations and orders governing and regulating the handling, storage and disposition of salt water, mineral brines, waste oil and other deleterious substances produced from or obtained as used in connection with the drilling, development, producing, refining and processing of oil and gas wells in this state as are reasonable and necessary for the purposes of preventing the pollution of the surface and subsurface waters in the state. . .¹⁶

Earthen storage ponds for those "deleterious" substances described above were allowed as long as they did not contribute to pollution.¹⁷

The enforcement of this act remained in the hands of the Commission's conservation officer. He was to be assisted by a conservation attorney and field agents employed by the Commission. Individuals and/or companies could appeal decisions of the Commission to the State Supreme Court.¹⁸

A rather notable provision of this act directed the various other agencies of the government, their officers, and municipalities to cooperate with the Commission and render assistance when requested.¹⁹ They were also

¹⁶52 Okla. Stat. § 139 (1961).

¹⁷52 Okla. Stat. § 140 (1961).

¹⁸52 Okla. Stat. § 141 (1961).

¹⁹52 Okla. Stat. § 142 (1961).

directed to file complaints with the Commission in cases where their agents encountered pollution of the type mentioned above.²⁰ This was the first time interagency cooperation in the area of water pollution was given legal recognition.

The state enacted only one other piece of legislation concerning the oil and gas industry prior to the passage of the Federal Water Quality Act of 1965. On June 8, 1965, just four months before the Federal Act, the Legislature granted the Corporation Commission the right to plug or repair abandoned wells.²¹ Prior to this these abandoned wells had been the center of considerable controversy. In the early days many wells had been plugged with logs. Through the years these plugs often rotted or the casings deteriorated to a point where oil or brine began to leak into the surrounding fresh water strata or surface flows. In many instances drilling records were incomplete or companies had gone out of business. When pollution occurred from this source individuals not only lacked recourse for damages, but also a means to stop the pollution. The 1965 law provided that the Corporation Commission could repair

²⁰Ibid.

²¹52 Sess. Laws of Okla. Ch. 191 (1965); Okla. Stat. §§ 309-317 (Supp. 1965).

or plug these wells. It allowed the Commission to traverse both public and private lands in pursuit of this objective.²²

Department of Health

It was not until 1917 that the Legislature publicly recognized the hazards of bad water to its constituents. It enacted a fairly comprehensive law, for that period, designed to protect the public from sewage discharges into state waters.²³ This law defined the water of the state to include "all streams and springs and all bodies of surface and underground water, whether natural or artificial, within the boundaries of the state."²⁴ It further defined sewage as "any substance that contains any discharges from the bodies of human beings or animals, or chemicals or other wastes from domestic use, manufacturing or other forms of industry."²⁵ The act prohibited any future discharge of sewage into the waters of the state unless a permit was granted by the State

²²52 Okla. Stat. § 310 (Supp. 1965).

²³Sess. Laws of Okla. Ch. 166 (1917); (codified at 63 Okla. Stat. §§ 1-901, 1-906, 1-908) (Supp. 1963).

²⁴Sess. Laws of Okla. Ch. 166 § 1 (1917); (codified at 63 Okla. Stat. § 1-901) (Supp. 1963).

²⁵Sess. Laws of Okla. Ch. 166 § 4 (1917); (codified at 63 Okla. Stat. § 1-901) (Supp. 1963).

Board of Health (forerunner of the State Department of Health). It authorized the State Board of Health to require plans and specifications outlining treatment proposals.²⁶ The Board could also set requirements concerning the degree of treatment necessary.²⁷

This act was not retroactive. It provided that individuals or companies discharging sewage into state waters before its passage could continue until such time as the Board deemed it injurious to the public's health.²⁸ This is especially interesting in light of the fact that the statute did not become effective until eighteen months after its passage. This delayed action by the Board until after September 30, 1918.²⁹ While this passage seemed to encourage new discharges before the law would take effect, a second feature demonstrating considerable insight contradicted this thought. Section 5 provided that a permit must be obtained for any extension or addition to already existing individual, municipal, or industrial sewer

²⁶Sess. Laws of Okla. Ch. 166 § 4 (1917); (codified at 63 Okla. Stat. § 1-908 (b)) (Supp. 1963).

²⁷Sess. Laws of Okla. Ch. 166 § 4 (1917); (codified at 63 Okla. Stat. § 1-908 (d)) (Supp. 1963).

²⁸Sess. Laws of Okla. Ch. 166 § 4 (1917). This portion of the original law was not carried over to the new codification for obvious reasons.

²⁹Sess. Laws of Okla. Ch. 166 § 10 (1917); (codified at 63 Okla. Stat. § 1-908 (a)) (Suppl. 1963).

facilities. This provision enabled the Board to effectively control already existing facilities. A penalty clause stipulated that violators were guilty of a misdemeanor and were subject to fines ranging from twenty-five to one hundred dollars if convicted. Each day constituted a separate offense.³⁰ Non-compliance of a Board directive concerning sewage disposal could become a costly choice in terms of 1917 values.

In 1947 the Legislature authorized the State Department of Health to purchase a mobile water and sewage laboratory to complement its existing program.³¹ The unit was to: make stream pollution studies; assist in obtaining information relevant to the design of new treatment plants; check existing water and sewer plants to assure they were maintaining standards; provide laboratory services to municipalities and state agencies lacking these facilities; and assist in the instruction of plant operators.³²

In the same year the Department was assigned the responsibility of monitoring public bathing places.³³

³⁰Sess. Laws of Okla. Ch. 166 § 8 (1917); (codified at 63 Okla. Stat. § 1701) (Supp. 1963).

³¹Sess. Laws of Okla. Ch. 15 § 1 (1947); (codified at 63 Okla. Stat. § 1-905) (Supp. 1963).

³²Ibid.

³³Sess. Laws of Okla. Ch. 15a §§ 1-10 (1947); (codified at 63 Okla. Stat. §§ 1-1013 - 1-1020) (Supp. 1963).

The passage of this statute gave recognition to the growing use and importance of water as a source of recreation for the citizens of Oklahoma.

By the early 1950's Oklahoma's drought cycle had become increasingly apparent. The value of reservoirs for municipal water storage had been demonstrated and their construction was on the rise. In order to avoid pollution of these waters protective measures were undertaken. A Reservoir Sanitation Act was enacted by the Legislature during the 1951 session.³⁴ Since large amounts of public drinking water were involved the Health Department was designated as the controlling agency. The act itself provides for the maintenance of sanitary conditions "on all property located within two hundred (200) feet of the high water line of any reservoir."³⁵ Departmental regulations prohibit boats with marine toilets on a water reservoir having less than 3,000 acres in surface area or less than 10,000 acres where the water is used as a municipal water supply. Where permitted, marine toilets must be capable of producing an effluent with under 240 coliform bacteria per 100 milliliters.

³⁴Sess. Laws of Okla. Ch. 15 §§ 1-8 (1951); (codified at 63 Okla. Stat. §§ 1-912 - 1-914) (Supp. 1963).

³⁵Sess. Laws of Okla. Ch. 15 § 3 (1951). This distance was subsequently changed to 600 feet. 63 Okla. Stat. § 625.2 (b) (codified at 63 Okla. Stat. § 1-913 (b) (Supp. 1963).

The legislature, in 1959, passed the Water and Sewage Works Operators Act.³⁶ This act set up the machinery for the requirement of mandatory certification of individuals responsible for the operation of water and sewage treatment plants. Training programs were established as a prerequisite.

The mandatory licensing program represented the culmination of many years of cooperative effort on the part of numerous individuals and organizations. Back on March 9, 1926, at a waterworks school held in Stillwater, Oklahoma, it was decided to organize the water superintendents for the continuance of educational meetings. This was the beginning of the Oklahoma Water Works Conferences. In the 1929 meeting it was voted to include sewage operators as well. The name was changed to the Oklahoma Water and Sewage Conference. At its 1938 meeting a voluntary licensing program was established. Under the sponsorship of Oklahoma A & M (now Oklahoma State University), the State Department of Health, the Municipal League, and Conference representatives, voluntary licensing was carried out until supplanted by the 1959 act.³⁷

³⁶Sess. Laws of Okla. Ch. 15 §§ 1-17 (1959); 59 Okla. Stat. §§ 1101-1116 (1961).

³⁷Loyd F. Pummell, "Progress Report Water Pollution Control in Oklahoma" (Paper presented at the 19th Oklahoma Industrial Waste and Pollution Conference, Stillwater, Oklahoma, Oct. 1, 1968.), p. 7.

The last major addition to the State Department of Health's legal basis of involvement in water pollution control came in 1963. An amendment that year authorized the adoption of regulations for laboratory submission of operational reports.³⁸ These monthly reports from all waste treatment plants within the state were to form the core of a new comprehensive surveillance system.

Although the State Statutes regarding the Health Departments were codified and renumbered in 1963 the duties enumerated in the above paragraphs were retained. The revision was undertaken for the purpose of consolidation and brevity.

Water Resources Board

As noted earlier in this chapter, the State Engineer was empowered to oversee the appropriation and utilization of Oklahoma's waters under the Revised Laws of 1910. The State Engineer retained these duties until March 28, 1927. On this date "the powers, duties and authorities heretofore conferred upon the State Engineer. . . pertaining to waters, drainage, irrigation and water control" were transferred to the newly created State Conservation Commission.³⁹ The

³⁸63 Okla. Stat. § 1-904 (Supp. 1963).

³⁹Sess. Laws of Okla. Ch. 70 § 2 (1927).

Conservation Commission was a short lived body in the area of water control, relinquishing its coverage to the Oklahoma Planning and Resources Board in 1937.⁴⁰ These amendments and revisions referred only to the agency in charge of the appropriation machinery, however, and in no way changed the procedure of obtaining water rights under this doctrine. Nor were any of these agencies granted statutory authority to control pollution. Oklahoma was preparing to celebrate its golden anniversary as a state when this situation was remedied. The 1950's witnessed the passage of two of the most important pieces of water quality control legislation ever enacted in Oklahoma: the Oklahoma Water Pollution Control Act of 1955 and the creation of the Oklahoma Water Resources Board in 1957.

Until 1955 water pollution coverage within the state was incomplete. The existing coverage was spread among three agencies of the state government. The Department of Wildlife Conservation had authority to investigate pollution in cases where either fish or game were affected. The Health Department entered in cases involving community water supplies. The Corporation Commission had jurisdiction when damage could be traced to the oil and gas industry. It is apparent that this system left many polluters unchallenged. Water supplies, not in current use, had little protection.

⁴⁰Sess. Laws of Okla. Ch. 24 Art. 17 § 2 (1937).

The pollution of these supplies was effectively reducing an important natural resource, one vitally important to the state's future development. The value of this resource had been aptly demonstrated during the dust bowl era. The return of drought conditions in the early 1950's brought back memories of prior conditions and increased the pressure to protect the state's water resources. The culmination of this reaction was the Water Pollution Control Act which became effective on June 7, 1955.⁴¹

There is no mistaking the intent of this act. Its purpose is explicitly set out in the first paragraph:

Whereas the pollution of the waters of this State constitutes a menace to public health and welfare, creates public nuisances, is harmful to wildlife, fish and aquatic life, and impairs domestic, agricultural, industrial, recreational and other legitimate beneficial uses of water, and whereas the problem of water pollution of this State is closely related to the problem of water pollution in adjoining states, it is hereby declared to be the public policy of this State to conserve the waters of the State and to protect, maintain and improve the quality thereof for public water supplies, for the propagation of wildlife, fish and aquatic life, and for domestic, agricultural, industrial, recreational and other legitimate beneficial uses; to provide that no waste be discharged into any waters of the State without first being given the degree of treatment necessary to protect the legitimate beneficial uses of such waters; to provide for the prevention, abatement and control of new or existing water pollution; and to cooperate with other agencies of this State, agencies of other States and the Federal Government in carrying out these objectives.⁴²

⁴¹Sess. Laws of Okla. Ch. 9 §§ 1-14 (1955); 82 Okla. Stat. §§ 903-916 (1961).

⁴²82 Okla. Stat. § 904 (1961).

It was designed with complete coverage in mind. The act recognized the duties of the three agencies mentioned above. It sought to complement their authority through cooperation and supplementation.

Pollution surveillance was extended to all industry within the state.⁴³ Heretofore only the oil and gas industry and those operations which directly affected municipal water supplies were controlled. Permits were now required before any industrial disposal systems could be constructed or altered.⁴⁴ Increases in the volume or the strength of effluent discharges were subject to review.⁴⁵ It became unlawful for any sewage to be allowed to flow into state waters, without a permit. In applying for construction permits detailed plans of the proposed treatment facilities were required and subject to review.⁴⁶ If for any reason these conditions were not adhered to the permits could be revoked subject to the findings of a hearing.⁴⁷ The act also empowered the Attorney General to implement injunctions

⁴³82 Okla. Stat. § 905 (1961).

⁴⁴82 Okla. Stat. § 907 (1961).

⁴⁵Ibid.

⁴⁶82 Okla. Stat. § 906 (1961).

⁴⁷82 Okla. Stat. § 909 (1961).

against violators.⁴⁸

The most farsighted provision of the act required the classification of state waters into groups "according to their present and future best uses."⁴⁹ Water quality standards were to be set up and classification was to be defined in terms of the maintenance of such standards. Provision was made for public hearings to be held prior to classification.⁵⁰ Prominent throughout this section is the continued reference to future as well as current need. It is the first legal recognition of this concept.

Although established as law in 1955 it was two years before implementation of the act began. As originally passed the act fell under the jurisdiction of the Oklahoma Planning and Resources Board. Like its predecessors, however, the Board was hampered by the multiplicity of its duties. Water was but one of its concerns. The creation of the Oklahoma Water Resources Board in May, 1957, removed this obstacle.⁵¹ The Water Resources Board assumed all the duties of the Planning and Resources Board with respect to water including those set out in the 1955 Water Pollution Control Act. Water was the board's only concern.

This was the situation then on the eve of the Federal

⁴⁸82 Okla. Stat. § 912 (1961).

⁴⁹82 Okla. Stat. § 906 (1961).

⁵⁰82 Okla. Stat. § 908 (1961).

⁵¹Sess. Laws of Okla. Ch. 23 §§ 1-10 (1957); 82 Okla. Stat. §§ 1071-1079 (1961).

Water Quality Act. A fairly comprehensive set of state laws had evolved in Oklahoma. Four separate agencies, the Department of Wildlife Conservation, the Corporation Commission, the Department of Health and the Water Resources Board shared the burden of administration. Their statutory powers were based upon the state's right to protect the public domain. This concept had been established with the adoption of the appropriative doctrine of water rights by the Territorial Legislature and its later inclusion in the state's Revised Laws of 1910. In addition to the government's right to prevent pollution of the state waters, individual rights to sue for damages stemming from polluted water had been clearly set out. The nuisance doctrine of the law of riparian water rights had become an accepted fact in the state courts.

Oklahoma's Reaction to the
Federal Water Quality Act of 1965

Until the passage of the Water Quality Act of 1965 the Federal Government had refrained from entering the area of pollution surveillance on the local level. The Pollution Control Act of 1948, as amended in 1956, announced the Federal Government's willingness to assist the states, but direct intervention was not intended.⁵² The 1965 amendment signaled a reversal in previous federal policy. It provided

⁵²₃₃ U.S.C. § 466 (1964).

that the states were to establish water quality criteria for interstate waters and their tributaries.⁵³ These criteria, together with a plan for implementation and enforcement, were to be completed by June 30, 1967.⁵⁴ They were to be sent to the Secretary of the Department of Health, Education and Welfare for approval.⁵⁵ The state was required to inform the Secretary by October 2, 1966, as to its intent.⁵⁶ If the state failed to comply with the provisions of this act the federal government would prepare a set of regulations for the state.⁵⁷

Upon receipt of this statute the state of Oklahoma moved immediately to comply with its requirements. On January 13, 1966, Governor Henry Bellmon issued an executive order establishing the Oklahoma Water Quality Coordinating Committee.⁵⁸ This committee was to be comprised of representatives from

⁵³ 33 U.S.C. § 466 (g) (1) (Supp. V, 1970). The text of P.L. 89-234 is presented in Appendix I.

⁵⁴ 33 U.S.C. § 466 (a) (1) (Supp. V, 1970).

⁵⁵ 33 U.S.C. § 466 (a) (1964). This responsibility was transferred to the Secretary of the Interior under Reorganization Plan No. 2 of 1966.

⁵⁶ 33 U.S.C. § 466 (g) (1) (Supp. V, 1970).

⁵⁷ 33 U.S.C. § 466 (g) (2) (Supp. V, 1970).

⁵⁸ A copy of this letter is contained in Appendix I.

the four state agencies engaged in pollution control. Provision was also made for three non-voting members to be chosen from the State Department of Agriculture, the State Commissioners of the Land Office and the Oklahoma Industrial Development and Park Department.⁵⁹ Aside from satisfying the requirement of P.L. 89-234 the committee was also requested to eliminate any duplication of effort that might exist in this area among state agencies. Three days later, on January 16, 1966, Governor Bellmon notified the Honorable John W. Gardner, Secretary, Department of Health, Education and Welfare of Oklahoma's intent to comply with the new law.⁶⁰

The committee began preparation immediately. Regular meetings were held on the second Wednesday of each month at the State Department of Health. Initial consideration centered on the conduct of the public hearings which were required by the new law.⁶¹ The major issue was whether to develop quality criteria before or after the hearings. Some members feared that prior development might lead the public to believe that opinions had already been formulated. Others argued that the criteria could be utilized as a guide for discussion and constructive criticism during the hearings.

⁵⁹A list of these appointees is found in Appendix I.

⁶⁰A copy of this letter is contained in Appendix I.

⁶¹33 U.S.C. § 466 (g) (4) (Supp. V, 1970).

The latter view prevailed and a task force was formed to prepare the criteria.⁶²

Several sources were drawn upon in this early attempt. Some historical data on the quality of streams and rivers flowing through the state was available from monitoring records of the United States Geological Survey (U.S.G.S.). Richard P. Orth of the Water Quality Branch of the U.S.G.S. consented to serve as an advisor to the task force. The federal government provided information and publications. Committee representatives held meetings and attended public hearings in other states. In order to obtain the views of interests outside the government an Advisory Committee was established by Governor Bellmon in June, 1966. Industry, education, municipalities and conservation were represented.⁶³ The inclusion of Professor George W. Reid of the University of Oklahoma is particularly notable. Professor Reid was, at that time, engaged in research on water quality criteria for Oklahoma. His study was funded through a federal grant. The Advisory Committee utilized the results of this investigation as the basis of their suggestions to the Coordinating

⁶²A list of members of the task force is found in Appendix I.

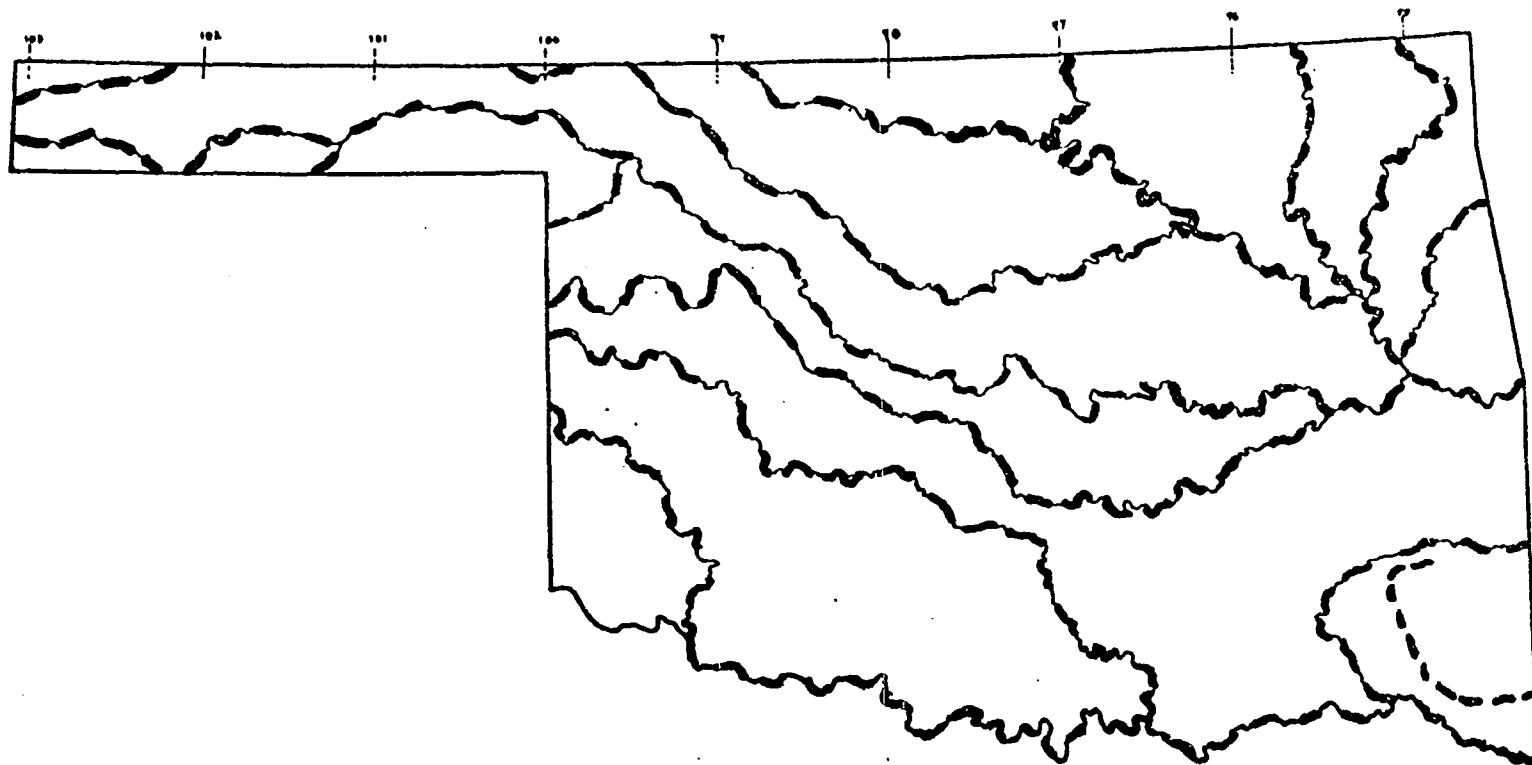
⁶³A list of the members of the advisory committee is found in Appendix I.

Committee.⁶⁴

Compilation of the criteria for presentation at the public hearings was completed by September, 1966. The focus of attention then shifted to the hearings themselves. The river systems in question had already been determined by the federal government's reference to interstate waters (Figure 1). What remained was the order in which the hearings were to be held. It was the opinion of the Coordinating Committee that the quality of water leaving the state should receive priority. Accordingly, hearings on the Lower Red River, the Little River and the Arkansas River below the Keystone Dam were scheduled first. These were followed by public hearings on the criteria evolved for the Poteau River, Illinois and Neosho Rivers, Verdigris and Caney

⁶⁴The quality criteria developed by Professor Reid is found in Appendix I. Unlike the criteria finally adopted by the state, Professor Reid's was broken into four categories of water usage; municipal, recreation, industrial and agricultural. This was in strict compliance with Oklahoma's Water Pollution Control Act of 1955 which directed that the state's waters be classified "according to their present and future best uses", (8a Okla. Stat. § 906) as well as empowering the establishment of water quality standards. This system would have been far more comprehensive than the one in current use. In deciding the degree of protection to adopt in a stream being used for more than one of these purposes the strictest standards would be chosen. Unfortunately the Advisory Committee was little more than a token showpiece. In personal interviews with the author both Harold Cooksey, a member of the Advisory Committee and Leland Roberts, who represented the Department of Wildlife Conservation noted that very little if any attention was paid to the efforts of the membership of this committee.

FIGURE 1
INTERSTATE WATERS SUBJECT TO FEDERAL WATER QUALITY ACT



Rivers, Salt Fork of the Arkansas, and the Red River above Dennison Dam. The final schedule, as derived by the Coordinating Committee, is presented in Table 1.

The same format was used in all of the hearings. Public notice of the hearing was published in local newspapers inviting interested parties to attend. Invitations were mailed to known vested interests. Copies of the suggested criteria were made available in advance. The hearing was presided over by an Assistant Attorney General of the State of Oklahoma. After having the proposed criteria read, the hearing officer requested specific comments and recommendations for change. This was followed by opening the floor to general discussion. Participants were allowed ten days following the hearing to express their views in writing to the committee. A representative of the Federal Water Quality Administration was present at every hearing.

Armed with the information gleaned from the hearings the members of the Coordinating Committee returned to Oklahoma City in March 1967. During the next two months they reviewed the recommendations and comments derived at the hearings. On May 9, 1967, a final hearing was held at the underground auditorium of the state capital complex. The completed version was then forwarded to the Governor.

Oklahoma's water quality standards were submitted to the Honorable Stewart Udall, Secretary of the Interior by

TABLE 1

HEARINGS HELD IN THE STATE OF OKLAHOMA ON QUALITY STANDARDS
TO BE APPLIED TO INTERSTATE WATERS, 1966-1967

River or Stream Covered	Place	Date	Length (Hours)	Attendance ^a
Red River below Dennison Dam	Hugo	October 6, 1966	2	46
Little River Basin in Southeastern Oklahoma	Idabel	November 3, 1966	2-1/2	88
Arkansas River from Keystone Dam to Oklahoma-Arkansas State Line	Muskogee	December 7, 1966	2	46
Arkansas River from Keystone Dam to Oklahoma-Arkansas State Line	Ponca City	December 8, 1966	2	41
Poteau River, Tributaries and Lee Creek	Poteau	February 21, 1967	2-1/4	43
Illinois and Neosho Rivers and Tributaries	Wagoner	February 22, 1967	2	38
Verdigris and Caney Rivers and Tributaries	Bartlesville	February 23, 1967	2-1/2	43
Salt Fork of Arkansas River above Great Salt Plains Reservoir and all Tributaries	Woodward	March 9, 1967	1-1/2	29
Red and Washita Rivers and Tributaries above Dennison Dam	Altus	March 10, 1967	2-1/4	56
Summary Hearing on all Interstate Rivers and Tributaries	Oklahoma City	May 9, 1967	2-1/2	76

^aIncludes members of the hearing committee.

Source: Compiled from Oklahoma Water Resources Board. Proposed Water Quality Criteria and Stream Standard Hearings before the Oklahoma Water Quality Coordinating Committee, 1967.

Governor Dewey F. Bartlett on July 26, 1967.⁶⁵ The standards were approved, with certain exceptions, by the Secretary on February 28, 1968. The Secretary singled out six concepts as unacceptable or in need of further work: (1) A clear and precise statement was requested to the effect that where existing water quality is better than the written standards the existing quality will be maintained; (2) The dissolved oxygen criteria in those streams classified as fishing waters was too low; (3) Specific numerical criteria concerning the content of water utilized for recreational purposes was requested; (4) The allowance of temperature changes, due to external cause, in the Illinois River were to be rescinded because of its possible adverse effect on the trout population of the stream; (5) It was recommended that Oklahoma consolidate its pollution control authority into one agency; (6) The state had agreed to submit a complete list of industries discharging wastes into interstate waters and a plan for abatement by January, 1969, in its standards. The Secretary noted the necessity of attaining this objective if the state was to successfully combat pollution.⁶⁶ The Governor agreed to take these comments under advisement. Several amendments to the original standards were approved

⁶⁵Governor Bartlett had replaced Governor Bellmon in January 1967. Copies of the transmittal letter and the criteria as submitted are contained in Appendix I.

⁶⁶A copy of Secretary Udall's letter to Governor Bartlett is contained in Appendix I.

by the Department of Pollution Control in 1969. They pertained to suggestions one through four contained in Secretary Udall's letter of February 28, 1968.⁶⁷ Although items five and six were never undertaken by the state the federal government approved the amended standards in February, 1970.

The continued operation of the Water Quality Coordinating Committee was assured by the passage of House Bill 905 on May 2, 1968.⁶⁸ This bill, known as the Pollution Control Coordinating Act of 1968, created the State Department of Pollution Control. The Department was to be administered by the former representatives to the Coordinating Committee plus the President of the State Board of Agriculture. Agriculture's legal basis for pollution control was traced to a 1955 law granting the Department authority to regulate pesticides within the state.⁶⁹

In reality the act was no more than Legislative recognition of Governor Bellmon's original executive order. The five state agencies were to continue to carry out their individual statutory duties with respect to water pollution.⁷⁰

⁶⁷These amendments are contained in Appendix I.

⁶⁸Sess. Laws of Okla. Ch. 279 (1968); 82 Okla. Stat. §§ 931-939 (Supp. 1968).

⁶⁹Sess. Law of Okla. Ch. A, art. 3E (1955); 2 Okla. Stat. §§ 3-81 - 3-88 (1961).

⁷⁰Sess. Laws of Okla. Ch. 279 § 3 (a) (1968); 82 Okla. Stat. § 933 (a) (Supp. 1968).

The Coordinating Board was given legal recognition to assure adherence to the state's new water quality criteria.⁷¹

During the eighteen months of work on Oklahoma's quality criteria two additions to the pollution control program had been enacted by the 31st Oklahoma Legislature. The first of these provided a tax incentive for the construction of industrial waste treatment facilities.⁷² Eligible industries were entitled to an annual credit against their state income tax liability of up to twenty percent of their net installation investment.⁷³ The second created a Conservation Division within the Corporation Commission, to be staffed with a Manager of Pollution Abatement among others.⁷⁴ This was the first time the Commission had employed an individual whose sole responsibility was pollution control.

Between the completion of Oklahoma's water quality criteria and the cut off point of this study (December 31, 1970), legislative activity has been limited to a single extension of pollution surveillance. A 1969 law requires

⁷¹Sess Laws of Okla. Ch. 279 § 5 (1968); 82 Okla. Stat. § 935 (Supp. 1968).

⁷²Sess. Laws of Okla. Ch. 170 (1967); 82 Okla. Stat. §§ 921-925 (Supp. 1967).

⁷³82 Okla. Stat. § 922 (Supp. 1967).

⁷⁴Sess. Laws of Okla. Ch. 207 (1967); 52 Okla. Stat. §§ 149-153 (Supp. 1967).

feedlot operators to provide drainage systems adequate to prevent stream pollution prior to receiving their state license.⁷⁵ The State Department of Agriculture monitors the feedlot licensing program.

Compared to earlier years Oklahoma's pollution laws were subject to very little revision or extension after 1965.⁷⁶ The really significant accomplishment of this period was the establishment of water quality criteria for interstate streams. Even though Oklahoma's Water Quality Act of 1955 had authorized the Water Resources Board to set quality standards on all streams within the state the job was finally undertaken, in its limited form, to satisfy the requirements of the Federal Water Quality Act of 1965.

Summary

Oklahoma's water quality control program is a product of eighty years of governmental action and reaction. Its development began with the adoption of the doctrine of riparian rights in 1890. The riparian doctrine established the individual's right to a "reasonable use" of water. In later years this concept became the basis of individual suits to recover payment for damages stemming from water pollution. In 1897 the Territorial Legislature passed the appropriative

⁷⁵Sess. Laws of Okla. Ch. 116 § 10 (1969); 2 Okla. Stat. § 9-210 (Supp. 1969).

⁷⁶A list of the Statutes in force as of December 31, 1970, is found in Appendix I.

doctrine. It declared the unappropriated waters of the state to be a public good. As such, water deserved public protection and the police powers of the state were extended to it. Although both doctrines were carried over into statehood, the development of water pollution control laws has been carried out under the concepts developed in the appropriative statutes.

The first pollution laws were directed at the protection of fish and wildlife. This protection involved the prevention of contamination of fresh water supplies from wastes and residues given off in the production of oil. As a result, the first state agencies involved in pollution control were the Department of Wildlife Conservation and the Corporation Commission which had been created to regulate the oil and gas industry. Public water supplies did not come under state supervision until 1917. In that year the State Board of Health was empowered to protect the public from the hazards of bad water. Regulation was carried out through the issuance of permits to discharge sewage into state waters. Pollution surveillance remained the responsibility of these three agencies for the following thirty-eight years. While the coverage of their respective areas was extended during this period the state's growth had created problems outside their sphere of influence. The Water Pollution Control Act of 1955 was designed to fill this void. It was the most comprehensive and significant

water quality law passed in the first 50 years of statehood. It gave legal recognition to the value and multiple benefits of clean water. Its purpose was to protect this resource for the benefit of future as well as current generations. In 1957 the Water Resources Board was created to carry out the provisions of the act.

On the eve of the Federal Water Quality Act of 1965 Oklahoma had, on paper, the organizational machinery and statutory power to set up the most comprehensive of state water quality programs. It must be noted, however, that while the state did possess the necessary machinery prior to 1965 it did not develop the water quality criteria under its own initiative. The standards were established in response to the Federal Act. The creation of the Department of Pollution Control and the inclusion of Agriculture on its Coordinating Board were also based on federal prompting. How the state fared in implementing the water quality control program is taken up in the next three chapters.

OKLAHOMA'S MONETARY COMMITMENT TO
WATER POLLUTION CONTROL

CHAPTER THREE

The evolution of Oklahoma's water quality program was examined in the preceding chapter. Quality control has advanced from its accompanying role in water legislation to its present status of primary objective. There currently exists a rather comprehensive set of laws delegating authority in water quality surveillance. But laws themselves are not enough. They are only a written reflection of intention. Their application and enforcement over time comprise the real test of a state's commitment to clean water. Enforcement of the law depends, to a great extent, on the surveillance techniques adopted by the agencies respectively charged with this responsibility. The adequacy of this surveillance is a function of the quantity and quality of manpower devoted to the attainment of the goal. This in turn is directly related to finances. Inadequate funding and/or personnel can result in the failure of even the best of programs. An investigation of the state's monetary commitment is the first step in the analysis of its program to carry out the intention of the law.

Financing Pollution Control

There are a number of potential sources of funds for water quality control. Among them are the Federal Government, the State Government, industry, municipalities and concerned individuals. This investigation centers on the second of these, the State Government. In several instances this will necessitate an examination of federal grants and matching funds utilized by state agencies.

State expenditure may be divided into two categories, direct and indirect. Direct expenditure refers to monies actually disbursed by the state in its control efforts. It includes such items as personnel services, equipment, supplies, monitoring, and transportation. Indirect support relates to contributions in forms other than cash outlays. The best example is the tax credit system.

Direct Expenditure

The Department of Pollution Control and the agencies which make up its Coordinating Committee have accounted for all of the state's direct expenditure on pollution control since 1960. An analysis of each of these agencies' financial commitment during this time is essential to the development of an overall expenditure pattern for the state.

Department of Pollution Control

As pointed out in Chapter Two this agency is only three years old. It was formed to give legislative approval to the executively created Coordinating Committee. Its statutory recognition also resulted in a small appropriation each year to cover administrative expenses. Table 2 contains a summarization of the expenditures. State appropriations from the general fund have accounted for all of the resources of the Department.

Water Resources Board

Although the creation of the Water Resources Board in 1957 was in part designed to facilitate the implementation of the 1955 Water Pollution Control Act, the Board did not single out pollution needs and control in its budgetary or manpower requests for ten years. Pollution surveillance was but one of a multitude of tasks facing the agency. These problems were handled by staff members in general. By 1967 these problems were of such a nature that special job descriptions were established and specific funding requested for the following fiscal year. This procedure has been continued and expanded in subsequent years.

For those years prior to fiscal 1968, in which data on pollution control expenditures was not kept, estimates were developed. They were based on the following information. Before 1968 the Board had not devoted any staff

TABLE 2

DEPARTMENT OF POLLUTION CONTROL EXPENDITURES ON
WATER QUALITY CONTROL, FISCAL YEARS 1969 AND 1970^a
(Dollars)

Fiscal Year	Expenditure
1969	5,829
1970	15,000

^aDepartment created in May, 1968, and first
funded in fiscal year 1969

Source: Oklahoma Executive Department, Division of
the Budget. State of Oklahoma Budget 1970
(Oklahoma City: Oklahoma Executive Depart-
ment, 1970).

positions to water quality control.¹ Expenditures on personnel services, supplies, and transportation in this area were minimal if not zero. The only outlay related to the pollution program was for contractual services.

For over twenty years the United States Geological Survey (USGS) has provided the state with data on the chemical content of streams and lakes within its boundaries.² After 1957 this agreement was handled by the Water Resources Board. In exchange for the information the Board paid approximately one-half the cost of this monitoring. Budget figures for this program were available from the USGS branch office in Oklahoma City for the years 1964-1970. Since the number of gauging stations remained stable between 1960 and 1964 the expense of the monitoring program in the latter year was felt to be representative of earlier years. These figures are contained in Table 3. The resulting

¹Stated in separate interviews with Paul R. Wilson and Duane Motsenbocker at the Oklahoma Water Resources Board offices, November, 1970, and February, 1971.

²This information was published annually by the Quality of Water Branch, U.S. Geological Survey in cooperation with the Oklahoma Planning and Resources Board and later with the Oklahoma Water Resources Board from 1949 until 1962 under the title Chemical Character of Surface Waters in Oklahoma. Since 1962 the data has been kept through the use of computer storage by the federal government. Printouts are available from the Robert S. Kerr, Federal Water Quality Laboratory at Ada, Oklahoma. Additional data on this surveillance system is contained in Chapter Four.

TABLE 3

A BREAKDOWN OF EXPENDITURES ON THE UNITED STATES GEOLOGICAL
SURVEY'S WATER QUALITY SURVEILLANCE PROGRAM IN
OKLAHOMA, FISCAL YEARS 1960-1970
(Dollars)

Fiscal Year	Total Cost of Surveillance	Paid by Water Resources Board
1960	50,000	25,000
1961	50,000	25,000
1962	50,000	25,000
1963	50,000	25,000
1964	50,000	25,000
1965	50,000	25,000
1966	60,000	30,000
1967	65,800	32,900
1968	71,800	35,900
1969	75,000	37,500
1970	81,600	40,800

Source: Furnished by J. W. Odell, Water Resources Division,
United States Geological Survey, Oklahoma City
Office.

estimates of the Board's total annual expenditure on water quality control for 1960-1967 along with recorded expenditure in the post 1967 era is found in Table 4. Even with the recent awareness of environmental problems and resulting increase in the Board's pollution budget the monitoring contract still accounted for 49 percent of the agency's total outlay on quality control in 1970 (Table 4). Water Quality Control itself still accounts for a relatively minor portion of the Board's total budget. It has risen from 14.08 percent of the total to only 17.09 percent in the past eleven years.

The prime incentive for the Water Resources Board's separation of budget records in 1968 was the receipt of funds from a federal grant. Under Section 7 of the Federal Water Pollution Control Act, states are eligible for matching grants to assist them in their pollution control efforts. The State Department of Health coordinates Oklahoma's application. Under an agreement between the two agencies, the Board is reimbursed for water quality control efforts which help to satisfy the requirements of the federal grant. In turn the Board and the Department of Health were required to adopt accounting methods separating pollution control in budget statements after 1967. The Board received \$19,500 in both 1968 and 1969 and \$20,000 in 1970.

A closer examination of the Board's expenditures since 1968 with particular reference to the receipt of these federal funds raises some interesting questions. Table 5

TABLE 4

WATER RESOURCES BOARD EXPENDITURES ON WATER QUALITY CONTROL,
FISCAL YEARS 1960-1967 ESTIMATED, 1968-1970 ACTUAL
(Dollars)

Fiscal Year	Expenditure		Percent of Total on Pollution	Percent of Pollution Expenditure for USGS Surveillance
	Total	Pollution Control		
1960	177,563	25,000	14.08	100
1961	193,489	25,000	12.92	100
1962	166,081	25,000	15.05	100
1963	170,000	25,000	14.71	100
1964	164,753	25,000	15.17	100
1965	170,000	25,500	15.00	98
1966	246,508	31,000	12.57	97
1967	270,337	34,000	12.57	97
1968	342,048	43,419	12.67	83
1969	416,827	59,419	14.39	63
1970	491,898	84,068	17.09	49

Source: Oklahoma Executive Department, Division of the Budget, State of Oklahoma Budget (Oklahoma City: Oklahoma Executive Department) 1962-1963 p. 117; Oklahoma Water Resources Board, Annual Report to the Governor of the State of Oklahoma and to the Members of the First Session of the 32nd Legislature. Publication 26 (Oklahoma City: Oklahoma Water Resources Board, 1969) p. 16. "Budget Request for Fiscal Year 1972", Oklahoma City, 1970, pp.17-19. (Mimeographed.)

TABLE 5

A BREAKDOWN OF THE WATER RESOURCES BOARD'S EXPENDITURE ON
POLLUTION CONTROL IN RELATION TO THE RECEIPT OF
FEDERAL FUNDS, FISCAL YEARS 1968-1970
(Dollars)

Fiscal Year	Total Expenditure (1)	USGS Monitoring (2)	Other Expenditure (1-2+3)	Federal Funds (4)	Excess (3-4)
1968	43,419	35,900	7,519	19,500	(11,981)
1969	59,419	37,500	11,919	19,500	(7,581)
1970	84,068	40,800	41,268	20,000	21,268

Source: Total expenditure taken from Oklahoma Executive Department, Division of the Budget, State of Oklahoma Budget (Oklahoma City: Oklahoma Executive Department) 1968, p. 120; 1969 p. 125; 1970, 9. 189. USGS Monitoring cost furnished by J. W. Odell, Water Resources Division United States Geological Survey, Oklahoma City Branch. Federal funds transferred to Water Resources Board furnished by Loyd F. Pummill, Director, Environmental Health Services, Oklahoma State Department of Health.

contains this breakdown. State funds utilized by the Board to pay for the cooperative monitoring program with the USGS are non-allowable in matching federal grants. When this monitoring outlay is subtracted from the Board's total expenditure the remainder ends up smaller than the amount of federal funds transferred from Health to the Board in two out of the three years the program has been in existence. The failure of the Board to match the federal money is not indicative of any illegal manipulation in itself. The state lumps all of its pollution control measures and expenditures together when applying for federal funds under Section 7. Thus the inclusion of the Corporation Commission which receives no federal funds makes up for the lack of eligible expenditures by the Board. Since the application is made on behalf of the state it can then distribute the funds among the agencies engaged in water quality control as it sees fit. The last column of Table 5 is not so readily explainable, however. What did the Water Resources Board do with the excess federal funds in 1968 and 1969? If these funds were indeed marked for pollution control what happened to them? In 1968 the Board stated \$9,500 of the federal money was to be spent on the salary of an engineer or sanitarian. The remaining \$10,000 was reimbursement for the cost of personnel devoted to water pollution control.³ A

³ Oklahoma State Department of Health, State of Oklahoma Water Pollution Control Plan, Fiscal Year 1968 (Oklahoma City: Oklahoma State Department of Health, 1967) p. 17.

comparison with the Board's manpower breakdown for 1968 given in Table 16 will serve to point out the fallacy of this justification. The engineer spent only .25 percent of his time in pollution oriented work. While the author was never given access to the detailed accounts of the Board it seems more likely that the excess federal funds in 1968 and 1969 were spent on other programs of the agency. While not questioning the legality of this situation it must be pointed out that a major shortcoming of the state's water quality control program centers on inadequate financing. Any failure to spend all available monies on this program should be questioned.

Corporation Commission

The Corporation Commission was one of the earliest state agencies granted pollution control powers. Its primary purpose was the regulation of the oil and gas industry. As the industry grew the Commission found it necessary to internally delegate its authority. Pollution surveillance was originally entrusted to a conservation agent and later was expanded into a conservation section. In 1955 a small staff of twelve, complete with a Director of Anti-Pollution, was organized within the section. Statutory recognition was given with the passage of House Bill 781 in 1967 creating a Conservation Division within the Corporation Commission.⁴

⁴Sess Laws of Okla. Ch. 207 (1967); 52 Okla. Stat. §§ 149-153 (Supp. 1967).

As was the case with its predecessor the Division is charged with the conservation of oil and gas deposits within Oklahoma as well as pollution prevention. These objectives overlap. Field workers may be checking conservation and pollution problems simultaneously. Office personnel may work in both areas in the course of a given day. Because of this, the two have not been separated in the Division's accounting and budgeting. Only total expenditure figures for the Conservation Division were available for the period under examination. This situation required the use of an estimating procedure similar to that developed for the Water Resources Board.

The 1967 law also provided a detailed outline of the staffing pattern. It included a Manager of Office Administration charged with overseeing the budgetary system of the Division. Information gleaned from discussions with the current Manager, Mr. W. H. Bowers, was relied upon in making the estimate. Mr. Bowers calculated actual expenditure on pollution control to have been 30 percent of the Division total in fiscal 1970, 25 percent in 1969 and 20 percent in 1968. The organizational change and resulting increase in surveillance which took place between 1967 and 1968 accounts for the substantial jump in expenditure from 10 to 20 percent in these respective years. It seems unlikely, however, that this trend would have prevailed during the 1960-1966 period. The anti-pollution program

organized in 1955 had stabilized by 1960. Employment was maintained at twelve throughout these years. There were no increases in statutory power or regulative coverage. Based on this maintenance of the status quo the 10 percent of total figure, used in 1967, seems applicable to the previous seven years as well. Once these percentages were derived they were multiplied times the total outlay of the Conservation Division in each of the years to obtain the amount spent on pollution control. The results are contained in Table 6.

The Conservation Division does not receive any federal or state appropriations for its water quality program. It operates solely on revenues earned from excise taxes levied on oil and gas producers. The excise tax on oil is seven thirty-seconds ($7/32$) of one cent (1¢) per every barrel produced in Oklahoma.⁵ The Tax Commission collects this revenue and deposits it with the State Treasurer. The State Treasurer apportions 93.65 percent of the money to a conservation fund.⁶ This fund is reserved for covering expenses of the Conservation Division of the Corporation Commission. The tax on natural and/or casing head gas is collected and apportioned in much the same manner. Originally the rate was set at two one-hundredths ($2/100$) of one cent (1¢) per thousand (1,000) cubic feet produced with eight-ninths ($8/9$)

⁵68 Okla. Stat. §§ 1220.1 & 1220.3 (a) (1961); Replaced by 68 Okla. Stat. §§ 1101 & 1103 (a) (Supp. 1965).

⁶68 Okla. Stat. § 1103 (a) (Supp. 1965).

TABLE 6

CORPORATION COMMISSION EXPENDITURE ON WATER QUALITY
CONTROL, FISCAL YEARS 1960-1970 ESTIMATED
(Dollars)

Fiscal Year	Total Expenditure of the Conservation Division	Expenditure on Water Quality Control	
		Amount	Percent
1960	462,417	46,242	10
1961	497,835	49,784	10
1962	508,103	50,810	10
1963	544,639	54,464	10
1964	584,915	58,492	10
1965	628,536	62,854	10
1966	651,261	65,126	10
1967	665,994	66,599	10
1968	840,231	168,046	20
1969	925,613	231,403	25
1970	1,033,727	310,118	30

Source: Total expenditure data taken from Oklahoma Executive Department, Division of the Budget, State of Oklahoma Budget (Oklahoma City: Oklahoma Executive Department) 1962-1963, p. 102; 1964-1965, p. 94; 1966-1967, p. 92; 1968, p. 106; 1969, pp. 111-112; 1970, p. 158.

going to the Conservation Fund.⁷ This was raised to four one-hundredths (4/100) of one cent (1¢) and seventeen-eighteenths (17/18) in 1967.⁸ In reality the state's oil and gas producers are paying for the water pollution surveillance program exercised by the state over their industry.

Department of Health

Environmental Health Services is one of six organizational programs currently operated by the State Department of Health. It is comprised of five divisions: Water Quality Control, Occupational and Radiological Health, Air Pollution Control, General Sanitation, and Consumer Protection. The first of these, Water Quality Control, is of major interest in this investigation. It is divided into two sections, Public Water Supply and Water Pollution Control. While these sections are closely related from an administrative standpoint, their end objective is quite different. Even if the water pollution program were to achieve optimum control, it would still be necessary to treat water for public consumption in order to assure its safeness. The Health Department would still need to exercise controls over the distribution system to protect it from contamination and back-siphonage. Bacteriological and chemical surveillance

⁷68 Okla. Stat. §§ 1220.2 & 1220.3 (b) (1961); Replaced by 68 Okla. Stat. §§ 1102 & 1103 (b).

⁸Sess. Laws of Okla. Ch. 208 § 2 (1967); 68 Okla. Stat. § 1102 & 1103 (b) (Supp. 1967).

of the various distribution systems in the state would still have to be undertaken. The success of one of the two programs does not cancel the need of the other. Thus, pollution control can be separated and examined individually. Expenditures of the Water Pollution Control Section for 1960-1970 are contained in Table 8. The Department of Health was the only agency able to furnish detailed data back through 1960.

A second organization within the Department plays a supporting role. This is the Community Health Service. District and county sanitarians employed by the Community Health Services assist the Water Pollution Control Section on the local level by carrying out inspections checking complaints and disseminating information. The county offices handle routine matters which need not occupy the resources of the Water Pollution Control Section. In recent years Health Department estimates of this assistance have ranged from 4.1 to 2.9 percent of the total budget of the County Health Departments.⁹ Total community health outlays have increased at a much faster rate than that portion devoted to pollution control. This has resulted in a percentage decline in pollution expenditures in recent years. In

⁹ Oklahoma State Health Department, State of Oklahoma Water Pollution Control Plan as submitted each fiscal year 1968-1971 in support of grant application to the Federal Water Pollution Control Administration, U.S. Department of the Interior.

TABLE 7

DEPARTMENT OF HEALTH, COMMUNITY HEALTH SERVICES EXPENDITURES
ON WATER QUALITY CONTROL, FISCAL YEARS 1960-1970 ESTIMATED
(Dollars)

Fiscal Year	Total Expenditures of the Community Health Services	Expenditure on Water Quality Control	
		Amount	Percent
1960	1,165,897	23,318	2.0
1961	1,307,324	26,145	2.0
1962	1,298,988	25,980	2.0
1963	1,552,333	31,047	2.0
1964	1,613,160	32,263	2.0
1965	1,885,919	37,718	2.0
1966	1,843,306	38,866	2.0
1967	2,211,550	44,231	2.0
1968	2,593,159	106,080	4.1
1969	3,346,552	116,500	3.5
1970	4,579,642	133,975	2.9

Source: Total expenditure data taken from Oklahoma Executive Department, Division of the Budget, State of Oklahoma Budget (Oklahoma City: Oklahoma Executive Department) 1962-1963, p. 53; 1964-1965, p. 51; 1966-1967, p. 51; 1968, p. 56; 1969, p. 58; 1970, p. 81.

TABLE 8

DEPARTMENT OF HEALTH EXPENDITURES ON WATER QUALITY
CONTROL, FISCAL YEARS 1960-1970
(Dollars)

Fiscal Year	Water Pollution Control Section (actual)	Community Health Services (estimated)	Total
1960	60,597	23,318	83,915
1961	62,185	26,145	88,330
1962	102,000	25,980	127,980
1963	104,875	31,047	135,922
1964	108,000	32,263	140,263
1965	108,010	37,718	145,728
1966	121,447	38,866	160,313
1967	128,774	44,231	173,005
1968	177,397	106,080	283,477
1969	214,489	116,500	330,989
1970	240,080	133,975	374,055

Source: Actual Expenditure data for the Water Pollution Control Section furnished by Loyd F. Pummill, Director, Environmental Health Services, Oklahoma State Department of Health. Community Health Services estimated derived in Table 6.

the pre-1967 period community health expenditure has been estimated at 2.0 percent of the total. Utilizing these estimates the contributions of the various local health agencies have been calculated. The results are contained in Table 7. This has been combined with outlays of the Water Pollution Control Section in Table 8 to achieve annual totals for the period in question.

As was indicated earlier the Department of Health has been authorized by the state to receive and administer federal monies for water quality control. It has transferred a small portion of these funds to the Water Resources Board each year since 1968. The remainder has been kept by the Department for use by its Water Pollution Control Section. These funds have accounted for approximately half of the section's annual income. Table 9 contains a breakdown of income to the Water Pollution Control Section by source.

Department of Agriculture

The Department of Agriculture is a relative newcomer to pollution control. Its main interests are pesticide usage and feedlot runoff. It regulates both through a licensing system. Water quality control is not the major concern in either area. While both programs are necessary to protect the public's food supplies and the farmer's livelihood, water quality control is but one of a number of criteria that must be satisfied before licenses are granted.

TABLE 9

DEPARTMENT OF HEALTH, WATER POLLUTION CONTROL SECTION
 SOURCE OF FUNDS, FISCAL YEARS 1960-1970
 (Dollars)

Fiscal Year	State Funds	Federal Funds	Total
1960	30,597	30,000 ^a	60,597
1961	31,185	31,000 ^a	62,185
1962	39,600	62,400	102,000
1963	42,475	62,400	104,875
1964	44,300	63,700	108,000
1965	44,010	64,000	108,010
1966	56,514	64,933	121,447
1967	64,118	64,656	128,773
1968	82,968	94,429	177,397
1969	117,745	96,744	214,489
1970	140,924	99,156	240,080

^aThe figures for 1960 and 1961 are approximations. A detailed breakdown of funds by source was unavailable for these years.

Source: Furnished by Loyd F. Pummill, Chief, Environmental Health Services, Oklahoma State Department of Health.

Agriculture's first and only expenditure for pollution control was made in fiscal 1970 when pesticide monitoring equipment was purchased for \$10,000. The money was taken from the state's general fund appropriation to the Department.

Department of Wildlife Conservation

While the state fish and game ranger is often the first line of defense in water pollution control the Department does not budget any money to this area. The cost of fish kill investigations within the state is paid for with federal funds. Under the Dingle Johnson Act of 1950 the federal government will return funds to the state for fish conservation projects.¹⁰ These funds are a product of a federal excise tax on fishing rods, creels, reels and artificial lures, baits and supplies. Once collected they are apportioned among the states qualifying for these grants on the basis of population and area served. To qualify a state must earmark its revenue from the sale of fishing licenses for exclusive use by the Department in charge of fishery programs. In addition the state must have an authorized fish conservation program. Oklahoma has satisfied both requirements. It has received funds from this source for a number of years. The Department of Wildlife Conservation

¹⁰16 U.S.C. § 777 (1964).

began to apply a portion of this money to fish kill investigations in 1965. The annual amounts budgeted to this end are contained in Table 10.

Between 1960 and 1965 the Department had recorded only four fish kills.¹¹ In each case the investigation was incomplete. They failed to note the area, the cause, or the number of fish killed. These reports amounted to little more than a sighting of dead or dying fish. For all practical purposes there were no funds devoted to pollution control by the Wildlife Department before 1965.

Total Direct Expenditure

A summary of direct expenditures by the State of Oklahoma on water quality control is contained in Table 11. Out of the six state agencies engaged in this program at the end of 1970 three, the Water Resources Board, the Corporation Commission, and the Department of Health stand out in terms of direct outlays. Between 1960 and 1965 these three accounted for 100 percent of the state's expenditure on water pollution control. Their 95 percent of total in 1970 represents their lowest total. The big three has been consistently led by the Department of Health, with the Corporation Commission and the Water Resources Board following in that order.

¹¹U.S. Department of Health, Education and Welfare, Public Health Service, Division of Water Supply and Pollution Control, Basic Data Branch, Pollution Caused Fish Kills, Pub. 847, (Washington, D.C.: Government Printing Office) 1960 p. 4; 1961 p.6; 1962 p.4; 1963 p.5; 1964 p.4.

TABLE 10

FEDERAL FUNDS BUDGETED TO FISH KILL INVESTIGATION UNDER
THE DINGLE JOHNSON ACT, FISCAL YEARS 1965-1970
(Dollars)

Fiscal Year	Amount
1965	3,000
1966	3,000
1967	3,000
1968	3,000
1969	6,000
1970	7,500

Source: Kenneth Johnston, Oklahoma State
Department of Wildlife Conservation.

TABLE 11

TOTAL DIRECT EXPENDITURE BY THE STATE OF OKLAHOMA ON WATER QUALITY
CONTROL, BY AGENCY, FISCAL YEARS 1960-1970
(Dollars)

Fiscal Year	Department of Pollution Control ^a	Oklahoma Water Resources Board	Corporation Commission	Department of Health	Department of Agriculture ^b	Department of Wildlife	Total
1960	-0-	25,000	46,242	83,915	-0-	-0-	155,157
1961	-0-	25,000	49,784	88,330	-0-	-0-	163,114
1962	-0-	25,000	50,810	127,980	-0-	-0-	203,790
1963	-0-	25,000	54,464	135,922	-0-	-0-	215,386
1964	-0-	25,000	58,492	140,263	-0-	-0-	223,755
1965	-0-	25,500	62,854	145,728	-0-	3,000	237,082
1966	-0-	31,000	65,126	160,313	-0-	3,000	259,439
1967	-0-	34,000	66,599	173,005	-0-	3,000	276,604
1968	-0-	43,419	168,046	283,477	-0-	3,000	497,942
1969	5,829	59,419	231,403	330,989	-0-	6,000	633,640
1970	15,000	84,068	310,118	374,055	10,000	7,500	800,741

^aDepartment created in May, 1968, and first funded in fiscal year 1969.

^bDid not actively enter pollution control field until fiscal year 1969.

Source: Compiled from data in Tables 2, 4, 6, 8 and 10.

Total direct expenditure has grown from \$155,157 in 1960 to \$800,741 in 1970. This growth may be divided into two periods. From 1960 to 1967 spending on water quality control increased from \$155,157 to only \$276,604. This was an increase of 78.27 percent. The ensuing three years witnessed a growth of 189.49 percent, from \$276,604 to \$800,741. Several causes may be cited for the more rapid growth in the latter period. The establishment of a Conservation Division within the Corporation Commission is one. In addition to increasing the staff devoted to pollution control, funds derived from an excise tax on oil and gas producers were earmarked for use by the Division. In 1970 the Conservation Division expended \$310,118 as compared to \$66,599 in 1967. This represents a growth of 365.64 percent. The increase in money available to the Division in 1968 as opposed to 1967 is apparent in Table 12. A second factor was the step-up in federal funds made available to the state after 1967 (Table 12). Federal funds rose 87.20 percent from \$67,656 in 1967 to \$126,656 in 1970. The third element in Oklahoma's increase in direct expenditures was the rise in state appropriations to the various agencies engaged in pollution control. The state increased its monetary contribution by \$221,618 or 155.68 percent in the past four years. The significant increase in financial commitment by the respective sources came after the passage of the Federal Water Pollution Control Act of 1965.

TABLE 12

FUNDS BY SOURCE FOR THE STATE OF OKLAHOMA'S
WATER QUALITY CONTROL PROGRAM, FISCAL YEARS 1960-1970

Fiscal Year	Oil and Gas Industry	Federal Grants	State Appropriations	Total
1960	46,242	30,000	78,915	155,157
1961	49,784	31,000	82,330	163,114
1962	50,810	62,400	90,580	203,790
1963	54,464	62,400	98,522	215,386
1964	58,492	63,700	101,563	223,755
1965	62,854	67,000	107,228	237,082
1966	65,126	67,933	126,380	259,439
1967	66,599	67,656	142,349	276,604
1968	168,046	116,929	212,967	497,942
1969	231,403	122,244	279,993	633,640
1970	310,118	126,656	363,967	800,741

Source: Compiled from data in Tables 2, 5, 6, 9 and 10.

Indirect Expenditure

Oklahoma's indirect contribution to pollution control is the state tax credit allowance for the installation of industrial waste treatment facilities. Although this does not represent expenditure by the state it is definitely a monetary contribution in terms of income foregone. The program is relatively new. It represents a compromise between two somewhat conflicting objectives. In the past four years the executive branch of the state government has engaged in a rigorous program aimed at expanding Oklahoma's industrial base. The construction of new or additions to existing plants will normally increase waste removal problems. If water quality is to be maintained manufacturers will have to equip these additions with treatment facilities. This, of course, increases their investments. As an alternative they might seek other locations for their firms. In order to avoid this problem and, at the same time, protect state waters Oklahoma established a tax incentive program in 1967.¹²

Under this law a firm may annually deduct up to twenty percent of its net investment in treatment facilities from its state income tax liability. The firm may continue this policy until the total cost of the investment is recouped. It should be pointed out that operating costs are not

¹²Sess. Laws of Okla. Ch. 170 (1967); 82 Okla. Stat. § 921-925 (Supp. 1967).

considered part of the investment. Neither are expenditures on treatment processes which result in savings and/or profits to the company. It may not claim a credit larger than its actual liability. As an example, suppose that Firm X constructs a \$100,000 waste treatment operation. The company receives no benefits from this in terms of recycling materials used in production or in the sale of effluents produced. It may apply \$20,000 ($\$100,000 \times .20$) a year against its state income tax assuming its net income is sufficiently large to generate a liability of this size. Utilizing an effective state income tax rate of two percent of net income Firm X would have to clear approximately \$1,000,000 ($\$20,000 \div .02$) to claim the total allowable credit. Smaller net incomes would result in extended write-off periods.¹³

Interested individuals or corporations may file applications with the State Industrial Development and Park Department, the Water Resources Board or the Corporation Commission. The latter two are responsible for checking the applications. The Corporation Commission verifies those of the oil and gas industry. The Water Resources Board handles

¹³ Reductions in net income would result in proportionate decreases in the size of the tax credit and inversely related growth in the pay off period. When net income is decreased from \$1,000,000 to \$500,000 the tax credit must be reduced from \$20,000 to \$10,000 and the pay back period jumps from five to ten years on an investment of \$100,000 in waste treatment facilities.

all others. In both instances an investigation is conducted into the types of pollutants to be discharged, the complete plans for treatment, and the cost analysis associated with the particular form of treatment. The investigation is to take place before construction commences. Upon preliminary approval the industrial concern may proceed with its plan. Any changes in design during the construction period must be cleared with the proper authority. The treatment facility is checked upon completion and, when approved, certification is sent to the Oklahoma Tax Commission. Facilities included in the tax credit may not be treated as a depreciable asset in calculating tax due the state.

A total of thirty-two applications have been made since 1967 (Table 13). Their estimated total project costs are set at \$9,008,879. They range in value from \$2,500 to \$4,785,051. Their average value is \$281,496. The modified mean value is \$131,885, less than half the true mean. This is due to the extremely large cost of the Weyerhaeuser application. The Oklahoma Water Resources Board has received twenty-five of these applications with a total estimated value of \$7,819,616. The remaining seven with a projected value of \$1,188,263 were filed with the Corporation Commission. As of December 31, 1970, a total of eleven applications had received final certification. This included all seven of the applications filed with the Commission. Three of the eleven were approved in 1968, and four each in

TABLE 13

STATE INCOME TAX CREDIT APPLICATIONS BY OKLAHOMA INDUSTRIES
BASED ON THE CONSTRUCTION OF WASTE TREATMENT FACILITIES, 1967-1970

Industry	Plant Location	Application Date	Agency Certifying	Certification Date	Planned Cost (Dollars)
Weyerhaeuser Co.	Craig	11-30-67	OWRB	10- 8-68	311,212
Georgia Pacific Corp.	Pryor	1-16-68	OWRB	8-12-69	63,005
Kerr-McGee Corp.	Wynnewood	1-19-68	Corp. Comm.	3-29-68	156,958
Kerr-McGee Corp.	Cushing	1-19-68	Corp. Comm.	4- 2-68	121,508
Southwest United Industries, Inc.	Tulsa	2-14-68	OWRB	Pending	52,200
General Electric Co.	Oklahoma City	4-10-68	OWRB	12- 9-69	146,420
Kerr-McGee Corp	Cimarron	5-29-68	OWRB	Pending	492,000
Public Service Co. of Oklahoma	Tulsa	8- 7-68	OWRB	Pending	56,768
Public Service Co. of Oklahoma	Oologah	8-12-68	OWRB	Pending	76,000
Weyerhaeuser Co.	Broken Bow	11-27-68	OWRB	Pending	155,082
Kerr-McGee Corp.	Sequoyah	3-24-69	OWRB	Pending	616,000
Public Service Co. of Oklahoma	Weleetka	4- 8-69	OWRB	Pending	8,500
Kerr-McGee Corp.	Wynnewood	5-21-69	Corp. Comm.	6-24-69	93,820
Kerr-McGee Corp.	Cushing	5-21-69	Corp. Comm.	6-24-69	10,737
Oklahoma Gas & Electric	Osage Station	6-26-69	OWRB	1-13-70	13,261
Oklahoma Gas & Electric	Muskogee	6-26-69	OWRB	Pending	15,500

TABLE 13 (Continued)

Industry	Plant Location	Application Date	Agency Certifying	Certification Date	Planned Cost (Dollars)
Holly Creek Fryers, Inc.	Broken Bow	12-18-69	OWRB	Pending	117,500
Kerr-McGee Corp.	Wynnewood	5-11-70	Corp. Comm.	7- 7-70	68,139
Kerr-McGee Corp.	Cushing	5-11-70	Corp. Comm.	7- 7-70	7,101
Big Chief Roofing Co.	Ardmore	6- 8-70	OWRB	Pending	69,000
Texaco, Inc.	Tulsa	7-19-70	Corp. Comm.	11-26-70	730,000
Weyerhaeuser Co.	Valliant	8- 7-70	OWRB	Pending	4,785,051
Midwest Carbide Co.	Pryor	8-10-70	OWRB	Pending	15,120
Muskogee Iron Works	Muskogee	8-11-70	OWRB	Pending	9,200
Kerr-McGee Corp.	Sequoyah	8-11-70	OWRB	Pending	291,800
Big E Industries Inc.	Durant	9- 4-70	OWRB	Pending	43,898
Kerr-McGee Corp.	Cimarron	9-24-70	OWRB	Pending	201,140
Cato Oil & Grease, Inc.	Oklahoma City	10- 5-70	OWRB	Pending	8,245
Kerr-McGee Corp.	Oklahoma City	10- 6-70	OWRB	Pending	202,884
Madewell and Madewell	Jones	10-27-70	OWRB	Pending	19,260
Cushing Tank Car, Inc.	Cushing	10-28-70	OWRB	Pending	48,070
Oktronics, Inc.	Okemah	11-23-70	OWRB	Pending	2,500

Source: Derived from application forms filed with the Oklahoma Water Resources Board and the Conservation Division of the Corporation Commission.

1969 and 1970. The Tax Commission has stated that no claims were made in either 1968 or 1969. As of this writing the 1970 returns are incomplete. Although no indirect contributions have been made to date the potential of this program must not be discounted. It represents a recognition of the relationship between industrialization and pollution. Oklahoma wants and needs industry but not at the cost of her lakes and streams.

Total Water Quality Control Expenditures

The failure of any of the certified industries to claim tax credits results in total direct expenditures and total expenditures on water quality control being synonymous. The two points made in the discussion of total direct spending, namely that a big three exists in pollution control and that increased financial commitment is a product of post-1967 policies, is equally valid here. An analysis of Oklahoma's commitment in terms of ability to pay and per capita expenditures will add further insight into the seriousness with which the state pursues clean water.

A currently utilized measure of a state's ability to pay is expenditures made per \$1,000 of personal income. Table 14 contains such a breakdown for Oklahoma. In the period under examination expenditure on water quality control has risen from \$0.04 to \$0.09 per \$1,000 of personal income generated in Oklahoma. The significant fact is that

TABLE 14

OKLAHOMA EXPENDITURE ON WATER QUALITY CONTROL PER
\$1,000 OF PERSONAL INCOME, 1960-1970
(Dollars)

Year	Total Personal Income (Thousands) (1)	State Expenditures on Water Quality Control (2)	Expenditure Per \$1,000 (2÷1)
1960	4,296,989	155,157	.04
1961	4,455,002	163,114	.04
1962	4,676,603	203,790	.04
1963	4,880,434	215,386	.04
1964	5,222,431	223,755	.04
1965	5,654,419	237,082	.04
1966	6,099,458	259,439	.04
1967	6,594,523	276,604	.04
1968	7,258,505	497,942	.07
1969	7,872,095	633,640	.08
1970	8,489,728	800,741	.09

Source: Total personal income figures furnished by the
Bureau of Business and Economic Research, University
of Oklahoma.

TABLE 15

ANNUAL PER CAPITA EXPENDITURE ON WATER QUALITY CONTROL
IN THE STATE OF OKLAHOMA, 1960-1970

Fiscal Year	Population (Thousands) (1)	Expenditure (Dollars) (2)	Per Capita Expenditure (2÷1)
1960	2,328.3	155,157	.07
1961	2,367.8	163,114	.07
1962	2,382.5	203,790	.09
1963	2,397.2	215,386	.09
1964	2,411.9	223,755	.09
1965	2,426.6	237,082	.10
1966	2,441.2	259,439	.11
1967	2,455.9	276,604	.11
1968	2,470.6	497,942	.20
1969	2,485.3	633,640	.25
1970	2,559.3	800,741	.31

Source: U.S. Department of Commerce, Bureau of the Census
United States Census of Population 1960. Detailed
Characteristics. Oklahoma, Final Report PC (1) -
38D (Washington, D. C.: Government Printing Office,
1962) p. 38-267.

. 1970 Census of Population. Advance
Report. Oklahoma. PV (VI) - 38 (Washington, D. C.:
Government Printing Office, 1970), p. 3. Population
estimates for 1961-1969 provided by Bureau of Business
and Economic Research, University of Oklahoma

it did not begin to rise until 1968. During the 1960-1967 period it remained at \$0.04. It is only in the last three years that pollution control expenditures have risen faster than personal income. Even though expenditure, as measured here, has doubled in the past decade it remains a pittance. Oklahoma does not fare much better in its per capita expenditure on pollution control. As above the majority of the growth has taken place since 1967. In the past ten years per capita expenditure has grown from \$0.07 to \$0.31. There was only a \$.04 increase in the first seven years while the past three witnessed a \$0.20 gain. Clean water cost a citizen of Oklahoma less than a pack of cigarettes in fiscal 1970. Certainly this was not excessive.

What did this money purchase? Primarily it paid the salaries of personnel hired by the various state agencies to carry out surveillance and enforcement of the state's new water quality standards. How many and how qualified were those employed is the next area of concern.

OKLAHOMA'S MANPOWER
COMMITMENT TO WATER POLLUTION CONTROL

CHAPTER FOUR

The data availability and problems inherent in the investigation of manpower devoted to water pollution control closely paralleled those encountered in the preceding financial examination. With the exception of the Health Department personnel records are extremely sketchy for the pre-1968 period. Even in recent years a number of discrepancies were found between staffing counts submitted to the federal government and those furnished in state budget requests. Where these problems could not be resolved the respective agency was credited with the largest of the available figures.

Department of Pollution Control

The Department is administered by the Pollution Control Coordinating Board composed of representatives of the five state agencies engaged in pollution control. The official members are the State Commissioner of Health, the President of the State Board of Agriculture, the Director of the Oklahoma Water Resources Board, the Director of the Department of Wildlife Conservation and the Chairman of the Oklahoma Corporation Commission. In reality only the Director of the Oklahoma Water Resources Board has regularly attended the Board's meetings. The other members have appointed alternates.

The State Commissioner of Health and the Chairman of the Corporation Commission delegated this duty to the Chief of Environmental Health Services and the Manager of Pollution Abatement of the two respective agencies. The other departments have been represented by various officials at different times.

As implied, the major function of the Board is to coordinate the efforts of the member agencies. In reality it was created to give legal recognition to the relationship of the five agencies and to belay any problems with the new federal laws.

The Department expended money on personnel services for the first time in fiscal year 1970. The Board's executive secretary, now chosen from among the employees of the respective agencies, received half of his normal salary from the Department. He is expected to devote half his time to the administration of the Department and the other half to his normal job. Under this arrangement the secretary bears the responsibility for carrying out two related yet potentially conflicting tasks. The executive secretary in 1970 was Mr. Glenn Sullivan who is also the assistant director of the Water Resources Board. In the event that a member agency neglects its duties the Department is bound to reprimand this laxity and carry out the necessary prevention or abatement

process itself. If the organization in question happened to be the Water Resources Board it would place Mr. Sullivan in a compromising situation. This, of course, would be the same for any executive secretary who also works part time for an agency whose efforts he is supposed to be coordinating. The solution to this dilemma is an executive secretary chosen from outside the confines of the existing agencies.

Water Resources Board

Staffing patterns are available for the pollution section of the Water Resources Board only for 1968-1970 (Table 16). As in the financial analysis there is every indication that prior to this time the Board did not devote a substantive portion of its manpower to this task. Most of the employees serve the pollution program on a part time basis. They were originally hired to carry out other duties. When the hearings began in 1966 they were temporarily utilized in this endeavor and have remained, in different degrees, since then. This policy is reflected in the job descriptions on file with the State Merit Board.¹⁴ Of the technical positions budgeted to the Board's control program only one, the pollution control specialist, requires previous experience

¹⁴ Job descriptions for the various positions utilized by the Water Resources Board in its control program are found in Appendix II-a. Normal staff line positions such as secretarial help have not been included.

or knowledge in the area. This position was not created until June, 1967, for use in the fiscal 1968 budget request. This is the only position which has been budgeted full time to water quality surveillance, and only two specialists have been hired. They comprise one-half of the program's staff.

Several other points serve to reinforce the manpower shortage concept advanced here. Since its creation the Board has been charged with the responsibility of setting up water quality standards for the streams and rivers of the state. This task was not undertaken until after the passage of the Federal Water Quality Act. The Board was invested with primary responsibility in the control of industrial waste discharges within the state. It has yet to undertake a study to determine the extent of industrial waste discharges, the types, or their effects. For all practical purposes the Water Resources Board's contribution to pollution control was minimal before 1968.

Corporation Commission

In the early 1960's water pollution problems resulting from oil or gas were handled by a staff of twelve operating out of the central office of the Corporation Commission. This small anti-pollution organization relied upon complaints from the general public in lieu of systematic surveillance. The creation of the Conservation Division within the Com-

TABLE 16

PERSONNEL ENGAGED IN WATER QUALITY CONTROL EMPLOYED BY
THE WATER RESOURCES BOARD, FISCAL YEARS 1968-1970^a

Position Title	1968	1969	1970
Executive Director	.25	.10	.06
Assistant Director	.00	.25	.47
Staff Engineer	.25	.40	.00
Planning Engineer ^b	.50	.00	.00
Pollution Control Specialist	1.00	2.00	2.00
Ground Water Geologist	.00	.00	.01
Technical Assistant ^b	.25	.00	.00
Laboratory Helper ^c	1.00	1.00	1.00
Secretary ^b	1.00	.50	.10
Stenographer	.50	.50	.42
TOTAL	4.75	4.75	4.06

^aPrior to fiscal year 1968 no personnel assigned to water quality control.

^bUtilized during preparation of state quality standards.

^cFunded by Board for use in joint monitoring efforts with United States Geological Survey.

Source: Compiled from data contained in federal grant applications made annually 1968-1971 and the 1972 budget proposal of the Water Resources Board.

mission's organizational framework in May of 1967 changed this procedure. The former Director of Anti-Pollution was replaced with a Manager of Pollution Abatement. Centralization was supplanted by localization. The state was divided into four districts (Figure 2). Each was staffed with a district manager, an office assistant and eight field inspectors. The field inspectors are the backbone of the system. They are supported by the legal and administrative services available at the main office in Oklahoma City. Pollution surveillance is but one of several duties assigned to the field agents. It does, however, occupy the majority of their time. The present Manager of Pollution Abatement, Mr. Sam F. Shakley, estimates that pollution abatement problems now require 75 percent of the agent's workday. This is up from approximately 50 percent in 1968 and 65 percent in 1969. While the fragmentation of duties is not normally desired it does have merit in this particular situation. The agent's other duties can readily be combined with and in many instances reinforce the pollution surveillance function. Any one of the numerous tasks performed by the agent in the field places him in a position to survey the result of oil or gas production on nearby water supplies.

The purpose of the 1967 reorganization was to bring in qualified personnel.¹⁵ This was accomplished by including

¹⁵This point was emphasized by Mr. Shakely during a personal interview with the author. This comment is reinforced by the detail and length of the Section 2 of House Bill 781 which established the new positions.

Oklahoma Corporation Commission

Oil & Gas Conservation Division

District Offices

1
Bristow

125 West 6th Street
Bristow, Oklahoma 74010
Tel: 367-2515 (AC-918)
H. J. McNally - Manager
Ray Magee - Office Assistant

2
Kingfisher

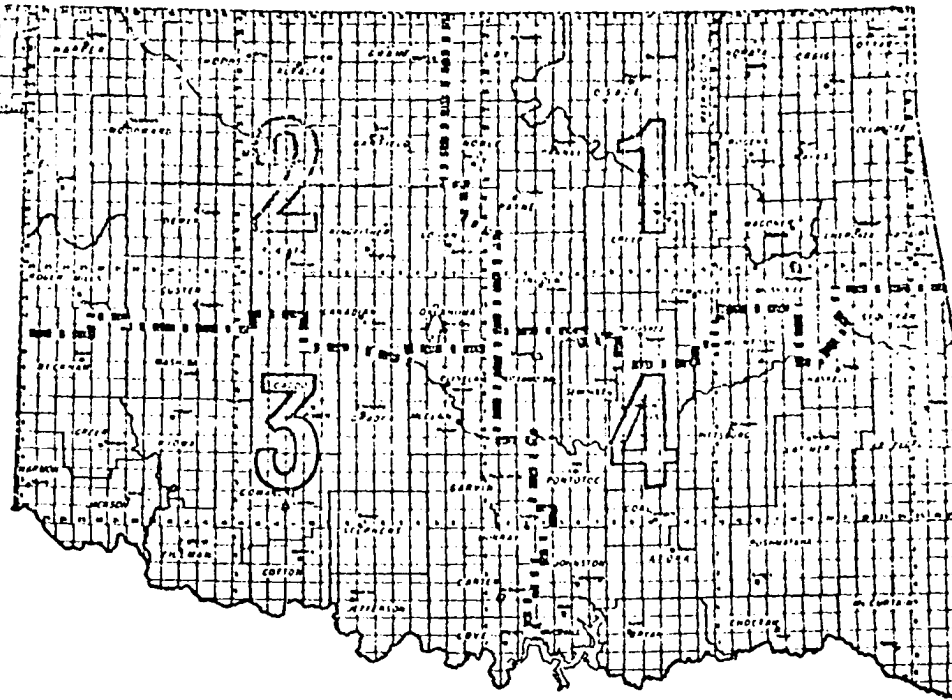
113 East Roberts
Kingfisher, Oklahoma 73750
Tel: 375-5570 (AC-405)
Arthur L. Bowles, Jr. - Manager
Doris McKeever - Office Assistant

3
Duncan

3 North 11th Street
Duncan, Oklahoma 73533
Tel: 255-0103 (AC-405)
Percy L. Hall - Manager
C. C. Brunton - Office Assistant

4
Ada

1124 North Broadway
Ada, Oklahoma 74820
Tel: 332-2727 (AC-405)
Nelson R. Greene - Manager
Clive R. Rigsby - Office Assistant



within the act specific descriptions of each position created for the new Conservation Division. As a result the Corporation Commission now has the largest staff directly engaged in water quality control. In all fairness it must also be remembered that the oil and gas industry pays for this through the excise tax on its production. The source of revenue substantially diminishes the state's arguments on behalf of budget restraint. It allows for higher salaries and more restrictive job requirements. This is apparent in the job descriptions for employees engaged in the Corporation Commission's pollution program.¹⁶ Table 17 contains an employment breakdown for the Conservation Division since its formation in 1968. As previously pointed out employment had been stabilized at twelve in earlier years.

Department of Health

Water quality control is one of five sections comprising the Environmental Health Services Division in the Department of Health. Job specifications for positions within the Division have been expressed in terms that allow recruitment for employment in any of the five. This generalization of qualifications is carried a step further within the Water Quality Control section.¹⁷ Many of the personnel within the

¹⁶These descriptions are contained in Appendix II-b.

¹⁷Job descriptions for personnel in the Water Pollution Control Section are found in Appendix II-c.

TABLE 17

PERSONNEL ENGAGED IN WATER QUALITY CONTROL EMPLOYED BY
THE CORPORATION COMMISSION, FISCAL YEARS 1968-1970^a

Position Title	1968	1969	1970
Manager of Pollution Abatement	1.0	1.0	1.0
Manager of Field Operations	.5	.6	.7
District Managers	2.0	2.4	3.0
District Office Assistants	2.0	2.4	3.0
Field Inspectors	16.0	19.2	24.0
Secretary	1.0	1.0	1.0
Manager of Office Administration	.1	.1	.1
Staff Engineers and Geologists	.5	1.0	1.5
Trial Examiner	.5	.5	.5
Court Reporter	.5	.5	.5
TOTAL	24.1	28.7	35.3

^aThe fractionalization within the table is due to the multiplicity of duties assigned to members of the Conservation Division. Under such an arrangement a number of employees devote only a portion of their working day to pollution oriented problems.

Source: Compiled from information furnished by W. H. Bowers, Manager of Office Administration, Conservation Division, Corporation Commission.

section are budgeted part time on the water pollution control program and part time on the public water supply program. This division of duties accounts for the fractionalization in Table 18. The arrangement does have advantages. Personnel may be easily shifted within the organization from one job to another. An engineer in the field can check public drinking water supplies and pollution control efforts concurrently. This reduces travel time and transportation costs. On the other hand, this situation begets a number of problems. When an employee is forced to wear two hats or serve two masters discontent is often the result. It tends to prevent efficiency in either task. It is a rare individual that can work mornings on one problem and afternoons on another and all the while maintain a high level of concentration. This is especially true in the central office where staff members are constantly interrupting one another with questions relating to common assignments.

Compounding the problems inherent in the multiplicity of duty is the sheer size of the area that must be covered. Environmental Health Services has divided the state into seven districts (Figure 3). Each is served by one district sanitarian. In addition to their role in water quality control they are expected to assist local sanitarians to carry out local programs, make surveys and reports on sanitation problems, make epidemiological investigations in

TABLE 18

PERSONNEL EMPLOYED BY THE WATER POLLUTION
OKLAHOMA STATE DEPARTMENT OF HEALTH,

Position Title	1960	1961	1962	1963	1964
Chief, Env. Health Services	.50	.50	.50	.50	
Director, Water Quality Control	1.00	1.00	1.00	1.00	1
Principal Engineer	-	-	-	-	
Senior Engineer	-	1.00	1.00	1.00	2
Engineer	3.00	1.00	1.00	1.00	
Assistant Engineer	1.00	2.00	2.00	2.00	2
Public Health Engr. Aide	-	-	-	-	
Env. Health Specialist	-	-	-	-	
Principal Chemist	-	-	-	-	
Chemist	1.00	1.00	1.00	1.66	1
Assistant Chemist	-	-	-	-	
Public Health Administrator (Non-Medical)	-	-	-	-	-
Sanitarian III	-	-	-	-	-
Sanitarian II	-	-	-	-	-
Sanitarian I	1.00	-	-	-	-
Entomologist	-	-	-	.50	
Clerical	1.00	1.50	1.50	3.00	3
Lab. Helper	-	-	-	.25	
TOTAL	8.50	8.00	8.00	10.91	10

Source: Loyd F. Pummill, Director, Environmental Health Services

TABLE 18

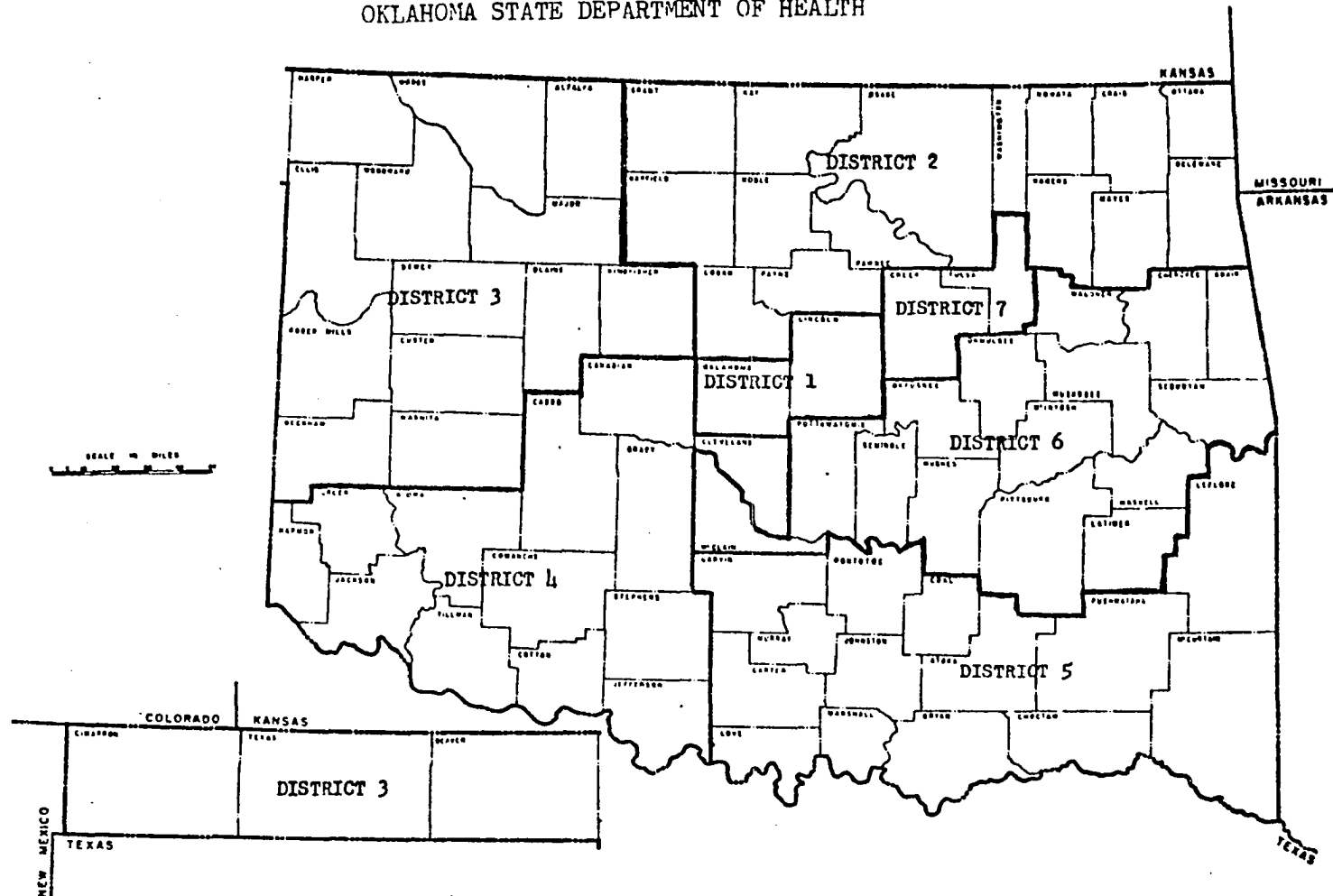
PERSONNEL EMPLOYED BY THE WATER POLLUTION
OKLAHOMA STATE DEPARTMENT OF HEALTH,

Position Title	1960	1961	1962	1963	1964
Chief, Env. Health Services	.50	.50	.50	.50	
Director, Water Quality Control	1.00	1.00	1.00	1.00	1
Principal Engineer	-	-	-	-	
Senior Engineer	-	1.00	1.00	1.00	2
Engineer	3.00	1.00	1.00	1.00	
Assistant Engineer	1.00	2.00	2.00	2.00	2
Public Health Engr. Aide	-	-	-	-	
Env. Health Specialist	-	-	-	-	
Principal Chemist	-	-	-	-	
Chemist	1.00	1.00	1.00	1.66	1
Assistant Chemist	-	-	-	-	
Public Health Administrator (Non-Medical)	-	-	-	-	
Sanitarian III	-	-	-	-	
Sanitarian II	-	-	-	-	
Sanitarian I	1.00	-	-	-	
Entomologist	-	-	-	.50	
Clerical	1.00	1.50	1.50	3.00	3
Lab. Helper	-	-	-	.25	
TOTAL	8.50	8.00	8.00	10.91	10

Source: Loyd F. Pummill, Director, Environmental Health Services,

FIGURE 3

AREA COVERED BY DISTRICT SANITARIANS, ENVIRONMENTAL HEALTH SERVICES,
OKLAHOMA STATE DEPARTMENT OF HEALTH



outbreaks of communicable diseases, inspect dairies and milk producers, carry out local sanitarian duties in areas not served by a local health department, advise public and private individuals with regard to technical sanitation problems and assist in the training of new personnel. The population served in each of the seven districts is enumerated in Table 19. By comparison the Conservation Commission of the Corporation Commission divided the state into four districts, each served by a staff of ten, whose only job is the policing of the oil and gas industry.

In an attempt to remedy this situation the Water Quality Control Section has divided the state into twelve sections and assigned central office personnel responsibility for these areas (Figure 4). This is in addition to their normal duties. The futility of this gesture is evident upon examination. As an example, Mr. Hall and Mr. Harrison are accountable for area five. They are also responsible for the training and certification of water and sewage plant operators throughout the state. This alone is a fulltime job. Mr. Newton and Mr. Penland of area seven provide a second example. Mr. Newton is the Director of the Water Quality Control Section. Mr. Penland is in charge of the federal grant program for the construction of waste treatment facilities in Oklahoma. Table 20 contains a list of the personnel assigned to the twelve areas, the area population and their corresponding duties in the central

TABLE 19

POPULATION SERVED BY EACH OF THE DISTRICT SANITARIANS
IN THE STATE OF OKLAHOMA 1970^a

District	Counties Served	Population ^b
1	2	531,625
2	15	389,234
3	16	158,925
4	13	390,559
5	14	243,192
6	15	343,426
7	2	439,385

^aSee Map 3 for the area comprising each district.

^bTotal population here is smaller than that given in Table 15. Table 15 contains the corrected total population as of January 1971. Table 19 is based upon the latest county breakdowns.

Source: U.S. Department of Commerce, Commerce News June 30, 1970, by Henry H. Smith, DC-17608 (Washington, D.C.: Department of Commerce, 1970).

FIGURE 4

OKLAHOMA STATE DEPARTMENT OF HEALTH, WATER QUALITY CONTROL DIVISION PERSONNEL AREA ASSIGNMENTS

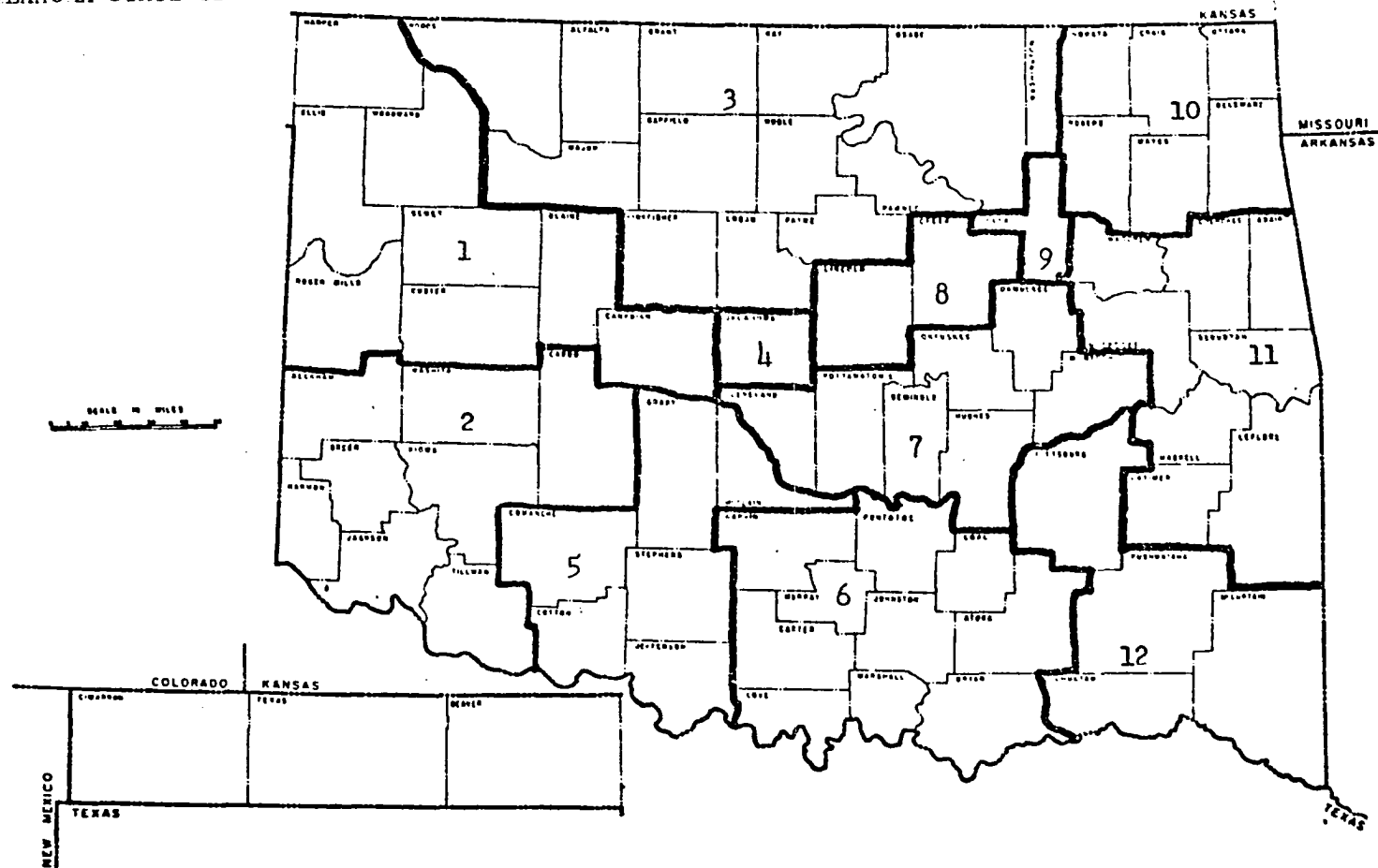


TABLE 20

CENTRAL OFFICE PERSONNEL OF THE WATER QUALITY CONTROL
DIVISION, OKLAHOMA STATE DEPARTMENT OF HEALTH,
DISTRICT ASSIGNMENTS, 1970

District	Personnel Assigned	Central Office Duty	Counties in District	Population in District ^a
1	Jack Miller	Operations	11	126,342
2	Larry Brown	Operations	8	122,631
3	Bob Crowell	Planning	13	308,067
4	Mark Coleman	Laboratory	1	512,948
	H. A. Caves	Laboratory		
	Dave Dougall	Laboratory		
	Jim Rowh	Laboratory		
	Ken Settle	Laboratory		
5	Dempsey Hall	Training	6	194,986
	Dick Harrison	Training		
6	R. H. Frank	Planning	10	159,899
7	Charles Newton	Director	7	215,772
	Jerry Penland	Planning		
8	George McBryde	Operations	2	63,661
9	T. A. Williamson	Operations	1	394,401
10	LeRoy Rachels	Planning	6	120,112
11	D. Wattenbarger	Planning	8	188,898
12	Mike Kahzoon	Operations	4	88,629

^aTotal population here is smaller than that given in Table 15. Table 15 contains the corrected total population as of January, 1971. Table 20 is based upon the latest county breakdowns available.

Source: U.S. Department of Commerce, Commerce News June 30, 1970 by Jenry H. Smith, DC-17608 (Washington, D.C.:Department of Commerce, 1970), pp. 1-3.

office. It appears highly unlikely that any have sufficient time available to lend much assistance in the field.

The assistance rendered by local sanitarians is minimal at best. While it is true that there are over one hundred local sanitarians in the state sheer numbers do not make a system. Like their district counterparts they are saddled with a multitude of work. Among other things they:

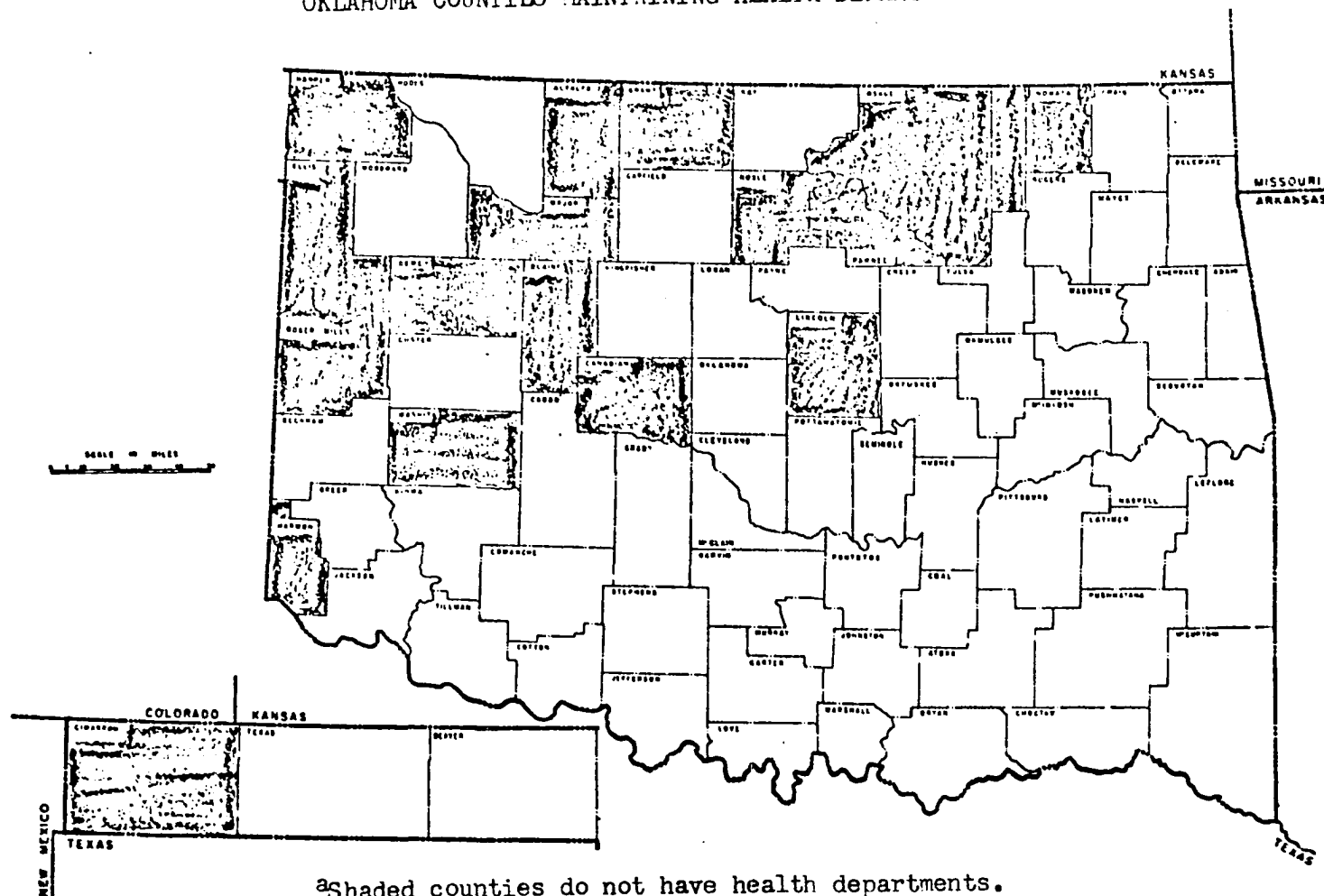
Makes surveys, inspections and reports on food stores, garbage collection and disposal services, bedding plants, food manufacturing and processing plants, private and semi-public water supplies and sewage disposal facilities, dairies, pasteurization plants, private and public schools, tourist camps, hotels, swimming pools, public eating and drinking establishments, mosquito breeding areas; represents department before local groups concerning environmental sanitation; keeps records and reports; solicits cooperation and assistance of local civic clubs and governmental agencies, and performs related duties as assigned.¹⁸

Even if local sanitarians were able to devote all of their time to sewage monitoring problems would still exist. Out of Oklahoma's seventy-seven counties only fifty-nine have health departments (Figure 5). The state's two most populated counties, Oklahoma and Tulsa, employ almost one-third of the local sanitarians. Thus, considerable area would still be left unchecked.

The problems enumerated above are a direct result of inadequate funding. The Water Quality Division simply does

¹⁸Taken from the job description of a "Sanitarian I) as provided by the State Merit Board.

OKLAHOMA COUNTIES MAINTAINING HEALTH DEPARTMENTS^a



not have the budget necessary to hire the required number of staff. This has resulted in a multiplication of responsibility per individual, the inability to complete necessary tasks and a general deficiency of information on municipal pollution in Oklahoma.

Department of Agriculture

As indicated earlier, the Department of Agriculture is the newest addition to the Pollution Control Board. It has not expended any funds on personnel services to date. This will have to change if the state is to cope with the increasing amount of water pollution resulting from agricultural sources. Economic pressure for higher yields has resulted in the conglomeration of farm lands and the increased use of commercial fertilizers, pesticides, feedlots and irrigation. Agricultural run-off now contains chemicals unheard of ten years ago in concentrations which are altering stream life and water content. Research efforts and surveillance activity will have to keep pace with agricultural growth if adequate water supplies are to be maintained. This will entail expenditure and manpower commitments in the coming years.

Department of Wildlife Conservation

The state's constant inclusion of the approximately one hundred wildlife rangers in its estimates of manpower devoted

to water pollution control is certainly unjustified. Pollution surveillance is not a major objective of the ranger. The Department's inclusion in the water quality control network is predicated on its goal of protecting fish and game in Oklahoma. Polluted water adversely affects fish and game. Rangers are typically the first to discover this effect. This occupies a very small portion of their time, however. The Department's Assistant Director for Planning and Operations, Mr. Leland Roberts, calculates that less than five percent of a ranger's time is spent on pollution related problems.¹⁹ While it is wrong to include the total ranger force in manpower evaluations it would be equally unfair to dismiss their value. The presence of a ranger in the field, regardless of his reason for being there, does provide the state with an early warning system. No doubt, it also discourages a number of pollution acts which might take place if he were not around.

Total Manpower Devoted to Water Quality Control

The correlation between income and employment levels is readily apparent in a comparison of Tables 11 and 21. Those points brought out in the financial analysis are also relevant in the examination of manpower devoted to water

¹⁹ Stated in a personal interview with the author and Mr. Mike Ayers on January 8, 1971.

TABLE 21

STATE OF OKLAHOMA TOTAL MANPOWER DEVOTED TO WATER QUALITY CONTROL
BY AGENCY, FISCAL YEARS 1960-1970

Fiscal Year	Department of Pollution Control ^a	Oklahoma Water Resources Board	Corporation Commission	Department of Health	Department of Agriculture ^b	Department of Wildlife	Total
1960	-0-	-0-	12.00	8.50	-0-	1.00	21.50
1961	-0-	-0-	12.00	8.00	-0-	1.00	21.00
1962	-0-	-0-	12.00	8.00	-0-	1.00	21.00
1963	-0-	-0-	12.00	10.91	-0-	1.00	23.91
1964	-0-	-0-	12.00	10.91	-0-	1.00	23.91
1965	-0-	-0-	12.00	7.70	-0-	2.00	21.70
1966	-0-	-0-	12.00	10.16	-0-	2.00	24.16
1967	-0-	-0-	12.00	9.00	-0-	2.00	23.00
1968	-0-	4.75	24.10	13.75	-0-	3.00	45.60
1970	.50	4.06	35.30	16.10	-0-	5.00	60.96

^aDepartment created in May 1968. First part time personnel not hired until 1970.

^bDid not actively enter pollution control field until 1969.

Source: Compiled from data in Tables 16, 17, 18 and data within the text.

quality control. While manpower totals for the state have grown from 21.50 in 1960 to 60.96 in 1970 the real rise in employment has come since 1967. The total equivalent number of personnel assigned to water pollution remained virtually constant between 1960 and 1967. Manpower additions during the period totaled a mere 1.50. In the past four years it has grown from 23.00 to 60.96. This represents an increase of 165 percent. The majority of this can be attributed to the reorganization of the Corporation Commission in 1968. Out of the 37.96 increase in total employment since 1967 the Corporation Commission has accounted for 23.30 or 61 percent. The Department of Health is responsible for 19 percent of the total growth. The remaining 20 percent is spread among the four other state agencies engaged in water quality control. Prior to 1968 the Corporation Commission and the Department of Health were the only agencies with staff assigned directly to this program. While the Oklahoma Resources Board is one of the big three in terms of expenditures, it does not maintain this position in the area of employment. Prior to 1968 its expenditure on water quality control was limited to the contractual agreement with the USGS for monitoring the chemical content of Oklahoma lakes and streams.

Summary

It appears, upon examination that the impetus for Oklahoma's water quality control program stems from the passage of the Federal Water Quality Control Act in 1965 rather than the state's own initiative. As pointed out in Chapter Two the legislature had empowered the executive branch to set up water quality standards back in 1955. This power, along with that of stipulating water use for the state's lake and streams, was transferred to the Water Resources Board in 1957. This task was not undertaken until the federal government made it mandatory in 1965. The ensuing two and one-half years were spent drawing up Oklahoma's standards. The changes made in the state's water quality program since the adoption of standards in 1967-1968 are closely tied to prerequisites established for federal water quality grants.

The various state agencies engaged in water pollution control did not maintain separate accounts for their expenditures until 1968. This coincides with the state's application to the federal government for water quality control funds. A requirement of this application was the maintenance of separate records for these expenditures. This year also witnessed the first significant increase in expenditure by the state during the 1960's (Table 11). State spending on pollution control doubled between 1967 and 1968.

Employment figures followed the trend in expenditures (Table 21). Job specifications for positions directly related to water quality control were not established until 1967. The Water Resources Board which had been originally charged with setting up standards did not employ persons in pollution control until 1968. The Conservation Division within the Corporation Commission was not established until 1968. Agriculture was not made an official member of the Pollution Coordinating Committee until 1968. Tax incentives for the construction of industrial waste treatment facilities was not forthcoming until 1967. The Department of Pollution Control was created in 1968 to satisfy federal criticism of the multi-agency approach and lack of coordination in Oklahoma. In reality it is a non-functioning Department used to appease the federal government. All of these activities point to reaction rather than action and procrastination instead of planning on the part of Oklahoma.

Realizing that Oklahoma's water quality program began in earnest only a few years ago the question becomes one of commitment and intent. Is the priority being assigned water quality control in the state's financial and manpower plans such that Oklahoma can be assured of adequate clean water supplies in the future? This was the goal in establishing water quality standards for the state. The attainment of this goal depends upon comprehensive knowledge of the state's present and potential pollution problems.

This knowledge is a product of the surveillance system which the state has instituted. The adequacy of this program is the subject of Chapter Five.

SURVEILLANCE AND ENFORCEMENT

CHAPTER FIVE

Two distinct types of legal recourse for pollution damage are available in the State of Oklahoma. They are based upon the concepts of riparian and appropriative rights discussed in Chapter Two. The first of these establishes an individual's right to seek compensation for losses incurred. The second recognizes the state's right to protect water. The two are not mutually exclusive. Upon discovery of a pollution source, either through a complaint filed or a field worker's report, the responsible state agency issues a "cease and desist" order. If the pollution is not stopped the agency may take the polluter to court. Even if the pollution is stopped the state may find it necessary to sue for damage done to state property or public resources. Meanwhile, an individual suffering injury from the same source must initiate his own suit if he wishes to recover from harm done to his personal property. Thus, a polluter may be liable in more than one court case for the same act. While both types of enforcement are important, the current investigation is concerned only with the state's water pollution control activities. Therefore, this Chapter will be limited to an examination of the enforcement procedures

of the various state agencies.

Execution of responsibility by the different agencies is closely related to the monetary and personnel resources at their disposal. The information provided in Chapter Three and Four should be kept in mind when reading the following pages.

Department of Pollution Control

The initiation of pollution abatement activity may result from anyone of the three mainstays of the surveillance system; complaints filed by private parties, detection by a monitoring operation or sight investigation by agency representatives in the field. The Department of Pollution Control has neither a monitoring operation nor field personnel. Water pollution problems brought to its attention by private parties are normally referred to the member agency of its Coordinating Board having jurisdiction over the particular type of violation. As already indicated the Department's main objective is the establishment of a coordinated water control program utilizing the existing resources and facilities of the several state agencies having prevention and control responsibilities under current statutes. In the event that the agency having authority fails, refuses or neglects to take action the Department is empowered to take the appropriate steps. Decisions concerning inadequate action by an agency are subject to a

concurring vote of at least three members of the Coordinating Board. In effect, the provision makes it highly unlikely that the Department will ever reprimand a member agency. As the old adage goes, "let he who is not guilty cast the first stone."

Two other functions of the Department bear mentioning at this point. The first relates to the pollution surveillance program. The five agencies represented on the Board are required to file reports with the executive secretary of any violations and abatement procedures undertaken. These reports are due prior to the Board's monthly meetings. The intent is to establish a centralized record of pollution control efforts. Failure to comply with this provision can result in an individual's removal from office.¹ This situation has not arisen to date. The second is the power of the Board to set quality standards for state waters. When new standards are adopted or existing standards are changed a reasonable time limit is set for compliance. Violators are subject to a fine of \$500.00 and/or imprisonment for ninety days with each day constituting a separate offense.² As with the other enforcement capabilities of the Department, this clause has yet to be invoked.

¹82 Okla. Stat. § 937 (a) (Supp. 1968).

²82 Okla. Stat. § 937 (b) (Supp. 1968).

Water Resources Board

The Protection of state waters from industrial wastes other than those produced by the oil and gas industry or emptied into municipal sewage systems is the responsibility of the Oklahoma Water Resources Board. On paper the Board has the strongest surveillance capabilities of any of the state agencies. In addition to the three basic surveillance methods of monitoring, field observation and complaint investigation, waste discharge permits are required of all industries under the jurisdiction of the Board.³ Unfortunately this potential has been handicapped by inadequate funding and a resulting personnel shortage.

By far the largest portion of the Board's annual expenditures on pollution control has been devoted to water quality monitoring. This is a joint venture. The United States Geological Survey (USGS) does the actual analysis and the Board pays half the cost. Heavy emphasis was placed upon the historical results of this program in the development of the water quality criteria Oklahoma submitted to the Federal Government. For surveillance and enforcement purposes, however, it suffers from several rather serious drawbacks.

In establishing and maintaining water quality standards three types of parametric tests are important. These measure

³82 Okla. Stat. § 905 (b) (1961).

the chemical and nutrient content of the water and its biological properties. The USGS program has primarily concentrated on the first of these. Nutrient tests for nitrates and/or phosphates present in state waters were conducted on a very limited scale until 1970. The damaging effect of these elements on water quality is the basis of both the federal and state government's recent attempts to pass legislation limiting their use in laundry detergents. Many industries utilize these same items in their processing.

Biological properties such as the amount of Dissolved Oxygen (D.O.) present and the related Biochemical Oxygen Demand (B.O.D.) of different effluents are extremely important to the preservation of aquatic life so essential to good stream management. Analysis of these parameters was not undertaken until the later part of fiscal year 1970. Even now, it is only being done "at eleven locations....on a once a month, grab sample basis."⁴

Due to the deficiency in biological and nutrient data, during the establishment of Oklahoma water quality criteria in 1967, textbook formulas had to be relied on. This procedure was not in strict compliance with the federal guidelines which stated that "in no case will standards providing

⁴ Oklahoma Department of Pollution Control, State Program Grant Application: Water Pollution Control Program, 1971 (Oklahoma City: Oklahoma State Department of Health, 1970), p. NR-9.

for less than existing water quality be acceptable."⁵ Since Oklahoma's knowledge of the existing quality was incomplete it could not establish its criteria on the basis of existing water quality. If current monitoring does not measure these parameters how can the maintenance of the accepted standards be verified? The answer is, it can not.

Even if the existing monitoring system did measure nutrient and biological content it is doubtful that any type of meaningful surveillance would be possible. One reason is the number of monitoring stations. Table 22 contains a summary of USGS stations in operation each year since 1960. There has been a noticeable increase in monitoring in the last three years. Oklahoma's water quality standards were based upon pre-1965 records, however. A second problem centers around the frequency of sampling and reporting. The speed with which an overdose of pollutants can decimate fish populations, poison livestock and even ruin public drinking supplies is amazing. Monthly samples, such as are being carried out with D.O, and B.O.D. are spaced too far apart to prevent many problems. Even weekly sampling can leave large gaps. The claim of daily samples on chemical content is somewhat overstated. Computer printouts of samples taken at Oklahoma

⁵U.S. Department of the Interior, Federal Water Pollution Control Administration, Guidelines for Establishing Water Quality Standards for Interstate Waters (Washington, D.C.: Government Printing Office, 1966), p.5.

TABLE 22

UNITED STATES GEOLOGICAL SURVEY WATER QUALITY SAMPLING
STATIONS IN OPERATION, 1960-1970

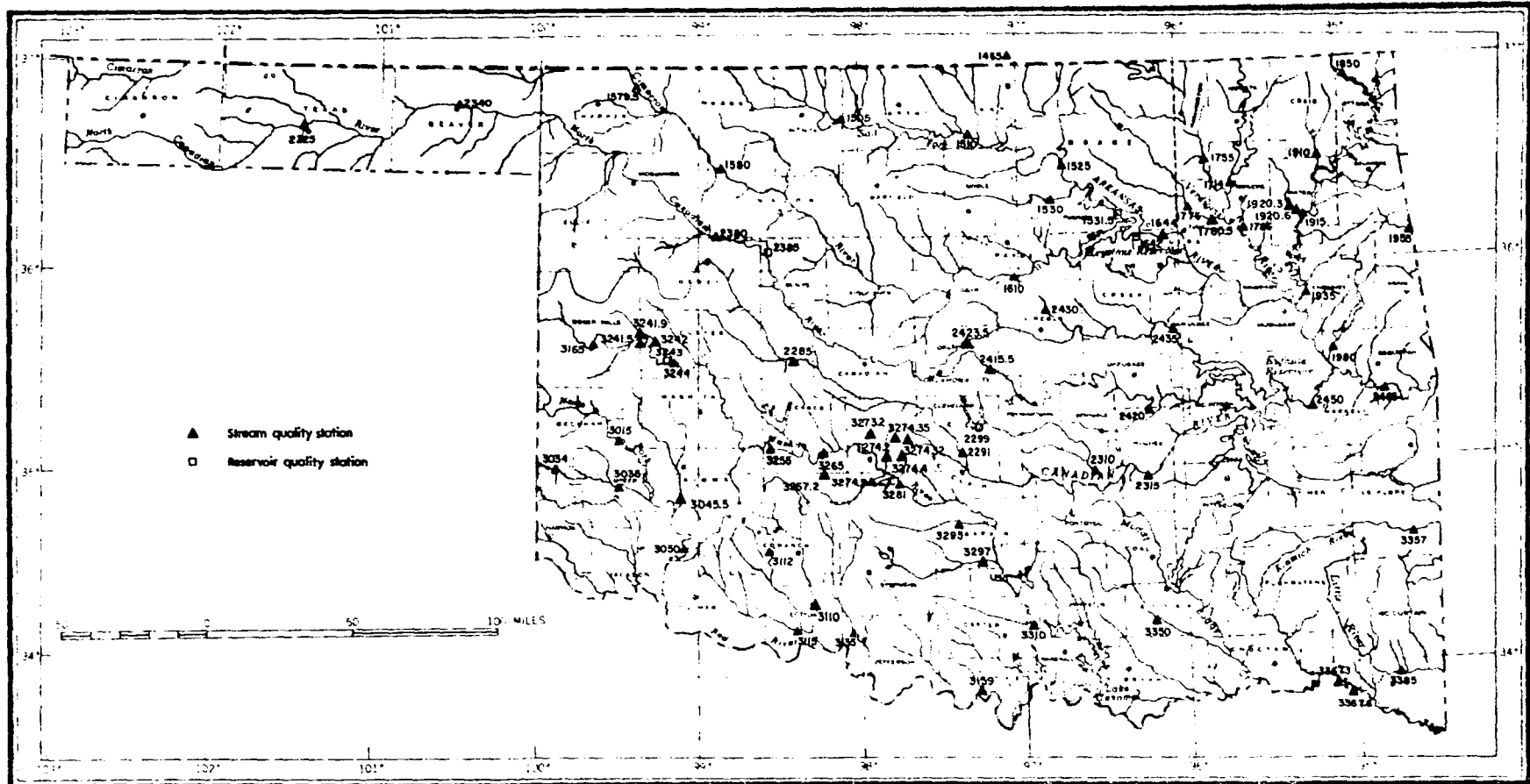
Year	Total	New Stations Added	Old Stations Reactivated
1960	29	6	0
1961	30	2	1
1962	30	2	1
1963	30	1	0
1964	28	5	8
1965	40	19	3
1966	42	5	0
1967	42	4	1
1968	66	24	7
1969	75	9	3
1970	73	2	0

^aWater year begins October 1 and ends the following September 30. It is designated by the year it ends in.

Source: Oklahoma Water Resources Board and the U.S. Geological Survey, Chemical Character of Surface Waters in Oklahoma 1962-1963, by T. R. Cummings, Bulletin No. 24, (Oklahoma City: Oklahoma Water Resources Board, 1967), pp. 8-9. U.S. Department of the Interior, Geological Survey, Water Quality Records in Oklahoma 1964 (Washington, D.C.: Government Printing Office, 1965) pp. 10-60. Water Resources Data for Oklahoma: Part 2. Water Quality Records, (Washington, D.C.: Government Printing Office) 1965, pp. 13-113; 1966, pp. 14-120; 1967, pp. 14-115. Data for 1968-1970 compiled from files of the U.S. Geological Survey, Water Resources Division, Oklahoma City Office.

FIGURE 6

LOCATION OF QUALITY OF WATER MONITORING STATIONS IN OKLAHOMA



Map of Oklahoma showing location of quality of water stations, water year 1971

gauging stations over the past three years show that as much as six days have passed between the collection of samples.⁶ Once collected the USGS does all the testing. In the event that problems arise they notify the Water Resources Board. The Board has no direct contact with the sampling or testing processes. Other than in an emergency situation the Board receives only an annual summation of the results. This is a far cry from keeping a close watch on changes in water quality.

Along with the number of stations and the sampling frequency, the placement of the stations is crucial. Ideally they should be positioned where they can monitor potential pollution sources. Decisions on the placement of monitoring stations are normally made on an annual basis in a meeting of USGS and state officials. This placement is considerably influenced by ability to combine this type of monitoring with other types maintained by the USGS. It should also be noted that economic growth in Oklahoma over the past ten years has altered industrial and municipal concentration. This is reflected in the fact that only fifteen of the seventy-three stations in operation in 1970 were in operation in 1960.⁷

⁶U.S. Department of the Interior, Federal Water Quality Administration, Computer printout on USGS water quality sampling stations, October 4, 1970.

⁷Files of the Oklahoma City office of the U.S. Geological Survey, Water Resources Division.

The deficiencies in the present monitoring system could be partially remedied by complementing it with active field investigation and a comprehensive permit program. Both alternatives have been and are now available to the Water Resources Board. Their use has been limited. Monetary and personnel restraints have stymied efforts directed toward field investigation. Routine office matters, along with complaint checking occupy the limited staff of the Board full time. The investigative procedure could be supplemented by requiring monthly reports from all industrial waste treatment plants. The staff could spot check the reports at random through personal contact. At the present time:

....reports are requested by the Water Resources Board on a monthly basis from industries that discharge large volumes of treated wastes, which if improperly treated, could greatly effect the water quality in the receiving stream. To date the Oklahoma Water Resources Board has required monthly operation reports from four industries and all are complying.⁸

Volume is certainly not the only critical measure of pollution potential. The composition of the effluent, the time of release, its impact on other wastes already in the stream, are all important. Rather than limit reports to a few on the basis of one criteria, reporting should be

⁸Oklahoma Department of Pollution Control, State Program Grant Application: Water Pollution Control Program, 1971. p. NR-11.

required of all industries. Although some effluents do more damage than others it is the sum total of wastes emptied into the state's streams which counts in the end.

Two problems currently prevent the adoption of such a policy. The first, inadequate funding, has already been discussed. The second is the Board's lack of knowledge on the waste releases of Oklahoma industry. In submitting the state's water quality standards to the Federal Government in 1968 the Coordination Committee acknowledged a lack of information on industrial wastes. They stated:

Inadequate and incomplete surveys and data are responsible for the incomplete listing. Programs are in progress, however, which will enable a complete listing of industrial noncompliance. These programs are outlined as follows:

1. The Corporation Commission through recently authorized new technical personnel will embark on a program of industrial waste surveys to include the 13 major refineries, 88 natural gasoline plants and numerous oil fields throughout the state. Such surveys should be complete during the next year.

2. The Water Resources Board is presently conducting an industrial waste survey to determine compliance with the standards. Those surveys include all industries under its jurisdiction. This survey will be complete as soon as budget and manpower will allow.

3. Recently enacted legislation has organized a committee to administer animal feedlot regulations. Some of these regulations are aimed at water pollution control. Representatives of the committee include the State Health Department, Water Resources Board, and the Department of Agriculture. This interagency committee, through a permit system, will soon acquire a complete listing and description of all animal feedlots in Oklahoma.

4. A questionnaire is currently being processed by the Oklahoma State Health Department in cooperation with the Water Quality Coordinating Committee which has as its objectives the listing of all known waste discharges to Oklahoma streams. The results of this survey will be available to agencies concerned with water pollution control or water resources development.

5. On or before January 1, 1969, the Federal Water Pollution Control Administration will be furnished a list, based on the findings in 1 through 4 above, of industrial wastes, animal feedlot wastes, and other wastes discharged to Oklahoma interstate streams. The list will include information concerning volumes and quality, adequacies and inadequacies, needs for additional treatment, and time schedule for completing remedial measures for industrial waste by 1972.⁹

The list was never completed. According to the Oklahoma Industrial Development and Park Department there are approximately 3500 manufacturing firms currently operating within Oklahoma.¹⁰ The Water Resources Board is charged with overseeing pollution control for those not emptying into a municipal treatment system. It does not know how many do or do not empty into a municipal facility. Therefore it cannot possibly know the area of its responsibility. It cannot know how many industries empty directly into streams. It cannot know what types of effluent are being discharged. Without this knowledge it cannot enforce the water quality standards nor protect the public from

⁹ Oklahoma Water Resources Board, Water Quality Standards for the State of Oklahoma 1968, Pub. 20, (Oklahoma City: Oklahoma Water Resources Board, 1968) pp. 69-70.

¹⁰ Oklahoma Industrial Development and Park Department, Oklahoma Directory of Manufacturers and Products (Oklahoma City: Industrial Development and Park Department, 1970) p. 1.

industrial water pollutants.

A study, of the type necessary to provide the Board with this data can be conducted on a one-time basis. An automatic updating mechanism is already available and in partial use by the Board. It is the permit required of industries before they can alter existing waste disposal activities. Under the Water Pollution Control Act of 1955 permits must be obtained before the construction or modification of treatment facilities can be undertaken, increases in volume or strength of wastes can occur, and/or before new plants are built or old ones modified.¹¹ In carrying out this duty the Board can "require the submission of such plans, specifications and other information as it deems relevant in connection with the issuance of such permits."¹² Information taken from the permit applications can be utilized as a source of continuous updating of the industrial effluent data bank. The whole system can be computerized. This would minimize storage, retrieval and updating problems.

Like its counterparts the permit program has not met expectations. The first permit was granted March 19, 1969, fourteen years after the law went into effect. By the end of that year 107 permits had been issued. In calendar 1970

¹¹82 Okla. Stat. § 905 (1961).

¹²82 Okla. Stat. § 904 (i) (1961).

only 46 permits were issued.¹³ Assuming that one-half of the 3500 manufacturing firms listed by the Industrial Development and Park Department empty into municipal sewers, this leaves approximately 1700 firms under the jurisdiction of the Water Resources Board. There is a large gap between the 153 permits issued and the Board's total responsibility.

Unlike a license, a permit is issued on a one-time basis. Estimates of the number of older firms discharging under permits varies from ten to twenty-five percent.¹⁴ An attractive source of revenue for financing the policing and investigative needs of the Water Resources Board would be to issue permits on an annual basis with a charge reflecting the cost of checking the applicant's compliance several times a year.

While the detection process has received the major emphasis to this point it is only part of the story. It must be accompanied by an effective enforcement process. Once the Board's surveillance system turns up an industrial pollution problem it must be remedied quickly. The 1955 Water Pollution Control Act outlined this process.¹⁵ When an industry is found to be in violation of the Oklahoma Water Quality Standards it is notified by certified mail

¹³ Compiled from records of the Oklahoma Water Resources Board.

¹⁴ Oklahoma Department of Pollution Control, State of Oklahoma Water Pollution Control Plan, Fiscal Year 1969 (Oklahoma City: Oklahoma State Department of Health, 1968), supp. sec. 3.3.3.

¹⁵ 82 Okla. Stat. § 907 (1961).

that the firm must comply with the standards by a specified date or represent itself at a hearing to answer the charges. If it fails to comply and/or cannot justify its actions at the hearing the Board will issue a "cease and desist" order. The decision may be appealed to the District Court of the area in which the pollution takes place. Any violations or failure to act in accord with the decision rendered by the Board or the Court will be judged as a misdemeanor. This could result in a fine of up to \$250 and/or a sentence not to exceed six months.¹⁶ Each day constitutes a separate offense. The State Attorney General acts as counsel to the Board.

Pollution investigations were essentially non-existent before 1968. The reporting requirement of the Department of Pollution Control furnishes a record of the Board's investigations in recent years. Since the department's first meeting in July, 1968, the Board has reported sixty-eight pollution investigations. There was one in 1968, eighteen in 1969 and forty-nine in calendar year 1970. All of these investigations have been instituted as a result of private complaints. There have been no court actions.

¹⁶82 Okla Stat. § 104 (1961).

Corporation Commission

The Corporation Commission has been the most active of the four state agencies involved in water quality control in recent years. Several factors have contributed to the relative success of their abatement efforts. The reorganization in 1968 that created the Conservation Division may be cited as the turning point. The placement of qualified personnel at strategic locations in the state has been the key element in the Commission's surveillance program. The maintenance of field offices has not only allowed for quicker checks on complaints but also allowed the Commission to embark on a continuing "well by well" survey of oil and gas production areas to determine the status of pollution control activities. Clean up instructions are issued wherever potential pollution problems are found to exist. Much of the program was made possible by reduction in travel time which has had the same relative effect as an increase in manpower. The implementation of the reorganization plan was predicated on the availability of sufficient funds. This was taken care of by taxing the industry itself. While finances are always a problem they have been adequate to support the Commission's water quality control operation. Compared to the other agencies the Commission's expenditures have been outstanding. This is the best demonstration of the importance of funding in water quality control. As noted in Chapter Three they accounted for over 38 percent

of total state spending in 1970. Another element in the success of the Commission is the limitation of surveillance to one particular industry. The Conservation Division is responsible only where the production, refinement, or transportation of oil and gas is involved. This is no small task, of course, but it does allow for a greater degree of specialization in knowledge and technique.

The Commission complements its continuing check of well sites with a permit system. Any individual or firm wishing to drill a well in Oklahoma must apply to the Conservation Division for a permit before commencing the project.¹⁷ This must also be done whenever an operation intends to rework an old well by drilling deeper, or plugging back to another formation. The application must include the following information:

- Date of Notification
- County in which well located
- Section, Township and Range
- 10-acre Description of well location
- The distance in feet on the diagrammatical
section plat from the South and West
line of the quarter section
- Name and address of the operator
- The Lease name
- Well number
- Date operations are to begin
- Estimated total depth
- The name and address of the authorized repres-
entative of the operator

¹⁷Oklahoma Corporation Commission, Regulations of the Oklahoma Corporation Commission Conservation Division (Oklahoma City: Oklahoma Corporation Commission, 1969), p. 12.

Lease boundaries outlined on diagrammatical
plat

Indicate by check whether the intent is to
drill, deepen, plug back, or re-enter¹⁸

This allows the Conservation Division to maintain a current record of all well sites and check their water pollution prevention measures during and after drilling. Failure to provide protection against water pollution will result in the revocation of the permit.

In addition to their constant well surveillance the Conservation Division requires oil refineries in the state to submit effluent analysis reports on a monthly basis. There are presently thirteen refineries in the state and all are complying. The refineries are inspected at least once a year by personnel of the Conservation Division. The Commission does not engage in stream monitoring of any type. This means the surveillance procedures discussed above have to be relied upon completely in protecting the public. To date they have functioned remarkably well. It also means the monitoring system employed by the Water Resources Board is doubly important.

Once a pollution problem is discovered, either through the normal investigative process of the field agent or the filing of a complaint, the Manager of Pollution Abatement in Oklahoma City is notified. In either case the field

¹⁸Ibid., p. 13.

agent must witness the violation. Based on the agent's findings the Manager is obliged to notify the alleged violator within ten days. In order to assure that this time limit is met the Manager telegraphs the operator. This notification contains a date by which compliance must be made and advises the operator that a shut down order will be requested if action is not taken. At the conclusion of the time limit one of three possible situations could exist. The problem could have been corrected in which case the complaint is dismissed. The operation could be in the process of correcting the situation. If an honest attempt at correction is underway the complaint is placed in the working file. This is analogous to an extension of the time limit. Failure to comply with the Commission's order will result in shutdown. This is normally accomplished by contacting the purchaser of the oil and requesting that he cease taking oil from the lease.

If the last situation exists a hearing is scheduled where the alleged violator is requested to show why he should not comply with the order of the Commission. This hearing is held in the Commission's office in Oklahoma City. It is presided over by a trial examiner. This hearing is the equivalent of scheduling the case in a district court. Appeals may be made only to the State Supreme Court. Unlike any of the other state agencies charged with pollution prevention the Corporation Commission employs its own full time

legal staff. The others utilize the services of the Attorney General's Office. Specialization is extended all the way from the field to the court room.¹⁹

The effectiveness of the Commission's operation in the post reorganization period is evident in its enforcement record. Table 23 contains a breakdown of pollution complaints filed with the Conservation Division in the four years before reorganization. Table 24 covers the period after reorganization. While the method of classifying actions taken was slightly different in the two periods it is readily apparent that the number of investigations increased substantially after the reorganization. In 1968 the Corporation Commission handled three times the number of investigations that it had in 1967. This load has continued in the following years.

The number of refineries applying for and receiving certification for tax credit (Table 13) is also indicative of the success of the Commission and the interest of the industry. Oil and gas producers are very conscious of their image and the effect pollution has on it.

¹⁹For a complete case history see Oklahoma Department of Pollution Control, State of Oklahoma Water Pollution Control Plan, Fiscal Year 1969, Attachments 3.6.3e-o.

TABLE 23

WATER POLLUTION INVESTIGATIONS UNDERTAKEN BY THE
CORPORATION COMMISSION IN THE FOUR YEARS PRIOR
TO THE 1968 REORGANIZATION

Year	Investigations	Hearings	Citations
1964	660	296	3
1965	700	426	10
1966	300	360	100
1967	600	325	100

Source: Oklahoma Executive Department, Division of
the Budget, State of Oklahoma Budget,
(Oklahoma City: Oklahoma Executive Depart-
ment) 1966-1967, p. 92; 1968, p. 106;
1969, p. 111.

TABLE 24

WATER POLLUTION INVESTIGATIONS UNDERTAKEN BY THE
CORPORATION COMMISSION AFTER THE 1968 REORGANIZATION

Fiscal Year	Pollution Investigations	Corrected & Dismissed	Working	Referred
1968	1859	1734	352	235
1969	1862	1714	151	112
1970	2036	1392	412	155

Source: Sam F. Shakley, Manager of Pollution Abatement,
Conservation Division, Corporation Commission.

Department of Health

There were 1,740,137 people living in urban areas of Oklahoma in 1970.²⁰ This amounted to 68 percent of the total population of the State. Add to this the industries and businesses which utilize municipal waste treatment facilities and the result is the state's largest potential source of water pollution. Unlike its counterparts in the pollution prevention program the Department of Health cannot depend on the abatement process. Municipal waste flows cannot be shut off without causing serious public health and nuisance problems. Since considerable time is involved in the funding, design and construction of waste treatment projects the best enforcement program is one based on preliminary studies and planning for prevention and control. The achievement of this objective depends upon early detection and identification of possible pollution problems. In attempting to attain this goal the Department has made use of a number of techniques and devices. All have suffered from the same deficiency, inadequate financing.

The resulting shortage of manpower was pointed out in Chapter Four. In planning for future needs first hand observation by qualified personnel is extremely important. The

²⁰U.S. Department of Commerce, Bureau of the Census, 1970 Census of Population. Advance Report. Oklahoma. PV (VI) - 38 (Washington, D.C.: Government Printing Office, 1970) p. 3.

Department of Health has recommended a minimum of four inspections per year for municipal and state installations.²¹ It concedes, however, that staffing limitations have reduced this to approximately one inspection per year.²² In an attempt to beef up the investigative process the State Board of Health issued a statement on December 10, 1967, requiring all municipal treatment operations to file monthly reports with the Water Quality Control Section. A standardized reporting form has been developed by the Department. It provides for daily measurement of chemical, nutrient and biological properties of the effluent releases as well as weather and rate of flow data.²³

The primary objective of this program is monthly submission of plant operation and laboratory control records. Effective evaluation depends on routine submission. Monthly reports provide complete operation data from which plant efficiency can be checked. Equipment malfunctions and/or overloading problems could be detected by studying them. They would provide evidence in answering charges that plant effluence is causing pollution. Their most important attribute is that when properly maintained individual plant

²¹Oklahoma Department of Pollution Control, State Program Grant Application: Water Pollution Control Plan, 1970 (Oklahoma City: Oklahoma State Department of Health, 1969), p. NR-11.

²²Loyd F. Pummill, Director of Environmental Services, State Department of Health, interview, November, 1970.

²³See Appendix III.

records could be combined into a state-wide monitoring network. This would be invaluable in assessing current water quality and compliance with the new stream standards. All of this could be, but, like so many of the state's other programs in this area it remains incomplete.

To be effective it has to be initiated at every water pollution control facility in the state. The accomplishment of this task will necessitate a heavy expenditure for training municipal personnel in testing and recording procedures. The reliability of the reporting system will depend upon standardization. Incomplete forms or sporadic reporting will leave gaps in the monitoring. It is essential that all local personnel receive the same training. Once trained they must be provided with the laboratory facilities and equipment necessary to carry out the tests. This calls for more expenditure. Even if the finances were forthcoming it would not completely rescue the current system.

In order to cut down the time between local recording and follow up investigations on problem areas a change will have to be made in the reporting process. Currently the forms are mailed directly to the Water Quality Control Office in Oklahoma City. If analysis detects a problem arising the state office notifies its district sanitarian or the local area health department to investigate the situation. A minor change in this procedure would result in quicker

action. By routing the reports through the local health agencies for review the local sanitarian would become aware of possible trouble at an earlier date. He could notify the state office of detected problems and any corrective actions he is taking. The reports would be reviewed again in the central office with persistent problems being handled by district personnel. This would reduce the time element and paperwork in problem assessment and control.

The success of combining field investigation and reporting to achieve comprehensive monitoring depends upon a thorough knowledge of the location and capabilities of every waste treatment facility within the state. Unfortunately the Department of Health does not possess this information. Without it the Department has resorted to "guess-timates". The data in Tables 25 and 26 was taken from the reports of the Department of Health contained in the annual Water Pollution Control Plan submitted to the Federal Government. Several questions arise immediately concerning the validity of their figures. The reporting requirement did not come into effect until December 10, 1967. This in itself was an oversight. It should have been included as a requisite for the construction permit. This late inclusion of the requirement can be taken as a plausible explanation of the upswing in the number reporting between 1967 and 1968 (Table 25). That the total number of facilities would remain the same in both years seems highly unlikely. The

TABLE 25

A BREAKDOWN OF OPERATIONAL REPORTS FILED BY MUNICIPAL
WASTE TREATMENT FACILITIES WITH THE OKLAHOMA
STATE DEPARTMENT OF HEALTH, 1967-1969

Year	Number Reporting	Number Not Reporting	Total
1967	206	217	423
1968	272	151	423
1969	249	152	401

Source: Oklahoma State Department of Pollution Control, State of Oklahoma Water Pollution Control Plan, (Oklahoma City: Oklahoma State Department of Health) 1968, p.3; 1969, p. 3; 1970, p. 3.

TABLE 26

INSPECTION OF MUNICIPAL WASTE TREATMENT FACILITIES BY
THE OKLAHOMA STATE DEPARTMENT OF HEALTH, 1967-1969

Year	Inspections Per Year	Number Inspected	Not Inspected	Total	Projected Next Year
1967	2	all	-o-	all ^a	all
1968	2	all	-o-	all ^a	all
1969	2	351	50	401	375

^aSince both tables 25 and 26 were taken from the same reports it would seem plausible to equate "all" with the figure 423 for 1967 and 1968. Why this was not done by the Department of Health is unclear. It tends to reinforce the opinion that a high degree of uncertainty surrounds the whole reporting system.

Source: Oklahoma State Department of Pollution Control, State of Oklahoma Water Pollution Control Plan, (Oklahoma City: Oklahoma State Department of Health) 1968, p. 3; 1969, p. 3; 1970, p. 3.

state has prided itself on being among the leading recipients of federal funds for the construction of municipal treatment facilities.

The drop in treatment facilities in 1969 is even harder to justify. The Department's 1969 Annual Report states there were over 425 plants in that year.²⁴ Although the frequency of reporting is listed as monthly in submission to the Federal Government this is not entirely correct. Out of the 249 reporting in 1969, 64 or approximately 25 percent filed less than six reports. The remaining 185 filed anywhere from six to the full complement of twelve required.

The inspection data in Table 26 further confuses the situation. The number of plants is forecast to drop again. The sudden inability of the Department to inspect all treatment works in 1969 would be quite alarming if one were to believe the 1967 and 1968 inspection summaries. The Department, quite simply, does not know how many facilities are operating in the state.

The last report on municipal sewerage facilities in Oklahoma was released in June, 1965.²⁵ It contained only the name of the receiving stream, the type of treatment, the actual effluent flow and the designed capacity of the different plants. In many instances even these limited facts were

²⁴Oklahoma State Department of Health, The First Annual Report of the Oklahoma State Department of Health: July 1968 to June 30, 1969 (Oklahoma City: Oklahoma State Department of Health, 1970), p. 29.

²⁵Oklahoma State Department of Health, "Municipal Sewerage Facilities of Oklahoma," Oklahoma City, 1965. (Mimeographed.)

missing or estimated. It is acknowledged by health officials that this study was not a complete census.²⁶ An attempt to remedy the situation was initiated in 1967 but manpower shortages resulted in its being shelved. Before the Department can fully institute a surveillance program of the type it envisages it must know how many plants there are and where they are.

An inventory of this type should have been available through reference to the Department's effluent permit files. Beginning in 1917 every municipality was required to obtain a permit from the Department of Health before it could discharge wastes into state waters.²⁷ Permits are also required before waste facilities can be constructed, enlarged or altered in any manner. If the permit system had been enforced and recorded carefully it would have furnished such a list. Armed with this information the Department could have assigned specific inspection responsibilities to the various district and local sanitarians. Monthly reports could have been checked against it to make sure all municipal facilities were complying with the 1967 regulation. The state has acknowledged that it "does not, at this time have a routine program for validating results of tests supplied

²⁶ Jerry Penland, Interview at Oklahoma State Department of Health, December, 1970.

²⁷ 63 Okla. Stat. § 1-908 (Suppl 1963).

by facility operators."²⁸ Permit forms could be designed in a manner that would update the data bank established upon completion of the survey.

The construction of waste treatment facilities is supposed to be carried out in accordance with standards set forth by the Department of Health's Sanitary Engineering Division.²⁹ When a construction permit is applied for, the Division examines the plans to make sure they meet the minimum design requirements. While this action is to be commended it suffers from a rather serious oversight. The standards were last revised in July, 1963. They do not take the state's new water quality criteria into consideration.

Three other programs in various stages of development deserve mention at this point. A mobile laboratory was purchased in 1947 for use in conducting field inspections. Due to financing and training needs, it has not been available for this task as originally planned. When not engaged in short courses it may be found on the back lot of

²⁸Oklahoma State Department of Pollution Control, State Program Grant Application: Water Pollution Control Program, 1970, p. NR-11.

²⁹Oklahoma State Department of Health, Environmental Health Services, Division of Sanitary Engineering, Standards for Water Pollution Control Facilities. O.D.H. Eng. Bulletin No. 0587. (Oklahoma City: Oklahoma State Department of Health, 1963).

the Health Department. The licensing of septic tank cleaners is the second. While rural states like Oklahoma have characteristically relied heavily on septic tanks and cesspools as a means of waste treatment relatively little attention has been given this potential pollution source. Aside from licensing cleaners the Department of Health has followed this pattern. There is no comprehensive permit system in existence. Unless constructed under one of the federal loan programs their placement and design goes unchecked. This will eventually cause substantial problems in Oklahoma's vast ground water supplies. The last of the three programs is still in its infancy. It involves the routine bacteriological sampling of designated "body contact recreation areas" to determine compliance with water quality standards. The implementation of the testing sequence has been delayed by problems in determining the areas to be monitored. In a temperate region like Oklahoma where water based recreation is receiving so much attention a program of this type should have been instituted long ago for safety's sake.

The purpose of the surveillance program is to detect problems before they occur. As mentioned previously prevention and not abatement is what the Department of Health is striving for. Accordingly their enforcement program reflects this ideal. Whenever a routine inspection reveals plant deficiencies, verbal notice is given to the municipality. It is normally confirmed by a letter and a copy of the inspection report.

If the problem persists one of several courses of action are taken depending upon the nature of the deficiency. If extensions to the present facility would only aggravate the situation construction permits may be withheld. The Department may contact the Federal Housing Administration and the Veterans Administration advising them that present facilities in a given location are inadequate. These agencies are reluctant to assure loans in such areas. If all else fails then and only then will the Commissioner of Health issue an order and prepare to follow it up with such legal action as might be required. Penalties for violating the regulations of the Department may range from \$100.00 to \$500.00 and/or thirty days in jail.³⁰ Like the Water Resources Board, the Department of Health kept no investigation records prior to the institution of the Department of Pollution Control requirements. It participated in only two investigations in 1968. The following year it conducted seventeen. In 1970 it handled fifty-three complaints. It has taken no court action.

The objectives of the Department in reference to water quality were expressed in a December 12, 1965, policy statement of the State Board of Health.

Consistent with the progress being made in the development of the waters of the State of Oklahoma

³⁰ 63 Okla. Stat. § 1-1701 (Supp. 1963).

and the increasing use of such waters for municipal, industrial and agricultural supplies as well as navigation, recreation and wildlife and other beneficial purposes, and in order to further reduce the hazards to the public health and to protect the waters of the State against the encroachment of pollution, the State Board of Health adopts the following statements as supplementary to existing Health Department policy:

1. That all wastes discharged to the waters of the State receive the equivalent of secondary treatment prior to being discharged, and that action be taken by the State Department of Health to secure the orderly achievement of this objective for all wastes under its jurisdiction.

2. That the State Department of Health continue to work with municipalities and other local, State and Federal agencies to secure better operation of waste treatment facilities and to encourage, where indicated, joint municipal and joint municipal-industrial projects for compatible wastes with the objectives of effecting more comprehensive basin planning and increased economy in meeting the higher costs of better treatment procedures which will be required in the future.

3. That the State Department of Health continue to support research in advance waste treatment methods and in the re-use of water for all purposes, with particular emphasis on the value of waste water for irrigation.³¹

The attainment of the first of these goals was the motivating force behind the establishment of a surveillance system. The deficiencies in this system have already been examined. Even if the present surveillance were functioning properly it would still fail to protect the state's waters, given the definition of secondary treatment being utilized

³¹Oklahoma State Board of Health, Policy Statement of the State Board of Health with Reference to Water Pollution Control Facilities. (Oklahoma City: Oklahoma State Department of Health, December 12, 1965.

by the Department of Health. In judging municipal compliance with statement one, the Department has accepted septic tanks as falling within the bounds of secondary treatment. This concept would normally be rejected.

Briefly, primary treatment removes the solids in sewage through screening and settling tanks. It removes approximately thirty percent of the organic matter in municipal sewage. Secondary treatment refers to the second step in most waste treatment systems in which bacteria consumes the organic parts of the wastes. This is accomplished by bringing the sewage and bacteria together in trickling filters or in an activated sludge process.

A septic tank is simply a container buried in the ground which receives effluent flows. The heavier objects settle to the bottom and form sludge. Bacteria in the sewage decomposes the organic wastes and the resulting effluent flows out of the tank into the ground. The problems with septic tanks lies in the degree of control that can be exercised over the outward flowing effluent. Unless the tanks are emptied regularly sludge deposits will build up decreasing the room in the tank and consequently the amount of time the sewage is subjected to bacteriological decomposition. This in turn will increase the percentage of organic waste escaping into the ground. This is especially true in the use of community tanks where additional construction has added disposal burdens beyond the original capabilities of

the tank. Since normal practice calls for burying the tanks the testing of incoming and outflowing effluents becomes rather difficult.

All of this makes for a large amount of guess work. The Department of Health has no established rules on the maintenance of septic tanks. The closest thing to regulation is their licensing of septic tank cleaners. If the Department continues to classify septic tanks as secondary treatment definite regulations must be adopted for their usage.

The lack of a comprehensive data bank precludes the attainment of the second goal enumerated above. Before any type of treatment project can be planned with confidence it is essential that the planners are equipped with as complete and detailed knowledge of the situation as is possible. It has already been noted that the Department of Health is sorely lacking in this area. Considerable time, effort and money will have to be expended to set up the necessary information center.

Research activities of the Department are nil. Insufficient staff exists to handle day to day matters, let alone surveillance or research. All in all the Department of Health has been given an immense task and a rather meager budget to accomplish it with. This is not to criticize the staff of the Department but rather a system which is able to assign priorities without making any commitments.

Department of Agriculture

Water quality surveillance by the Department of Agriculture is based upon complaints and licensing. Annual licenses are required of both pesticide applicators and feedlot operations. The maintenance of water quality precautions are a requisite for the continued granting of licenses.

Feedlots are subject to investigation by agricultural personnel. If proper safeguards against effluent drainage are not present the license may be denied. The passage of this law in 1969 was a definite boost to the water quality efforts in the northern and western sections of Oklahoma. In past years it was a generally accepted rule of thumb that when contemplating the construction of a feed yard the operator should select a site with good natural drainage. This way, rain could act as a flush, carrying away unwanted animal wastes. The unpredictability and intensity of rain in this section of Oklahoma led to devastating results. Heavy concentrations of these wastes were broken loose and carried away to nearby streams and rivers.

Every stream has some natural purification ability. Bacteria within the water digests many types of waste, especially human or animal. In the process oxygen is used up. The stream regenerates its oxygen supply through continuous contact with air on its surface. Overloading the

stream with animal excrement resulted in oxygen depletion and the suffocation of stream life. This situation could be avoided by treating the wastes or at least by evening out their release into state waters. The second alternative could be most easily achieved by constructing holding ponds for the effluent and releasing it periodically. The inclusion of a pollution avoidance clause in the new licensing law acts as an added incentive to construct some type of prevention facility. The law itself is so new that its enforcement has not been tested.

Unlike feedyards it would be almost impossible to monitor every commercial application of a pesticide. Instead applicators are licensed with the understanding that excessive residues in waters as a result of their activity can cost them their right to do business. When a complaint is received indicating the possibility of pesticide pollution an investigator is dispatched from the Department of Agriculture. Samples are gathered and tested in the Department's laboratory in accordance with methods approved by the Association of Agricultural Chemists. If the tests are positive a hearing is held. This may result in license revocation, fines, damage payments or a combination of the three. In the short period of time the Department of Agriculture has been engaged in pollution control they have engaged in twenty-seven investigations, two in 1969 and

twenty-five in 1970. Four of these involved feedyards. The remainder concerned pesticides. In all of these investigations the situation was either corrected or no pollution could be detected. There has been no court action to date.

Department of Wildlife Conservation

The Department of Wildlife Conservation has no licensing, permit, monitoring or standardized inspection schedule. It depends completely upon discoveries made by its rangers and complaints. As indicated in Chapter Four the Department has approximately one hundred game rangers distributed throughout the state. Their day to day activities bring them into contact with potential pollution problems. Since a fish kill is often the earliest sign of water pollution these field personnel are usually the first to be notified. In cases where the pollution is on a relatively minor scale the local ranger will attempt to make a determination as to the cause of the problem with the intention of correcting it. If the case involves the petroleum industry the ranger must notify the Corporation Commission. If corrective activity is initiated immediately then no legal action can be taken against the polluter. In cases where abatement is not forthcoming the ranger will seek redress in the county court. These minor violations are punishable by a fine of from \$100 to \$500 per each day the situation

goes uncorrected.³²

In pollution problems of greater magnitude where substantial fish kills are recorded the Department follows a different procedure. Normally biologists are called in from the main office to sample the water and determine the source and effect of the pollutant on the biota of the receiving stream. They are also instructed to ascertain the type and value of the fish lost. Since by law these fish are the property of the state the Department is authorized to take the polluter to court for compensation. The state is only interested in replacing game fish. They have not as yet requested reimbursement for the death of forage fish. In Oklahoma the walleye, northern pike, striped bass, large-mouth black bass, small-mouth black bass, spitted black bass, rock bass, black crappie, white crappie, trout, blue catfish under twenty-four inches and channel catfish are considered to be game fish.³³ Replacement costs are calculated by species and by the various size classes of each species. The Department utilizes an average wholesale price of those species which can be purchased from commercial hatcheries. The value of those species not available from commercial sources is calculated on the basis of the cost

³²29 Okla. Stat. § 409 (1961).

³³29 Okla. Stat. § 102 (k) (1961).

incurred by the Department in rearing them. Rough and game fish values not available from either of these sources are calculated from the average commercial wholesale value.

Court action can be avoided by negotiation between the Department and the offender. This method is open to political criticism, however, and has been avoided recently even though it is often much less expensive to the state.³⁴

Ordinarily the Department of Wildlife Conservation acts as a detection agency. The other state agencies assign personnel to these cases depending on the source of the pollution. Table 27 contains a summary of fish kills reported between 1960 and 1968. A more detailed description of each of these kills is found in Table 28. The Department of Pollution Control recorded only one instance involving fish in 1969. In the past year it has handled thirty-four complaints. With the exception of the Cimarron River fish kill in August, 1970, these investigations were of a minor nature.

³⁴A prime example of the insanity of this approach is the fish kill on the Cimarron River in July, 1970. Responsibility was determined to be with the Kerr-McGee Corporation. The firm acknowledged their guilt and offered to settle out of court for \$1,000. The state refused, pressed charges and won a court settlement of \$329.77. As of January, 1971, the State is still trying to figure out what to do with this money. It seems no provisions were ever established to handle damages such as this.

TABLE 27

RECORDED FISH KILLS IN OKLAHOMA, 1960-1968

Year	Number of Reports	Number of Fish	Miles of River Affected		Acres of Lake Affected		Miles of Shore Affected		Ranking ^a
			Number	Miles	Number	Acres	Number	Miles	
1960	3	--	--	--	--	--	--	--	--
1961		-- Did not report any kills	--	--	--	--	--	--	--
1962		-- Did not report any kills	--	--	--	--	--	--	--
1963	1	--	--	--	--	--	--	--	--
1964		-- Did not report any kills	--	--	--	--	--	--	--
1965	5	1,203,580	3	41	--	--	--	--	3/44
1966	3	530	2	6	1	1	--	--	45/46
1967	3	7,500	2	8	1	2	--	--	30/40
1968	7	189,550	2	91	4	28	--	--	12/42

^aOklahoma's ranking out of the total number of states reporting.

Source: U.S. Department of Health, Education and Welfare, Public Health Service, Division of Water Supply and Pollution Control, Basic Data Branch. Pollution Caused Fish Kills, Public Health Service Pub. no. 847. (Washington, D. C.: Government Printing Office) 1960-1968 Issues p. 3.

TABLE 28

A BREAKDOWN OF FISH KILLS IN OKLAHOMA

Year	River or Lake Affected	Nearest Town or City	Date of Kill	Cause	Estimated Number Killed
1960	Fort Gibson Lake	Wagoner	7/25/60	Industrial Waste	
	Fort Gibson Lake	Wagoner	8/20/60	Industrial Waste	--
	Dirty Creek	Weber Falls	8/10/60	Agricultural Poisons	
1961		--Did Not Report Any Kills--			
1962		--Did Not Report Any Kills--			
1963	Little River	Wright City	6/24/63	Industrial Waste	--
1964		--Did Not Report Any Kills--			
1965	Rock Creek	Elmore City	10/2/65	Municipal Sewage	2,000
	Ft. Gibson Res.	Pryor	12/24/65	Municipal Sewage	--
	Walnut Creek	Purcell	7/28/65	Municipal Sewage	500
	Big Turkey Creek	Waukomis	1/25/65	Petroleum	1,200,080
	Bandy Creek	Wilburton	12/1/65	Municipal Sewage	--
1966	Unnamed Farm Pond	Duncan	3/20/66	Agricultural Poison	180
	Quapaw Creek	Meeker	5/-/66	Municipal Sewage	350
	Cimarron River	Oilton	3/1/66	Petroleum	--
1967	Washita River	Davis	7/29/67	Municipal Sewage	3,500
	Farm Pond	Sulphur	7/1/67	Petroleum	1,000
	Unnamed Stream	Tulsa	9/29/67	Other	3,000
1968	Johnson Farm Pond	Corn	4/11/68	--	200
	Sec. 21 1N 2W	Elmore City	2/-/68	--	1,600
	Lynn Wiley FC Lk	Foster	2/-/68	--	1,500
	Cimarron River	Perkins	1/18/68	--	180,000
	Unnamed Pond	Perry	8/12/68	--	250
	Lake Hobart	Rocky	4/14/68	--	6,000
	Big Sallisaw Cr.	Sallisaw	9/11/68	--	--

Source: U.S. Department of Health, Education and Welfare, Public Health Service, Division of Water Supply and Pollution Control, Basic Data Branch. Pollution Caused Fish Kills Public Health Service Pub. no. 847. (Washington, D.C.: Government Printing Office) 1960-1968 Issues p. 3.

TABLE 28

FISH KILLS IN OKLAHOMA, 1960-1968

Cause	Estimated Number Killed	Type Game	Forage	Severity	Estimated Miles or Acres Affected	Duration of Critical Effect
Industrial waste	--	--	--	Moderate	3 m.	--
Industrial waste	--	--	--	Moderate	3 m.	--
Agricultural poisons	--	--	--	Heavy	--	--
Fills--						
Fills--						
Industrial waste	--	40 %	60 %	Heavy	--	2 days
Fills--						
Municipal sewage	2,000	1 %	99 %	Heavy	1 m.	3 days
Municipal sewage	--	--	--	--	--	--
Municipal sewage	500	5 %	95 %	Total	1 m.	1 day
Petroleum	1,200,080	1 %	99 %	Heavy	39 m.	5 days
Municipal sewage	--	--	--	--	--	--
Agricultural poison	180	100 %	--	Moderate	1 A.	7 days
Municipal sewage	350	--	100 %	Total	1 m.	--
Petroleum	--	--	--	Light	5 m.	1 day
Municipal sewage	3,500	30 %	70 %	Heavy	2 m.	8 hrs.
Petroleum	1,000	100 %	--	Moderate	2 A.	4 days
Herbicide	3,000	40 %	60 %	Total	5 m.	12 days
--	200	65 %	35 %	Moderate	2 A.	7 days
--	1,600	100 %	--	Total	16 A.	-- days
--	1,500	50 %	50 %	Heavy	8 A.	7 days
--	180,000	35 %	65 %	Heavy	90 m.	4 days
--	250	100 %	--	Moderate	2 A.	1-1/2 days
--	6,000	1 %	99 %	Light	--	4 days
--	--	10 %	90 %	Moderate	1 m.	2 days

Welfare, Public Health
 Pollution Control, Basic
 Public Health Service
 (Printing Office)

Summary

The State of Oklahoma has the statutory power and organizational framework essential for the implementation of a strong water quality control program. It has not achieved its potential. The basic reason is insufficient financial support. This restraint has resulted in manpower shortages. Without the necessary personnel the ability of the various agencies in the areas of surveillance and enforcement has been severely handicapped. The passage of the Federal Water Quality Act of 1965 served as the catalyzing force in highlighting the problems in the system. It placed the burden of clean water squarely on the state. In so doing it forced the state to attempt an internal coordination of its various water quality efforts. The results have been less than satisfactory.

The Department of Pollution Control was established in 1968 to satisfy the federal requirement of a designated state agency responsible for enforcing the state's water pollution laws. It is a misnomer. Run by a Coordinating Committee comprised of representatives of the five state agencies engaged in water control it meets only once a month. Rather than a comprehensive coordination of effort, each agency has tended to guard its vested areas of interest against encroachment from the others. Fundamental procedures such as standardized reporting of pollution problems

or integrated training of agency personnel have yet to be instituted. The concept behind this Department is a good one. If properly organized it would become the informational hub of the water quality control system. In order to achieve this goal its control will have to be divorced from the Coordinating Committee. The Department must be able to tell its members what to do and not vice versa.

The ideal solution would be the development of a program which would allow the Department of Health's objective of prevention rather than abatement to be adopted by all the agencies. The attainment of this goal will require a complete reorientation in the data collection process. Before planning for prevention can be relied on the present program of abatement must be completed. This can only be accomplished by a statewide census of all pollution problems, both present and potential. Once this is known the state can set about curing the present problems and planning to forestall the potential ones. This will demand complete cooperation between the five agencies. As an example the responsibility for industrial pollution is split between two agencies. The Department of Health has jurisdiction over all industries which empty their wastes into a municipal collection facility. The Water Resources Board is charged with monitoring the remaining industries of the state. Just how many industries do or do not utilize municipal facilities has never been determined. Neither agency can efficiently

carry out its duty. The solution would be to combine their talents with the Industrial Development and Park Department in a census of Oklahoma industry. A number of other surveillance gaps due to informational deficiencies have been noted in the text of this Chapter. This has resulted in the use of general and noncommittal statements as well as inconsistencies in the state's annual water pollution control plans submitted to the federal government. The phrase "this information will be presented as it becomes available" has become rather hackneyed in the course of these submissions. The information does not become available. The federal government must share the blame for these shortcomings. They have been lax in their analysis and follow up. If it were more insistent that the promised submissions were sent, the state would be forced to reappraise the situation or risk losing its federal funds.

This has not happened, however, and the state's water quality program is a reflection of these shortcomings. At best the state is only maintaining the present quality of its waters. This cannot even be stated with complete confidence. The state itself has admitted that:

In general, numerical values have been established for all significant interstate streams. These numerical values were based on historic records of quality and may not give adequate recognition to recent changes in water quality as a result of stream flow regulation through reservoir construction and water pollution control abatement measures of recent date. Sampling to verify the validity of numerical tables is

recognized as a major need. Intrastate streams are covered by general criteria since in many instances numerical data was not available. Since these general criteria stipulate that water quality will not deteriorate below present quality pending the establishment of specific criteria, the need exists for determining existing quality ranges where data is not now available.³⁵

Ultimately the state should strive not just for maintenance of the status quo but for a continued improvement in the quality of its water resources. This was the intent of the Federal Water Quality Control Act of 1965.

If the state is to meet the challenges of growth in the 1970's it will have to respond accordingly. Unless water quality control is assigned a higher priority in the state's over all plans, industrial, municipal and agricultural growth will be adversely affected, the recreation potential will be damaged and Oklahoma may once again revert to the desolation of the 1930's.

³⁵ Oklahoma State Department of Pollution Control, State Program Grant Application: Water Pollution Control Program, 1970.
p. NR-9.

RECOMMENDATIONS FOR REFORMATION OF OKLAHOMA'S
WATER QUALITY CONTROL PROGRAM

CHAPTER SIX

In the preceding examination of Oklahoma's existing water quality control program, numerous deficiencies and problems have been pointed out. In this Chapter recommendations for the improvement of the system will be advanced. The state has at hand the necessary basis for the implementation of a comprehensive water pollution control operation, but must move from intent to commitment and action. It can accomplish this through combining fuller utilization of the present system with the adoption of new policies in indicated problem areas.

There may be some truth to the argument that strong water quality control efforts will discourage investment and growth in Oklahoma, but this is a short run truth. In the long run, growth will be encouraged. Business firms, and more important, their employees, are increasingly looking for pollution free spaces. Oklahoma does not need those firms who predicate their investment on lax environmental standards.

The first step in accomplishing this task is to move beyond the present objective of pollution abatement to that of pollution avoidance. The policy of improving the quality of state waters must replace that of simply maintaining the status quo. This can only be done through planning. Planning

requires knowledge and a data bank from which information necessary to the decision making process can be drawn. This goal entails money and manpower, in quantities much larger than the state has to date been willing to commit. In the area of financial resources the state has again erred in following the short run concept. We need to examine the situation in terms of the present versus the future costs of clean state waters.

The recent formation of the new Federal Environmental Protection Agency (EPA) and the possibility of an end to the war in Viet Nam may well signal an increase in the availability of federal funds for state activities in this area. The leadership of the EPA has already indicated that the states will have to tighten up their planning if they wish to qualify for increased assistance. The possibility of increased federal funds to match state appropriations is certainly an incentive for states to increase their expenditures, but it would be unwise for Oklahoma to count on this source in their current plans. The state should examine present potential in light of existing resources.

The state needs more money for additional manpower. It also needs to raise current salaries to levels commensurate with the degree of responsibility apportioned the various positions. The state must pay top salaries if it desires to acquire experienced personnel. The continued development of new techniques for combating pollution will require more and

longer in-service training programs for the employees of the various agencies engaged in this endeavor. Monitoring operations will require the purchase of equipment. The expansion of financial and manpower resources devoted to water quality control will certainly be of great assistance in the surveillance and enforcement operations of the state.

The problems encountered in Chapters Two through Five fall into eight basic categories: (1) Lack of authority to adequately "consider" the environment; (2) Inadequate environmental impact research; (3) Inadequate short-range or long-range planning; (4) Insufficient public participation in the decisions-making process; (5) Lack of funding for environmental quality control; (6) Insufficient personnel (in numbers or qualifications); (7) Basic conflicts between agency or organizational "mission" and environmental quality; and (8) Failure to recognize the environmental imperative.

In the following pages, solutions to these problems will be advanced, but it should be pointed out that these recommendations do not exhaust the list of possible alternatives. As time passes and situations change new and better methods for dealing with water quality may appear. Revision aimed at proving strong enforcement will not be enough. The laws and the organizational framework must be viable as well as strong. The program will have to be able to adapt to future contingencies.

Department of Pollution Control

Oklahoma does not have a centralized, integrated, professionalized system of water quality control at the state level. Responsibility and expertise on water pollution are fragmented among five agencies: the Oklahoma Water Resources Board, the Corporation Commission, the State Health Department, the Department of Agriculture, and the Department of Wildlife Conservation. This deficiency was noted by the Federal Government in its review of Oklahoma's water quality standards, and the state was urged to "seek legislation to create a single state agency for water pollution control."¹ Oklahoma responded with the establishment of the Department of Pollution Control in 1968. Unfortunately this agency has no real powers or functions. Its strongest point is its potential.

Ideally the Department of Pollution Control should be a super agency in complete charge of all phases of environmental control within Oklahoma. However, the attainment of this goal is impractical given the current status of the water quality control program. Among the more obvious reasons are finances, support activities, and agency attitudes.

The Conservation Division of the Corporation Commission operates on funds derived from an excise tax on oil and gas producers. This revenue is earmarked for use by the Division.

¹See page 3, paragraph 2 of Secretary of the Interior Udall's letter to Governor Dewey F. Bartlett contained in Appendix I.

It would be extremely difficult to secure new legislation to transfer these funds to a super agency. As indicated in Chapter Three, these funds currently account for 39 percent of the state's total expenditure on water quality control. If federal funds were removed from this total, the oil and gas industries contribution would approximate 46 percent.² Problems would also arise with the Department of Wildlife Conservation. Wildlife operates on revenues acquired through the sale of fishing and hunting licenses. Federal grants to the state for wildlife management are predicated on the condition that license revenue be earmarked for use only in this area. While expenditures by the Department of Wildlife have been relatively minor, they are growing and they are basically federal funds. The transfer of these agencies' responsibilities could be achieved much more readily than the transfer of their funds. In light of the current financial plight of the state's water quality program the feasibility of such a transfer is very questionable.

Furthermore, it would be extremely difficult to separate out the pollution control function of any of the agencies without severely hampering their effectiveness or creating duplication. Removal of pollution surveillance from the duties of the Conservation Division's field inspectors would not do away with the need for field inspection. Transferring

¹See Table 12, Chapter Three.

the Water Pollution Control Section from the State Department of Health to a new super agency would have numerous drawbacks because the section currently utilizes the Health Department laboratory facilities as do the other five agencies. Would this support still be readily available to a new agency or would a new laboratory have to be established? The Department of Health's Pollution Control Section also relies on county and local sanitarians for many tasks. True separation would remove this possibility. The various degrees of duplication and loss of support activities would result in all five of the agencies if their pollution control functions were removed.

A third major hinderance to any attempt to create a super agency would be the opposition of the five agencies now engaged in water pollution control. The desire of these agencies to retain the control they have in the area of pollution surveillance was quite evident in the recent meetings of the Legislature's Special Committee on Pollution Control. Agency representatives were quite vehement in their arguments against the creation of one agency.³

Perhaps a super agency may be feasible at some time in the future when the expansion of the state's economy and its revenue base will support the duplication of facilities and

³These meetings were held during the months of October and November, 1970, at the State Capital. This attitude was also expressed by various staff members of the five agencies during personal interviews conducted by the author.

accompanying financial burden occasioned by such a move, but the recommendation here, is for an intermediate step. The existing Department of Pollution Control should be revamped into a true coordinating body as was originally envisaged. The attainment of this objective will require several revisions.

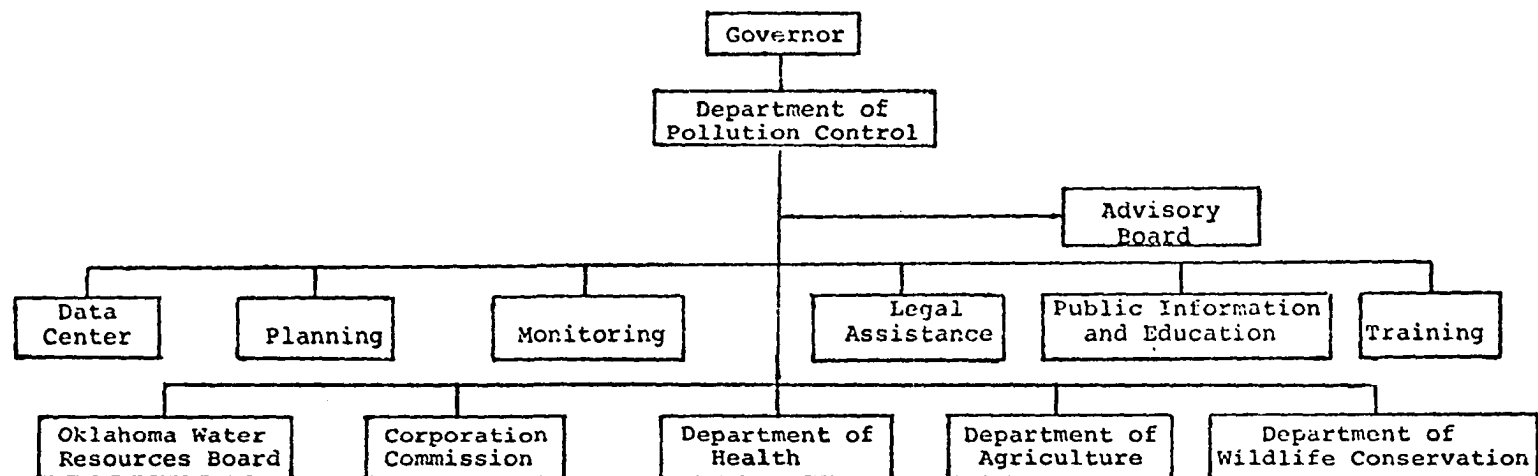
The most important step concerns the leadership of the Department. The Department needs a permanent director whose position of authority is above that of the five agency administrators. This position would be filled through appointment by the Governor. While this method is subject to political criticism, it has the advantage of assuring an established line of communication with the Governor. The director should possess a solid background in the area of environmental control and design. Above all, he must be an experienced administrator.

The Coordinating Committee would be replaced by an Advisory Board comprised of conservationists, businessmen, educators, and other knowledgeable individuals employed outside of government. Board members would be appointed by the Governor with qualifications set by the legislature. The Board would service the need for greater public participation in environmental design.

The changes in leadership and orientation must be accompanied by expanded functional responsibility (Figure 7). Immediate action should be taken to establish a comprehensive

Figure 7

Recommended Organizational Chart for the Water
Pollution Control Program of the State of Oklahoma



data bank. The crucial element in an effective surveillance and enforcement program is knowledge of the area to be covered. While agency responsibility has been defined in the law, the individual organizations have made little progress in carrying out their assignments. The Department of Health cannot send personnel to inspect all the municipal sewage treatment plants because it does not know where they are located. The Water Resources Board does not possess a complete list of industries discharging effluents in the state. A major reason for the ineffectiveness of the present surveillance system is this information gap. Locating the data bank within the Department of Pollution Control and granting it power to require the member agencies to furnish necessary information, will help to eradicate this problem and, at the same time, provide a yardstick against which future progress can be measured. The data bank will also have value as a support tool for planning research, education, and public information.

The use of modern computer technology is a must. The days of innumerable file cabinets filled with voluminous and inconsistent copies is past. The state needs to employ modern computer techniques which result in maximum efficiency and minimum time expenditure. The opportunity is available. The new State Department of Health building under construction in Oklahoma City is to be furnished with a modern computer center. Locating the data bank for the Department of

Pollution Control within this facility would result in lower costs for both organizations through time sharing. Data storage can begin before the completion of construction. The Department of Health already has a small computer section which could be utilized to record data until the new center is finished. To achieve the broadest possible coverage, the Department's data center should maintain direct lines of communication with the Robert S. Kerr Federal Water Quality Laboratory in Ada, Oklahoma, the new Agricultural Control Laboratory in Durant, Oklahoma, the Midcontinent Environmental Center Association (MECA), the Bureau of Water and Environmental Resources Research at the University of Oklahoma, and the Water Research Institute at Oklahoma State University. The establishment of such a data center would also provide added incentive for locating a regional environmental center in Oklahoma.

The water quality monitoring program now handled by the Water Resources Board, in conjunction with the United States Geological Survey should be transferred to the Department of Pollution Control. The Water Resources Board only has jurisdiction over one segment of industrial pollution. The monitoring program is designed to measure variation in over all water quality and not just variations due to industrial pollutants. As such it should be located within the central agency rather than one of its arms.

In the original determination of Oklahoma's water quality

standards, several gaps were noted in existing water quality records. Stream quality data was non-existent in a number of instances. The state had to resort to the use of text book formulas. The Federal Government stated in 1966 that "in no case will standards providing for less than existing water quality be acceptable."⁴ Rather, "there ought to be a constant effort to improve the quality of the water supply."⁵ Oklahoma's lack of knowledge concerning the existing quality in a number of her streams put the state in violation of the federal requisites from the beginning.

There is a definite need for a two directional expansion of the monitoring system. The number of water quality sampling stations should be increased to cover the missing areas. Second, nutrient and biological tests should be added to the present chemical sampling to attain a comprehensive overview of water quality.

Once this basic water quality information is available, the Department should turn its attention to more closely aligning the monitoring program to state needs. Monitoring stations should be relocated according to priorities determined on the basis of the census of industrial and municipal waste flows conducted by the member agencies. If the USGS

⁴U.S. Department of the Interior, Federal Water Pollution Control Administration, Guidelines for Establishing Water Quality Standards for Interstate Waters, (Washington, D.C: Government Printing Office, 1966), p. 3.

⁵Ibid.

is unwilling to go along with this, the Department may have to acquire monitoring equipment of its own. Complete and comprehensive water quality records are a **pre-requisite** to effective planning for future development.

A planning section should be created in the Department to oversee the formation of all state plans relating to water quality control. The state is required to submit an annual water pollution control plan to the federal government in its quest for matching funds. The facts and figures within these plans have been inconsistent from year to year. Additional information and reports have been promised in these submissions. These promises have not been kept. Part of the problem stems from the lack of professional planners employed by the five state agencies. Centralization of this function would result in definite economies in hiring environmental planners. The federal government must also share the blame. It has not provided much incentive for the improvement of the state planning process. It has neither cited the inconsistencies nor requested promised materials. This situation may change under the Environmental Protection Agency. Notice has already been served that more stringent reviews of state pollution plans will be forthcoming. These reviews are to be pre-requisites for increased federal funding.

In addition to the annual plan there is a definite need for an overall long range water quality control plan for the state. This need was recognized over fifteen years ago. The

Oklahoma Water Pollution Control Act of 1955 stated:

In order to effectuate a comprehensive program for the prevention, control and abatement of pollution of the waters of this State, the Board is authorized to group such waters into classes according to their present and future best uses for the purpose of progressively improving the quality of such waters and upgrading them from time to time by reclassifying them, to the extent that is practical and in the public interest. Standard of quality for each such classification consistent with best present and future use of such waters may be adopted by the Board and from time to time modified or changed.⁶

This power, which now rests with the Oklahoma Water Resources Board, should be transferred to the Department of Pollution Control.

In classifying state waters and planning for their use, the four basic demands of industry, municipalities, agriculture, and recreation should receive primary attention. The coordination of efforts with surrounding states should also be expanded.

The Department should be given the power of review over all projects which may affect water quality and the long range water quality control plan. All government agencies would be subject to this requirement. The Department should be granted veto power over state programs which are determined to be detrimental to the environment. The veto process could be overridden by the Governor under established procedures.

⁶82 Okla, Stat. §906 (a) (1961).

A third function of the expanded Department will be public information and education. In both the recent legislative hearings and the Governor's Environmental Quality Conference, it was noted that there is a general lack of awareness on the part of the public concerning the state's environmental protection activities.⁷ The lack of awareness or concern or both certainly contributed to the poor attendance records of the public hearing held in 1966-67 over the proposed water quality standards for the state.⁸ A rather common question in public discussions of water pollution control has been, "What can the average citizen do when he discovers a pollution problem?" The establishment of a public education and information office in the Department of Pollution Control will help to remove these problems.

Proper utilization of the public media to advise citizens of current water quality programs is a must. Utilizing its data bank as a primary source, news outlets can be furnished with a constant stream of relative information. Speakers would be made available for interested groups and organizations. Legislators would constantly be kept up to date on relevant issues and apprised of current legislation needs. The Department should publish a weekly

⁷Proceedings of the Governor's Environmental Quality Conference, ed. by Robert Fite, (Stillwater: Oklahoma State University, 1970), p. 98

⁸See Table 1, Chapter One.

or monthly newsletter. Pinpointing the most crucial needs could be achieved through a public awareness poll. To encourage public participation, understanding, and support of control programs, it will be necessary to educate the youth of the state as well as their parents. This can be accomplished through a cooperative effort between the Department of Pollution Control and the State Department of Education. The Department of Education began moving in this direction in 1970 with the appointment of an ecologist to work with its staff in the incorporation of environmental instruction into the curriculum. The Department of Pollution Control could assist Education in the formation of one or two week awareness programs for state teachers. The program could be initiated on a trial basis in the three Standard Metropolitan Statistical Areas (SMSA) in Oklahoma. These include Oklahoma City, Tulsa, and Lawton. In the beginning two-man teams from the respective areas' secondary school systems would be brought together at a central location. The team would consist of one physical science and one social science instructor. This would allow wider coverage and specialization in the sessions. Either one week seminars on water quality or two week seminars covering the broad spectrum of environmental problems could be offered. After the first class, the program would be re-evaluated and necessary improvements would be made. It would then be expanded to cover the remainder of the

secondary schools in the state and eventually the primary schools as well.

If the public awareness program is to work, it must be accompanied by an administrative awareness program. The whole concept of environmental quality control has developed so rapidly over the past few years that many government officials, both state and local, have been caught unprepared. They need training in all areas of environmental concern, from basic definitions to complicated technological applications. There is a definite need for a training office within the State Department of Pollution Control.

Immediate concern should be directed towards establishing a uniform reporting procedure for pollution problems encountered by the employees of the five state agencies sharing water quality control responsibility. The various field workers should be acquainted with the basics of complaint handling in the other agencies as well as their own. They should be well versed in investigative procedures and the collection of information and evidence in all phases of pollution regardless of what agency they represent. A uniform reporting system and a coordinated follow-up program should be adopted. Inspectors should be periodically versed in the latest technical advances in effluent treatment.

On the local scene, officials are being asked to prepare longer and more detailed plans and applications for federal treatment facility construction funds. The maze

of terms and questions is often times baffling. They need to be familiarized with current application techniques. They need to know the administrative and accounting requirements of the federal programs. The most efficient way to accomplish these tasks is through a centrally coordinated training program.

To assure effective enforcement of both the Department and its member agencies' regulations, a legal section should be established. The Corporation Commission is the only agency presently engaged in water pollution control that has a full time legal division. The remaining agencies depend upon the State Attorney General's Office. Creation of a legal office in the Department would result in the hiring of staff specializing in water law. In addition to handling prosecution cases for the agencies, advice on legislation would be readily available.

The Department of Pollution Control needs strong and able leadership if it is to do its job. It needs to expand its role in data collection, planning, public education, and training. It should be empowered to set rules and regulations covering water quality control. Surveillance and enforcement duties will remain with the five member agencies. The Department must insist that the agencies file comprehensive reports concerning these activities. The Department needs the authority to seek injunctive relief without approval of the five other agencies. It

should be vested with the power to penalize and fine violators in amounts that would definitely discourage acts of pollution. An account must be established where fine revenue can be deposited and earmarked for pollution control activities.⁹ Those found guilty of pollution acts should be required to pay court costs as well as damages. If this revamped system is to work, and the Department of Pollution Control is indeed to become a true coordinating body, each of the five participating agencies is going to have to cooperate to the fullest extent of its ability.

Water Resources Board

The Oklahoma Water Resources Board is charged with overseeing all aspects of industrial waste discharges into state waters with the exception of the oil and gas industries and those industries emptying into municipal collection systems. A major factor in the success of the state's water quality program is how well the Board accomplishes this task. Although the Board has been in existence for thirteen years, it does not have a list of those industries falling under its jurisdiction. The state's promise to

⁹When the Kerr-McGee Corporation paid by check for the damages arising out of the Cimarron River pollution incident in the fall of 1970, the state possessed no mechanism for cashing it. As late as February, 1971, the check was still uncashed. Although the polluter had paid for the replacement of the fish killed, the state could take no action. This situation must not be allowed to happen again.

carry out an industrial waste survey covering all industries under the jurisdiction of the Board was contained in its original water quality standards submitted to the Federal Government in 1968. It was reiterated in the 1968 and 1969 water pollution control plans. If the Board is to maintain an effective surveillance and enforcement program it will first have to define its area of responsibility. This will entail a census of industry within the state. The Board has neither the money nor the manpower necessary to canvas the state, examining every industry's effluent discharge. It does, however, have the legal basis to require industries to furnish the necessary information.¹⁰

It is suggested that the Board utilize a staging process in acquiring this information. The first stage involves identification. The first step entails the development of a comprehensive questionnaire covering industrial location, size, products, employment, and waste discharge. In addition to volume, the composition, strength, and release time of the discharge must be determined. The questionnaire should be a joint project involving both the Board and the State Department of Health. As mentioned above, three state agencies are engaged in the prevention of industrial water pollution; the Water Resources Board, the Department of Health, and the Corporation Commission. The Commission

¹⁰82 Okla. Stat. § 904 (1961).

has already identified its area of authority. Rather than have the remaining two agencies duplicate effort, both time and money can be saved by joining forces. The mailing list for the questionnaire can be taken from the breakdown of Oklahoma manufacturers published annually by the Industrial Parks and Development Department.

The second step involves transferring the results of the individual questionnaires to computer storage. Once this is accomplished an initial run can be made dividing industry according to which agency has jurisdiction. In order to assure compliance and cover the possibility that some industries may not be included in the Industrial Parks and Development Department's publication, a list of completed questionnaires will be printed and furnished to state licensing divisions. Before new business licenses will be granted to a firm, they must appear on this list.

Stage two involves changing the effluent discharge permit to an annual license. As the law now reads the Board has the power:

To issue, continue in effect, revoke, modify or deny, under such conditions as it may prescribe to prevent, control or abate pollution, permits for the discharge of wastes into the waters of the State, and for installation, modification or operation of industrial disposal systems or any parts thereof.¹¹

The Board has excersised this power over new industries

¹¹82 Okla. Stat. §904 (j) (1961).

since March, 1969, but it has not forced the older established firms to obtain a permit. This policy is, in effect, discriminatory.

The permits are currently issued on a one time basis at a charge of ten dollars. The fee is to cover the cost of processing the paper work. The permit system should be changed to an annual license with a charge based on the effluent flow of the respective firm. Companies maintaining treatment facilities would pay a minimum fee. License costs could then rise depending upon the quantity and quality of sewage being disposed of. Armed with the information gleaned from questionnaires, the Board could determine the amount of each firm's license. Just as the return of questionnaires was made a requisite for a state business license in stage one, the state could now require that an effluent disposal license be secured before a business license is granted. The effect of this requirement would be an automatic updating of the data bank. New firms would have to furnish a detailed description of their waste disposal system as an initial step in the acquisition of a business license.

The revenues produced from the licensing program of the Board would be deposited in a special fund. This fund would be earmarked for an industrial effluent inspection program. Unannounced spot checks of the various industries' waste discharges would be made throughout the year. This proposal would have a number of beneficial effects.

It would decrease industry's temptation to reduce licensing costs by understating effluent conditions. It would also deter bypassing in peak production periods and discourage the construction of additional plants without prior approval of the Board. Finally, it would provide incentive for accurate reporting in stage three. Industries found to have deficiencies in their waste disposal systems would be given a time schedule for compliance. Failure to correct the problems would result in license revocations.

The third phase of industrial waste data expansion would involve monthly reports. The Board would institute a requirement similar to that currently imposed on municipal treatment plants by the State Department of Health. These reports would be extremely valuable in determining seasonal variations in individual plant discharges, stream load, and river basin capabilities. This information is essential for overall planning. As an example, it is entirely possible that two firms engaged in different productive processes may individually discharge highly toxic effluents that, when combined, would produce a neutral waste. This locational aspect of planning could reduce costs to both firms.

Failure to submit the required reports would result in fines being assessed. In addition to the current liability of the firm, penalty clauses should be extended to cover their officers and employees. Operator certification should be implemented in cases where industries had constructed

treatment facilities. As an added incentive for firms to hire qualified operators, the Board might require bonds to be posted which would be forfeited if a firm is found liable for pollution damage.

The transfer of the monitoring and water quality standards responsibilities to the Department of Pollution Control, coupled with the increase in knowledge available from the expansion of the data bank on industrial effluent discharge, would enable the Board to concentrate on surveillance and enforcement. However, to be really effective, additional staff members would have to be hired. Currently the Board is requesting a doubling in the positions devoted to water quality in each of the next two years. If granted, this increase would bring the equivalent man power total to nineteen by 1973. In all probability the number will have to be doubled again by 1975.

The greatest need is for qualified field inspectors. Following the lead of the Corporation Commission, the Board should take the two river basins in the state, the Red and the Arkansas, and divide them into districts or regions with field offices. A number of permanent personnel could then be assigned to each district with the responsibility of checking and assisting industry within their respective areas. Both the job descriptions and salary schedules should reflect responsibility and only qualified engineers, biologists, and limnologists should be hired.

Revenue from the licensing program would pay part of the salary needs, but appropriations from the general fund would have to take care of the remainder. To secure such funds, a higher priority will have to be given water quality control than it now enjoys.

Corporation Commission

The reorganization of the Corporation Commission's Conservation Division in 1968 had a profound effect on water pollution control efforts in the oil and gas industry. The success of this program in the past three years can be attributed to two changes brought about by the reorganization. The first is the funding mechanism. The industry itself pays for surveillance and enforcement through an excise tax on its producers. As a result, water quality control is not dependent upon annual appropriations from the state. Instead it is geared to the size of the industry. Reduced funding would result from a decrease in the production of oil and gas, but in this case potential pollution problems would also be reduced. The second factor relates to the high degree of specialization within the Division. Regulation of the oil and gas industry is the pollution abatement section's only duty. This is reflected in the section's positional requirements. It also has a bearing on data availability.

Of the five agencies engaged in water quality control,

the Corporation Commission currently has the best record system. This statement does not mean that there is no room for improvement. The files of the Conservation Division are quite voluminous. Storage space and retrieval time could both be considerably reduced through computerization. This step would directly benefit surveillance and enforcement procedures. For example, computer programs could be written to provide printouts containing the names and location of persistent offenders. Furthermore, seasonal, annual, and area trends could be developed to assist in the assignment of personnel to the district offices.

Aside from improvement in the information system, only one other recommendation pertains to the Corporation Commission. Like the other agencies, the Commission has had a tendency to overguard against any outside infringement on its authority. Its funding source has given it a large degree of autonomy, but it is important that the Commission reintegrate its efforts with those of the other agencies. A coordinated pollution control program must have the full cooperation of all agencies concerned.

Department of Health

The Department of Health is the only agency that has adopted the principle of avoidance rather than abatement as a basic tenet in its water quality control program. Unfortunately the Department suffers from the same malady as its

sister agencies, insufficient information. If avoidance is to be successful, potential problems must be recognized and identified in their formative stages. Before the Department can initiate a successful avoidance program, it must first fully identify its area of responsibility and eradicate existing pollution problems within that area. The accomplishment of this task will at the same time result in an expansion of the informational base.

Health's first priority should be the location of all municipal waste treatment facilities. Each of the District Sanitariums should be asked to produce a list of treatment plants operating in the counties assigned to him. Local sanitarians employed by the county would be directed to give their full support. Once the plants are located, each should be given a complete inspection. In addition to the treatment process itself, this inspection would cover:

1. Location of the Facility
 - A. County
 - B. City
 - C. Inspection District
2. Population Served
 - A. Local
 - B. Other Communities
3. State Discharge Permit Number
4. Point of Discharge
 - A. Receiving Stream
 - B. Multi- or Single Discharge
5. Construction
 - A. Original
 - B. Additions

6. Financing
 - A. Source - Local, Federal
 - B. Type - Bond Issue, Grant, etc.
7. Annual Operation and Maintenance Cost
8. Average Daily Flow (Millions of Gallons per day)
 - A. Designed Capacity
 - B. Actual Load
 - C. Industrial Load
9. Manpower
 - A. Organization
 - B. Certified Operators by Classification
 - C. Maintenance
10. Laboratory Facilities

Plants found to be in non-compliance with the state's requirement of secondary treatment would be assigned a time frame for compliance. The schedule should take into consideration resources available to the municipality as well as corrective needs. Unfortunately, municipal governments realize that the Health Department will not close down local treatment facilities. Any degree of effluent treatment, no matter how bad, is preferable to no treatment at all. Armed with this knowledge, municipalities have often been quite slow in correcting problems. Added incentive should be provided by empowering the Department to fine municipalities for failure to comply.¹²

¹²In a memorandum dated March 27, 1967, regarding the efficacy of the Oklahoma Water Pollution Control Act of 1955, sent to the Director, Water Quality Standards Staff, Office of Program Plans and Development, Federal Water Pollution Control Administration, Theodore R. Rogowski, Acting Associate Solicitor for Water Resources and Procurement, FWPCA, made the following statement concerning section 905 (g) of the law:

The results of the municipal treatment facility survey would be forwarded to the data center of the Department of Pollution Control to be placed in storage in the center's computer system. The responses to the questions on industrial load could then be compared to the answers derived from the industrial questionnaire produced jointly by the Water Resources Board and the Department of Health. Thus discrepancies could be checked and corrected. The system would make it possible to combine industrial outflow figures to plot stream capacities. Discharge points could be identified and mapped for use in determining locational priorities for monitoring stations. Cost accounting programs could be run to assist in financial planning for new treatment plants.

Automatic updating of Health's portion of the data bank could be accomplished through use of the permit system utilizing a procedure similar to that already advanced for the Water Resources Board. Before any municipality could

"We suggest that the definition of "person" include officers or governing or managing bodies of the entities listed in the definition. This may be done by the addition of the words "and includes any officer or governing or managing body of any municipality, political subdivision, or public or private corporation" after the word "entity."

The personal liability of an officer of a corporation or of those responsible for the management of municipalities or other political subdivisions would give more force to the Act. Section 912 of the Act regarding penalties and injunctions provides that "persons who violate the Act are subject to the stated action. In our opinion, individuals who have decision making authority should also be subject to such penalties." A copy of this memo was forwarded to the state and reproduced as attachment 1.3 in the 1968, Water Pollution Control Plan. It was never followed up.

discharge wastes or alter its treatment or disposal system, it would be required to obtain a permit from the Department of Health. Strict enforcement of this regulation would provide the necessary updating mechanism. Changing the one time permit to an annual license with a fee based on the quantity and quality of effluent releases would provide the Department with much needed revenue. This money would be deposited in a fund earmarked for use in municipal treatment plant inspections. The expanded penalty clause making municipalities and their officials liable to fines would help to assure compliance.

An important part of Health's preventative program is the monthly reporting concept. Municipal treatment plants have been required to submit these reports for the past two years, but enforcement of this objective has been rather lax. Consequently, the Department has not had sufficient information on the location of these facilities. Furthermore, many plants lack the laboratory equipment and/or qualified personnel to carry out the necessary tests. The statewide census of treatment facilities will eradicate the first of these problems and identify those encountering the second.

Laboratory deficiencies can be eliminated through a joint effort on the part of state and local officials. First, laboratory equipment could be purchased by the state in large quantities and distributed to local plants with a

possible monetary savings. Second, the Department would initiate training programs for local operators in the use of the equipment and the reporting format. Thirdly, the Department would follow this up with a program for validating the results of the monthly reports through random inspections. As a result, the Department's mobil laboratory would return to the use for which it was originally purchased. In addition to validating reports, inspections by qualified personnel will assist in identifying potential problem areas before they get out of hand.¹³

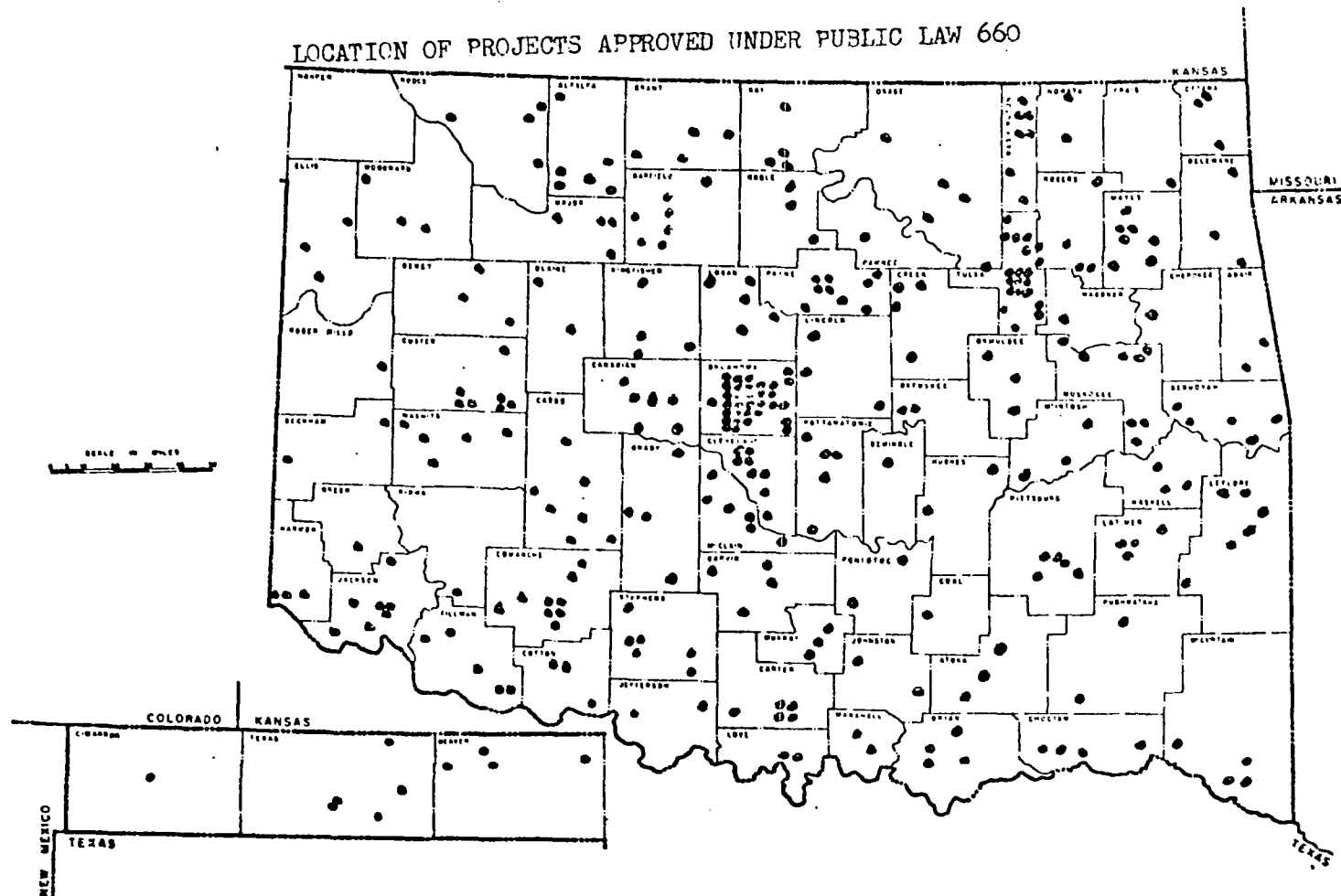
The adequacy of municipal waste treatment programs is a function of the available physical plant and the personnel operating it. The Federal Government has been providing funds for new construction and additions to existing plants under Public Law 660 since 1956. As of March 31, 1970, Oklahoma ranked fifth in the nation in the number of approved sewage treatment projects. A total of 369 projects valued at \$73,184,405.00 have been initiated since 1956 (Figure 8). The Federal share amounts to \$25,300,664.00.¹⁴

¹³The author and several colleagues noted the seemingly poor quality of the outflow of the Norman, Oklahoma, sewage treatment plant in October, 1970. No improvement was observed in this outflow over the next seven months. The City took no action to remedy the situation until ordered to do so by the State Department of Health in April, 1971.

¹⁴Figures furnished by Jerry Penland, Water Quality Control Section, State Department of Health.

FIGURE 8

LOCATION OF PROJECTS APPROVED UNDER PUBLIC LAW 660



A major criticism of a number of agency officials is that while local governments have spent large sums on physical plants, they have tended to scrimp on operating allocations, particularly on salaries.¹⁵ This policy results in the employment of marginally qualified applicants. The Department could remedy this situation through its operator certification program. Revision of the current certification requirements to reflect the responsibility inherent in these positions is essential. The adoption of stringent testing procedures and mandatory certification of all operators would force municipalities to revise their salary scales upward.

Once these basic pre-requisites for converting from abatement to preventative planning are attained, the Department should direct its attention to solving a number of related problems. Foremost among these are treatment needs in small communities, monitoring of recreation areas, and septic tank regulation. Many small communities in Oklahoma do not have adequate sewage collection and treatment systems. This problem is most often the result of financial difficulties encountered because of their size. They simply do not

¹⁵Taken from comments made by Forest Nelson, Director, Oklahoma Water Resources Board and Loyd F. Pummill, Chief of Environmental Health Services, State Department of Health during personal interviews. A random sample of several cities in Oklahoma tended to support this theory. Starting salaries for treatment plant operators were: Henryetta - \$300; Guymon - \$400; Muskogee - \$460; Norman - \$459.

have the revenue base required to pay for construction. A number of alternatives are open to the state for assisting these communities. Utilizing its planning system, the state could develop integrated or shared systems linking a number of towns to one large treatment operation. Another alternative would be for the state to make construction loans or grants to local governments. The state has no assistance program at the present time. The state might also consider cooperative bond issues or the guaranteeing of local issues.

The tremendous growth in Oklahoma's outdoor recreation plant, especially water related recreation, calls for increased preventative measures. Swimming, boating, camping, fishing, and lake side construction all contribute to the pollution potential. Routine bacteriological sampling in designated body contact areas should be implemented now. Furthermore, the state's continued acceptance of septic systems as equivalent to secondary sewage treatment demands stricter regulation in their construction and use. Instances of ground water contamination from septic overflows are already being recorded in Oklahoma. A permit system should be instituted and enforced immediately.

The completion of the changes enumerated in this section will necessitate a considerable expansion in the water quality control staff of the Department of Health. Therefore, additional funding must be provided. State legislators

will need to follow up their delegations of power in the maintenance of water quality with increased appropriations. Otherwise their intentions will not be carried out.

Department of Agriculture

The state of Oklahoma covers an area of approximately 44 million acres. Over three-fourths of this land is devoted to growing crops and the grazing of livestock.¹⁶ Population growth and industrialization are slowly but consistently eating away at this total. Even with the reduction in land area, farmers have been able to increase total output on their holdings by resorting to intensive land use. The result has been a tremendous upswing in the pollution potential of this sector. Most agricultural pollutants reach the state's streams and lakes through run-off. This process has been considerably affected in recent years by the increased use of irrigation. Water leaving these lands is apt to contain silt, fertilizers, pesticide residues, and animal wastes.

Silt or sediment picked up in the run-off process is really the other side of the soil erosion coin. Although soil erosion accounts for the greatest portion of suspended materials in the waters of Oklahoma, its effects on human,

¹⁶Marvin C. Emerson, "Current Efforts to Preserve Environmental Quality of the Land in Oklahoma," in Proceedings of the Governor's Environmental Quality Conference, ed. by Robert C. Fite, (Stillwater: Oklahoma State University, 1970), p. 53.

animal, and plant life are nowhere near as disastrous as the other three. Silt does, however, reduce recreation value through discoloration of the water as well as shortening the life span of the state's lakes and reservoirs through sediment build up. Concerted efforts on the part of federal, state, and local agencies to minimize this problem have been underway since the 1930's. The remaining three pollution sources are just beginning to receive attention.

The Department of Agriculture has instituted basic control procedures in pesticide application and feed lot construction. The Department's pesticide control is essentially an after the fact program. If a pesticide applicator is found to have polluted waters within the state, his license is subject to removal. Feed lot operators are required to "take such action as may be necessary to avoid pollution of any stream, lake, river, or creek."¹⁷ Agriculture needs to design a set of specific rules and guidelines for each of these areas. These rules should make perfectly clear what is deemed adequate and what is unlawful. A system of random inspections of these facilities should be instituted to assure conformity with the guidelines. When offenders are found they should be subject to fines as well as license revocation. Licensing fees could be raised to help pay for increased cost of inspection.

¹⁷Okla. Stat. § 9-210 (1969 Supp.).

Since there is every indication that farmers and ranchers will make more and more use of intensive methods to increase production, the Department must follow suit with a stronger pollution prevention program.

Department of Wildlife Conservation

The Department of Wildlife Conservation's major contribution to water quality control is surveillance. Enforcement and prosecution are normally turned over to the agency having jurisdiction over the pollution source. The Department's ranger corp has often been referred to as the first line of defense in pollution abatement. Although the recommendation of this chapter is to make prevention through planning the state's first line of defense, Wildlife Ranger's will still play a prominent role. Therefore, it is essential that they be fully trained in reporting and surveillance techniques. They should be equipped with small portable water sampling kits. Hours or even days may pass between the ranger's discovery of a polluted body of water and the arrival of another agency's personnel. In the meantime the pollutent may have moved downstream or become dissipated. If the ranger does not take samples immediately, identification of the pollutor and the placing of responsibility for damages may become impossible.

The Environment Quality Coordinator position which the Department created in 1970, but was unable to fund, should

be revitalized. He should be given the responsibility for planning and coordinating all environmental quality actions within the Department. He would also oversee the development of environmental standards for Department adoption as well as represent the Department in areas affecting the environmental aspects of wildlife conservation.

The necessary revenue for hiring the Coordinator, training the rangers and purchasing the water sampling kits could be acquired through a small increase in the price of fishing licenses. This increase might cost as little as \$.10 a year which seems a small price to pay for the maintenance of the state's fishing grounds.¹⁸

Summary

In the coming decade Oklahoma needs to advance its water quality control program from its current status of reaction to one of deliberate planned action. The passage of the Federal Water Quality Act of 1965 caught Oklahoma and many other states, unprepared. While it is true that Oklahoma had a fairly comprehensive set of laws on the books, intent and commitment are two different things. The

¹⁸Over 500,000 fishing licenses have been sold in each of the last three years by the Department. Assuming that this trend continues, a \$.10 increase would produce \$50,000 a year. The Coordinator's salary will account for approximately \$10,000 with the remainder available for training and sampling kits.

state became engaged in a decision making process before it had collected or evaluated all of the necessary information. If Oklahoma is to meet the challenges of the 1970's, it must re-evaluate its water quality control criteria and programs on the basis of current conditions. Once it has acquired the necessary knowledge, it can begin to eliminate existing problems. The eventual goal is the replacement of a system geared to abatement and maintenance of the status quo to one of prevention and improvement of the state's rivers and streams. The attainment of this goal will require substantial increases in state expenditures as well as the revision of the organizational framework. Oklahoma will have to appropriate larger sums to water quality control if the program is to succeed. Clean water must become a priority item in the minds of our lawmakers.

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APPENDIX I

WATER QUALITY ACT OF 1965

For Legislative History of Act, see p. 3313

PUBLIC LAW 89-234; 79 STAT. 903

[S. 4]

An Act to amend the Federal Water Pollution Control Act to establish a Federal Water Pollution Control Administration, to provide grants for research and development, to increase grants for construction of sewage treatment works, to require establishment of water quality criteria, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That:

(a) (1) section 1 of the Federal Water Pollution Control Act (33 U.S.C. 466)⁶¹ is amended by inserting after the words "Section 1." a new subsection (a) as follows:

"(a) The purpose of this Act is to enhance the quality and value of our water resources and to establish a national policy for the prevention, control, and abatement of water pollution."

(2) Such section is further amended by redesignating subsections (a) and (b) thereof as (b) and (c), respectively.

(3) Subsection (b) of such section (as redesignated by paragraph (2) of this subsection) is amended by striking out the last sentence thereof and inserting in lieu of such sentence the following: "The Secretary of Health, Education, and Welfare (hereinafter in this Act called 'Secretary') shall administer this Act through the Administra-

60. 16 U.S.C.A. §§ 772-7721.
61. 33 U.S.C.A. § 466.

tion created by section 2 of this Act, and with the assistance of an Assistant Secretary of Health, Education, and Welfare designated by him, shall supervise and direct (1) the head of such Administration in administering this Act and (2) the administration of all other functions of the Department of Health, Education, and Welfare related to water pollution. Such Assistant Secretary shall perform such additional functions as the Secretary may prescribe."

(b) There shall be in the Department of Health, Education, and Welfare, in addition to the Assistant Secretaries now provided for by law, one additional Assistant Secretary of Health, Education, and Welfare who shall be appointed by the President, by and with the advice and consent of the Senate. The provisions of section 2 of Reorganization Plan Numbered 1 of 1953 (67 Stat. 631) shall be applicable to such additional Assistant Secretary to the same extent as they are applicable to the Assistant Secretaries authorized by that section. Paragraph (17) of section 303(d) of the Federal Executive Salary Act of 1964 (78 Stat. 418) is amended by striking out "(5)" before the period at the end thereof and inserting in lieu thereof "(6)."

Sec. 2. (a) Such Act is further amended by redesignating sections 2 through 4,⁶² and references thereto, as sections 3 through 5, respectively, sections 5 through 14,⁶³ as sections 7 through 16, respectively, by inserting after section 1 the following new section:

"FEDERAL WATER POLLUTION CONTROL ADMINISTRATION

"Sec. 2. Effective ninety days after the date of enactment of this section there is created within the Department of Health, Education, and Welfare a Federal Water Pollution Control Administration (hereinafter in this Act referred to as the 'Administration'). The head of the Administration shall be appointed, and his compensation fixed, by the Secretary. The head of the Administration may, in addition to regular staff of the Administration, which shall be initially provided from the personnel of the Department, obtain, from within the Department or otherwise as authorized by law, such professional, technical, and clerical assistance as may be necessary to discharge the Administration's functions and may for that purpose use funds available for carrying out such functions; and he may delegate any of his functions to, or otherwise authorize their performance by, any officer or employee of, or assigned or detailed to, the Administration."

(b) Subject to such requirements as the Civil Service Commission may prescribe, any commissioned officer of the Public Health Service who, on the day before the effective date of the establishment of the Federal Water Pollution Control Administration, was, as such officer, performing functions relating to the Federal Water Pollution Control Act may acquire competitive civil service status and be transferred to a classified position in the Administration if he so transfers within six months (or such further period as the

62. 33 U.S.C.A. §§ 466a-466c.

63. 33 U.S.C.A. § 466d et seq.

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Secretary of Health, Education, and Welfare may find necessary in individual cases) after such effective date. No commissioned officer of the Public Health Service may be transferred to the Administration under this section if he does not consent to such transfer. As used in this section, the term "transferring officer" means an officer transferred in accordance with this subsection.

(c) (1) The Secretary shall deposit in the Treasury of the United States to the credit of the civil service retirement and disability fund, on behalf of and to the credit of each transferring officer, an amount equal to that which such individual would be required to deposit in such fund to cover the years of service credited to him for purposes of his retirement as a commissioned officer of the Public Health Service to the date of his transfer as provided in subsection (b), but only to the extent that such service is otherwise creditable under the Civil Service Retirement Act. The amount so required to be deposited with respect to any transferring officer shall be computed on the basis of the sum of his basic pay, allowance for quarters, and allowance for subsistence and, in the case of a medical officer, his special pay, during the years of service so creditable, including all such years after June 30, 1960.

(2) The deposits which the Secretary of Health, Education, and Welfare is required to make under this subsection with respect to any transferring officer shall be made within two years after the date of his transfer as provided in subsection (b), and the amounts due under this subsection shall include interest computed from the period of service credited to the date of payment in accordance with section 4(e) of the Civil Service Retirement Act (5 U.S.C. 2254(e)).

(d) All past service of a transferring officer as a commissioned officer of the Public Health Service shall be considered as civilian service for all purposes under the Civil Service Retirement Act, effective as of the date any such transferring officer acquires civil service status as an employee of the Federal Water Pollution Control Administration; however, no transferring officer may become entitled to benefits under both the Civil Service Retirement Act and title II of the Social Security Act based on service as such a commissioned officer performed after 1956, but the individual (or his survivors) may irrevocably elect to waive benefit credit for the service under one Act to secure credit under the other.

(e) A transferring officer on whose behalf a deposit is required to be made by subsection (c) and who, after transfer to a classified position in the Federal Water Pollution Control Administration under subsection (b), is separated from Federal service or transfers to a position not covered by the Civil Service Retirement Act, shall not be entitled, nor shall his survivors be entitled, to a refund of any amount deposited on his behalf in accordance with this section. In the event he transfers, after transfer under subsection (b), to a position covered by another Government staff retirement system under which credit is allowable for service with respect to which a deposit is required under subsection (c), no credit shall be allowed under the Civil Service Retirement Act with respect to such service.

(f) Each transferring officer who prior to January 1, 1957, was insured pursuant to the Federal Employees' Group Life Insurance Act of 1954, and who subsequently waived such insurance, shall be entitled to become insured under such Act upon his transfer to the Federal Water Pollution Control Administration regardless of age and insurability.

(g) Any commissioned officer of the Public Health Service who, pursuant to subsection (b) of this section, is transferred to a position in the Federal Water Pollution Control Administration which is subject to the Classification Act of 1949, as amended, shall receive a salary rate of the General Schedule grade of such position which is nearest to but not less than the sum of (1) basic pay, quarters and subsistence allowances, and, in the case of a medical officer, special pay, to which he was entitled as a commissioned officer of the Public Health Service on the day immediately preceding his transfer, and (2) an amount equal to the equalization factor (as defined in this subsection); but in no event shall the rate so established exceed the maximum rate of such grade. As used in this section, the term "equalization factor" means an amount determined by the Secretary to be equal to the sum of (A) $6\frac{1}{2}$ per centum of such basic pay and (B) the amount of Federal income tax which the transferring officer, had he remained a commissioned officer, would have been required to pay on such allowances for quarters and subsistence for the taxable year then current if they had not been tax free.

(h) A transferring officer who has had one or more years of commissioned service in the Public Health Service immediately prior to his transfer under subsection (b) shall, on the date of such transfer, be credited with thirteen days of sick leave.

(i) Notwithstanding the provisions of any other law, any commissioned officer of the United States Public Health Service with twenty-five or more years of service who has held the temporary rank of Assistant Surgeon General in the Division of Water Supply and Pollution Control of the United States Public Health Service for three or more years and whose position and duties are affected by this Act, may, with the approval of the President, voluntarily retire from the United States Public Health Service with the same retirement benefits that would accrue to him if he had held the rank of Assistant Surgeon General for a period of four years or more if he so retires within ninety days of the date of the establishment of the Federal Water Pollution Control Administration.

(j) Nothing contained in this section shall be construed to restrict or in any way limit the head of the Federal Water Pollution Control Administration in matters of organization or in otherwise carrying out his duties under section 2 of this Act as he deems appropriate to the discharge of the functions of such Administration.

(k) The Surgeon General shall be consulted by the head of the Administration on the public health aspects relating to water pollution over which the head of such Administration has administrative responsibility.

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Sec. 3. Such Act is further amended by inserting after the section redesignated as section 5 a new section as follows:

"GRANTS FOR RESEARCH AND DEVELOPMENT

"Sec. 6. (a) The Secretary is authorized to make grants to any State, municipality, or intermunicipal or interstate agency for the purpose of assisting in the development of any project which will demonstrate a new or improved method of controlling the discharge into any waters of untreated or inadequately treated sewage or other waste from sewers which carry storm water or both storm water and sewage or other wastes, and for the purpose of reports, plans, and specifications in connection therewith. The Secretary is authorized to provide for the conduct of research and demonstrations relating to new or improved methods of controlling the discharge into any waters of untreated or inadequately treated sewage or other waste from sewers which carry storm water or both storm water and sewage or other wastes, by contract with public or private agencies and institutions and with individuals without regard to sections 3648 and 3709 of the Revised Statutes, except that not to exceed 25 per centum of the total amount appropriated under authority of this section for any fiscal year may be expended under authority of this sentence during such fiscal year.

"(b) Federal grants under this section shall be subject to the following limitations: (1) No grant shall be made for any project pursuant to this section unless such project shall have been approved by an appropriate State water pollution control agency or agencies and by the Secretary; (2) no grant shall be made for any project in an amount exceeding 50 per centum of the estimated reasonable cost thereof as determined by the Secretary; (3) no grant shall be made for any project under this section unless the Secretary determines that such project will serve as a useful demonstration of a new or improved method of controlling the discharge into any water of untreated or inadequately treated sewage or other waste from sewers which carry storm water or both storm water and sewage or other wastes.

"(c) There are hereby authorized to be appropriated for the fiscal year ending June 30, 1966, and for each of the next three succeeding fiscal years, the sum of \$20,000,000 per fiscal year for the purposes of this section. Sums so appropriated shall remain available until expended. No grant or contract shall be made for any project in an amount exceeding 5 per centum of the total amount authorized by this section in any one fiscal year."

Sec. 4. (a) Clause (2) of subsection (b) of the section of the Federal Water Pollution Control Act herein redesignated as section 8⁶⁴ is amended by striking out "\$600,000," and inserting in lieu thereof "\$1,200,000,".

(b) The second proviso in clause (2) of subsection (b) of such redesignated section 8 is amended by striking out "\$2,400,000," and inserting in lieu thereof "\$4,800,000,".

64. 33 U.S.C.A. § 466e(b).

(c) Subsection (b) of such redesignated section 8 is amended by adding at the end thereof the following: "The limitations of \$1,200,000 and \$4,800,000 imposed by clause (2) of this subsection shall not apply in the case of grants made under this section from funds allocated under the third sentence of subsection (c) of this section if the State agrees to match equally all Federal grants made from such allocation for projects in such State."

(d) (1) The second sentence of subsection (c) of such redesignated section 8⁶⁵ is amended by striking out "for any fiscal year" and inserting in lieu thereof "for each fiscal year ending on or before June 30, 1965, and the first \$100,000,000 appropriated pursuant to subsection (d) for each fiscal year beginning on or after July 1, 1965,".

(2) Subsection (c) of such redesignated section 8 is amended by inserting immediately after the period at the end of the second sentence thereof the following: "All sums in excess of \$100,000,000 appropriated pursuant to subsection (d) for each fiscal year beginning on or after July 1, 1965, shall be allotted by the Secretary from time to time, in accordance with regulations, in the ratio that the population of each State bears to the population of all States."

(3) The third sentence of subsection (c) of such redesignated section 8 is amended by striking out "the preceding sentence" and inserting in lieu thereof "the two preceding sentences".

(4) The next to the last sentence of subsection (c) of such redesignated section 8 is amended by striking out "and third" and inserting in lieu thereof ", third, and fourth".

(e) The last sentence of subsection (d) of such redesignated section 8⁶⁶ is amended to read as follows: "Sums so appropriated shall remain available until expended. At least 50 per centum of the funds so appropriated for each fiscal year ending on or before June 30, 1965, and at least 50 per centum of the first \$100,000,000 so appropriated for each fiscal year beginning on or after July 1, 1965, shall be used for grants for the construction of treatment works servicing municipalities of one hundred and twenty-five thousand population or under."

(f) Subsection (d) of such redesignated section 8 is amended by striking out "\$100,000,000 for the fiscal year ending June 30, 1966, and \$100,000,000 for the fiscal year ending June 30, 1967." and inserting in lieu thereof "\$150,000,000 for the fiscal year ending June 30, 1966, and \$150,000,000 for the fiscal year ending June 30, 1967."

(g) Subsection (f) of such redesignated section 8⁶⁷ is redesignated as subsection (g) thereof and is amended by adding at the end thereof the following new sentence: "The Secretary of Labor shall have, with respect to the labor standards specified in this subsection, the authority and functions set forth in Reorganization Plan Numbered 14 of 1950 (15 F.R. 3176; 64 Stat. 1267; 5 U.S.C. 133z—15) and section 2 of the Act of June 13, 1934, as amended (48 Stat. 948; 40 U.S.C. 276c)."

65. 33 U.S.C.A. § 466e(c).
66. 33 U.S.C.A. § 466e(d).

67. 33 U.S.C.A. § 466e(f).

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(h) Such redesignated section 8 is further amended by inserting therein, immediately after subsection (e) thereof, the following new subsection:

"(f) Notwithstanding any other provisions of this section, the Secretary may increase the amount of a grant made under subsection (b) of this section by an additional 10 per centum of the amount of such grant for any project which has been certified to him by an official State, metropolitan, or regional planning agency empowered under State or local laws or interstate compact to perform metropolitan or regional planning for a metropolitan area within which the assistance is to be used, or other agency or instrumentality designated for such purposes by the Governor (or Governors in the case of interstate planning) as being in conformity with the comprehensive plan developed or in process of development for such metropolitan area. For the purposes of this subsection, the term 'metropolitan area' means either (1) a standard metropolitan statistical area as defined by the Bureau of the Budget, except as may be determined by the President as not being appropriate for the purposes hereof, or (2) any urban area, including those surrounding areas that form an economic and socially related region, taking into consideration such factors as present and future population trends and patterns of urban growth, location of transportation facilities and systems, and distribution of industrial, commercial, residential, governmental, institutional, and other activities, which in the opinion of the President lends itself as being appropriate for the purposes hereof."

Sec. 5. (a) Redesignated section 10 of the Federal Water Pollution Control Act⁶⁸ is amended by redesignating subsections (c) through (i) as subsections (d) through (j), and by inserting after subsection (b) the following new subsection:

"(c) (1) If the Governor of a State or a State water pollution control agency files, within one year after the date of enactment of this subsection, a letter of intent that such State, after public hearings, will before June 30, 1967, adopt (A) water quality criteria applicable to interstate waters or portions thereof within such State, and (B) a plan for the implementation and enforcement of the water quality criteria adopted, and if such criteria and plan are established in accordance with the letter of intent, and if the Secretary determines that such State criteria and plan are consistent with paragraph (3) of this subsection, such State criteria and plan shall thereafter be the water quality standards applicable to such interstate waters or portions thereof.

"(2) If a State does not (A) file a letter of intent or (B) establish water quality standards in accordance with paragraph (1) of this subsection, or if the Secretary or the Governor of any State affected by water quality standards established pursuant to this subsection desires a revision in such standards, the Secretary may, after reasonable notice and a conference of representatives of appropriate Federal departments and agencies, interstate agencies, States, municipalities and industries involved, prepare regulations

⁶⁸. 33 U.S.C.A. § 460g.

setting forth standards of water quality to be applicable to interstate waters or portions thereof. If, within six months from the date the Secretary publishes such regulations, the State has not adopted water quality standards found by the Secretary to be consistent with paragraph (3) of this subsection, or a petition for public hearing has not been filed under paragraph (4) of this subsection, the Secretary shall promulgate such standards.

"(3) Standards of quality established pursuant to this subsection shall be such as to protect the public health or welfare, enhance the quality of water and serve the purposes of this Act. In establishing such standards the Secretary, the Hearing Board, or the appropriate State authority shall take into consideration their use and value for public water supplies, propagation of fish and wildlife, recreational purposes, and agricultural, industrial, and other legitimate uses.

"(4) If at any time prior to 30 days after standards have been promulgated under paragraph (2) of this subsection, the Governor of any State affected by such standards petitions the Secretary for a hearing, the Secretary shall call a public hearing, to be held in or near one or more of the places where the water quality standards will take effect, before a Hearing Board of five or more persons appointed by the Secretary. Each State which would be affected by such standards shall be given an opportunity to select one member of the Hearing Board. The Department of Commerce and other affected Federal departments and agencies shall each be given an opportunity to select a member of the Hearing Board and not less than a majority of the Hearing Board shall be persons other than officers or employees of the Department of Health, Education, and Welfare. The members of the Board who are not officers or employees of the United States, while participating in the hearing conducted by such Hearing Board or otherwise engaged on the work of such Hearing Board, shall be entitled to receive compensation at a rate fixed by the Secretary, but not exceeding \$100 per diem, including travel time, and while away from their homes or regular places of business they may be allowed travel expenses, including per diem in lieu of subsistence, as authorized by law, (5 U.S.C. 73b-2) for persons in the Government service employed intermittently. Notice of such hearing shall be published in the Federal Register and given to the State water pollution control agencies, interstate agencies and municipalities involved at least 30 days prior to the date of such hearing. On the basis of the evidence presented at such hearing, the Hearing Board shall make findings as to whether the standards published or promulgated by the Secretary should be approved or modified and transmit its findings to the Secretary. If the Hearing Board approves the standards as published or promulgated by the Secretary, the standards shall take effect on receipt by the Secretary of the Hearing Board's recommendations. If the Hearing Board recommends modifications in the standards as published or promulgated by the Secretary, the Secretary shall promulgate revised regulations setting forth standards of water quality in accordance with the Hearing Board's recommendations which will become effective immediately upon promulgation.

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"(5) The discharge of matter into such interstate waters or portions thereof, which reduces the quality of such waters below the water quality standards established under this subsection (whether the matter causing or contributing to such reduction is discharged directly into such waters or reaches such waters after discharge into tributaries of such waters), is subject to abatement in accordance with the provisions of paragraph (1) or (2) of subsection (g) of this section, except that at least 180 days before any abatement action is initiated under either paragraph (1) or (2) of subsection (g) as authorized by this subsection, the Secretary shall notify the violators and other interested parties of the violation of such standards. In any suit brought under the provisions of this subsection the court shall receive in evidence a transcript of the proceedings of the conference and hearing provided for in this subsection, together with the recommendations of the conference and Hearing Board and the recommendations and standards promulgated by the Secretary, and such additional evidence, including that relating to the alleged violation of the standards, as it deems necessary to a complete review of the standards and to a determination of all other issues relating to the alleged violation. The court, giving due consideration to the practicability and to the physical and economic feasibility of complying with such standards, shall have jurisdiction to enter such judgment and orders enforcing such judgment as the public interest and the equities of the case may require.

"(6) Nothing in this subsection shall (A) prevent the application of this section to any case to which subsection (a) of this section would otherwise be applicable, or (B) extend Federal jurisdiction over water not otherwise authorized by this Act.

"(7) In connection with any hearings under this section no witness or any other person shall be required to divulge trade secrets or secret processes."

(b) Paragraph (1) of subsection (d) of the section of the Federal Water Pollution Control Act herein redesignated as section 10 is amended by striking out the final period after the third sentence of such subsection and inserting the following in lieu thereof: "; or he finds that substantial economic injury results from the inability to market shellfish or shellfish products in interstate commerce because of pollution referred to in subsection (a) and action of Federal, State, or local authorities."

Sec. 6. The section of the Federal Water Pollution Control Act hereinbefore redesignated as section 12 is amended by adding at the end thereof the following new subsections:

"(d) Each recipient of assistance under this Act shall keep such records as the Secretary shall prescribe, including records which fully disclose the amount and disposition by such recipient of the proceeds of such assistance, the total cost of the project or undertaking in connection with which such assistance is given or used, and the amount of that portion of the cost of the project or undertaking supplied by other sources, and such other records as will facilitate an effective audit.

"(c) The Secretary of Health, Education, and Welfare and the Comptroller General of the United States, or any of their duly authorized representatives, shall have access for the purpose of audit and examination to any books, documents, papers, and records of the recipients that are pertinent to the grants received under this Act."

Sec. 7. (a) Section 7(f) (6) of the Federal Water Pollution Control Act, as that section is redesignated by this Act,⁶⁹ is amended by striking out "section 6(b) (4)." as contained therein and inserting in lieu thereof "section 8(b) (4).".

(b) Section 8 of the Federal Water Pollution Control Act, as that section is redesignated by this Act,⁷⁰ is amended by striking out "section 5" as contained therein and inserting in lieu thereof "section 7".

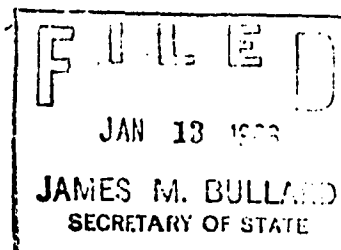
(c) Section 10(b) of the Federal Water Pollution Control Act, as that section is redesignated by this Act,⁷¹ is amended by striking out "subsection (g)" and inserting in lieu thereof "subsection (h)".

(d) Section 10(i) of the Federal Water Pollution Control Act, as that section is redesignated by this Act,⁷² is amended by striking out "subsection (e)" and inserting in lieu thereof "subsection (f)".

(e) Section 11 of the Federal Water Pollution Control Act, as that section is redesignated by this Act,⁷³ is amended by striking out "section 8(c) (3)" and inserting in lieu thereof "section 10(d) (3)" and by striking out "section 8(e)" and inserting in lieu thereof "section 10(f)".

Sec. 8. This Act may be cited as the "Water Quality Act of 1965".
Approved October 2, 1965.

STATE OF OKLAHOMA
OFFICE OF THE GOVERNOR
EXECUTIVE ORDER



TO: Honorable James M. Bullard
Secretary of State
State Capitol Building
Oklahoma City, Oklahoma

Dear Sir:

Please file for record the following Executive Order:

By virtue of the authority vested in me as GOVERNOR of the STATE OF OKLAHOMA it is hereby ordered, directed and declared that there shall be established as directed herein, a state coordinating committee to be known as the Oklahoma Water Quality Coordinating Committee.

It is further requested and directed that the Oklahoma Water Resources Board, the State Department of Health, the Wildlife Conservation Commission, and the Oklahoma Corporation Commission each appoint one representative and one alternate representative to serve on the aforementioned coordinating committee.

It is further requested and directed that the State Department of Agriculture, State Commissioners of the Land Office, and the Oklahoma Industrial Development and Park Department each appoint one representative and one alternate to serve as associate, non-voting, members on the aforementioned coordinating committee.

It is further ordered, that each such representative shall serve on said committee for such period of time as his governing board or commission may designate, provided however that no member, associate member, or ex-officio member shall receive any remuneration for service on said committee beyond that which he shall receive as compensation for his other responsibilities to the agency he represents.

It is further provided that the Governor of The State of Oklahoma shall serve as an Ex-officio member of said committee.

It is further requested that when said coordinating committee has been established, said committee shall organize by electing a Chairman, a Vice Chairman and Secretary, and shall adopt such rules of operations as may be necessary to accomplish the following principal purposes:

1. Eliminate, so far as possible, duplication of effort of all state agencies, and particularly the agencies involved in this coordinating committee, in the water pollution control program

Dear Sir:

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It is further requested that when said coordinating committee has been established, said committee shall organize by electing a Chairman, a Vice Chairman and Secretary, and shall adopt such rules of operations as may be necessary to accomplish the following principal purposes:

1. Eliminate, so far as possible, duplication of effort of all state agencies, and particularly the agencies involved in this coordinating committee, in the water pollution control program for the State.
2. Develop methods of implementation of Oklahoma Water Quality control regulations.
3. Formulate action programs for the abatement, prevention and control of all water pollution in the State at the earliest possible date.

4. Maintain the closest possible cooperation with the Federal Water Pollution Control Administration established by the Congress under P.L. 89-234, in perfecting Oklahoma's existing water quality criteria to meet, or exceed, the requirements established under the aforementioned federal legislation for upgrading water quality in Oklahoma.

5. Review existing pollution law under which the four agencies of the committee are operating to determine if any existing statutes need amendment or modification to more effectively control and abate water pollution; and where necessary, to prepare legislation for consideration of the Legislature for adoption.

6. The Committee shall meet at such intervals as is necessary to accomplish the foregoing objectives so that the closest possible coordination for the pollution control effort can be maintained at all times for the greatest possible benefit in the control and abatement of water pollution.

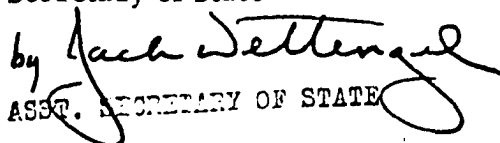
IN WITNESS WHEREOF, I HENRY BELLMON, GOVERNOR OF THE STATE OF OKLAHOMA, have hereto affixed my name and set my hand and caused to be affixed the GREAT SEAL OF THE STATE OF OKLAHOMA at Oklahoma City, Oklahoma this 13th day of January, 1966.

BY THE GOVERNOR OF THE STATE
OF OKLAHOMA


Henry Bellmon

ATTEST:


Secretary of State

by 
ASST. SECRETARY OF STATE

OKLAHOMA WATER QUALITY COORDINATING COMMITTEE

Forrest Nelson
Oklahoma Water Resources
Board
Room 535, State Capitol
Building
Oklahoma City, Oklahoma

Loyd Pummill
State Department of Health
3400 N. Eastern
Oklahoma City, Oklahoma

D. L. Jones
Pollution Division
Corporation Commission
Jim Thorpe Building
Oklahoma City, Oklahoma

Wendell Bever
Wildlife Conservation
Commission
1801 N. Lincoln
Oklahoma City, Oklahoma

ASSOCIATE COMMITTEE

Clyde Bower
Department of Agriculture
State Capitol Building
Oklahoma City, Oklahoma

Wilson Pruitt
Commissioners of Land Office
State Capitol Building
Oklahoma City, Oklahoma

John Bennett
Industrial Development and
Park Department
Will Rogers Building
Oklahoma City, Oklahoma



STATE OF OKLAHOMA
OFFICE OF THE GOVERNOR

HENRY BELLMON
GOVERNOR

OKLAHOMA CITY

January 16, 1966

Honorable John W. Gardner
Secretary
Department of Health, Education and
Welfare
Washington, D. C.

Dear Mr. Secretary:

In accordance with the provisions of Public Law 89-234 for the establishment of water quality standards on interstate waters, and consistent with the recommendations made by the Oklahoma Inter-Agency Water Pollution Control Coordinating Committee, I hereby declare the intent of the State of Oklahoma to adopt before June 30, 1967, after public hearing and in accordance with state statutes, water quality criteria applicable to interstate waters or portions thereof in the State of Oklahoma and a plan for the implementation and enforcement of the water quality criteria.

In view of the provisions contained in Public Law 89-234, providing the Secretary of Health, Education and Welfare with certain responsibilities in evaluating standards of quality established, it is respectfully requested that any administrative interpretations, definitions, and guidelines established or to be established by your office be forthcoming at the earliest possible date to avoid lost motion and undue delay.

Sincerely,

A handwritten signature in cursive script that reads "Henry Bellmon".

Henry Bellmon
GOVERNOR

HB:jb

cc: Jerome Svore Frank Raab
Charles Newton Don Ferrell

TASK FORCE

Forrest Nelson
Oklahoma Water Resources
Board
State Capitol Building
Oklahoma City, Oklahoma

Charles D. Newton
State Department of Health
3400 N. Eastern
Oklahoma City, Oklahoma

Clyde Bower
State Department of
Agriculture
State Capitol Building
Oklahoma City, Oklahoma

Wayne Evatt
Oklahoma Water Resources Board
State Capitol Building
Oklahoma City, Oklahoma

Leland Roberts
Wildlife Conservation
Commission
1801 N. Lincoln
Oklahoma City, Oklahoma

D. L. Jones
Corporation Commission
Jim Thorpe Building
Oklahoma City, Oklahoma

Richard P. Orth, Advisor
U.S.G.S. Quality of Water Branch
2800 S. Eastern
Oklahoma City, Oklahoma

ADVISORY COMMITTEE

Dr. Marvin T. Edmison,
Director
Research Foundation
Oklahoma State University
Stillwater, Oklahoma

J. R. Dungan, Jr.
Superintendent of Operations
Nipak, Inc.
Box 2820
Dallas, Texas

Don Libby
Director of Mineral Research
Dierks Forests, Inc.
810 Whittington Avenue
Hot Springs, Arkansas

M. V. Wright
Technical Consultant and Mgr.
for Pollution Abatement
Phillips Petroleum Company
Bartlesville, Oklahoma

Professor George W. Reid
Bureau of Water Resources
Research
University of Oklahoma
Norman, Oklahoma

W. B. Moran
City Manager
City of Shawnee
Shawnee, Oklahoma

Harold Cooksey
202 Security National Building
Norman, Oklahoma

SUGGESTED RAW WATER QUALITY CRITERIA
DEVELOPED BY PROFESSOR GEORGE REID
1966

Ion, Organism or Substance	Water Uses			
	Municipal	Recreation	Industrial	Agricultural
	<u>Persistent Chemical</u>			
Alkalinity (ppm CaCO ₃)	120	-	50-150	-
Alkyl benzene sulfinate (ABS)**	0.5	-	-	-
Arsenic (ppm As)	.01-.05	-	.01-.05	-
Barium (ppm Ba)	.5-1.0	.5-1.0	-	-
Bicarbonates (as ppm CaCO ₃)	120	-	3-100	-
Boron (ppm B)	1.0	-	-	.2-.5
Cadium (ppm Cd)	.01	-	0.01	-
Calcium (ppm Ca)	-	-	-	40
Carbonates (as ppm CaCO ₃)	120	-	200-400	10
Carbon dioxide (ppm CO ₂)	-	30	-	20-40
Chlorides (ppm Cl)	250	50	50-250	100
Chromium (ppm Cr)	.01-.05	1.0	.05	0
Color units	15	30	50	-
Copper (ppm Cu)	1.0	.2	-	.2
Fluoride (ppm F)	1.4-2.4	5.0	1.5	-
Hardness (as ppm CaCO ₃)	80	-	50-500	-
Halogenated hydrocarbons (ppm)	.006	.01	-	-
Hydrogen ion concentration (pH)	6.5-8.5	6.5-9.0	6.0-9.5	6.0-9.5
Iron (ppm Fe)	.3	-	.5	-
Lead (ppm Pb)	.05	-	-	-
Magnesium (ppm Mg)	.25	-	-	20
Manganese (ppm Mn)	.01-.05	-	-	-
Organophosphates	-	-	-	-
Radioactivity	Background	Background	Background	Background
Gross Beta (uuc/L)	1000	-	-	-
Radium 226 (uuc/L)	3	-	-	-
Strontium 90 (uuc/L)	10	-	-	-
Selenium (ppm Se)	.01	-	-	-
Silica (ppm SiO ₂)	10	-	60	-
Silver (ppm Ag)	.02-.05	-	-	-
Sodium (ppm Na)	0-10	-	50	30-60
Sulfates (ppm SO ₄)	250	-	100-250	190
Taste	0	-	-	-
Total dissolved salts (ppm)	500	1000	-	1000
Zinc (ppm Zn)	1-5	4	-	-

(-) indicates that no values have been established for this broad category.

** In view of the soap and detergent industry's scheduled replacement of ABS with linear alkylate sulfonate (LAS) see biodegradable classification.

Ion, Organism or Substance	Water Uses			
	Municipal	Recreation	Industrial	Agricultural
<u>Sediments</u>				
Floating Solids	0	0	0	0
Oil (ppm)	0	0.3	0	0
Specific Conductivity (microhos/cm.)	-	-	-	500-10,000
Suspended Solids	-	absence of sludge deposit	-	absence of sludge deposit
Total dissolved solids (ppm)	500	3000	100-1000	-
Turbidity (Jackson units)	1-25	10-25	250	-
<u>Biodegradable</u>				
Biochemical Oxygen Demand (ppm BOD)	1-3	-	10	10
Cyanides (ppm CN)	.01-.2	.02	.2	0
Dissolved Oxygen (ppm DO)	4-7	4-7	1-2	.2
Linear Alkylate Sulfonate (ppm LAS)	0.45	-	-	-
<u>Bacterial</u>				
Coliform organisms (MPN/100 ml)	1-50	1000-5000	5000	5000
<u>Thermal</u>				
Temperature (°F)	50	32-93	55-90	60
<u>Nutritional</u>				
Algae (std. units)	100	absence of toxic algae	1000	absence of toxic algae
Ammonia (ppm Ammonia N)	0.1	1.0-2.0	-	-
Nitrate (ppm Nitrate N)	1-45*	44	-	-
Total Nitrogen (ppm N)	5-10	10	-	-
Phosphates (ppm PO ₄)	10	10	-	-

(-) indicates that no values have been established for this broad category.

* Warnings should be administered for infant feeding if Nitrate concentration exceeds 45 ppm.



STATE OF OKLAHOMA
OFFICE OF THE GOVERNOR

DEWEY F. BARTLETT
GOVERNOR

OKLAHOMA CITY

July 26, 1967

The Honorable Stewart Udall
Secretary of the Interior
Washington, D. C.

My dear Mr. Secretary:

In accordance with the provisions of the Water Quality Act of 1965, P. L. 89-234 and the Clean Water Restoration Act of 1966, P. L. 89-753, the State of Oklahoma has prepared and adopted water quality standards for interstate and intrastate waters of Oklahoma.

By virtue of the authority vested in me as Governor, I hereby forward these for your review and approval so they will become state and federal standards.

Sincerely,

A handwritten signature in cursive script that reads "Dewey F. Bartlett".

Dewey F. Bartlett
GOVERNOR

DFB/bf



UNITED STATES
DEPARTMENT OF THE INTERIOR
OFFICE OF THE SECRETARY
WASHINGTON 25, D. C.

Dear Governor Bartlett:

I am pleased to inform you that, except as noted below, I have approved the water quality standards of the State of Oklahoma based upon my determination that they are consistent with the protection of the public health and welfare, the enhancement of the quality of the water, and the purposes of the Federal Water Pollution Control Act, as provided by Section 10 (c) (3) of that Act. Accordingly, the standards as approved are those applicable under the Act to the interstate waters of Oklahoma.

A basic policy of the Act is to protect and enhance the quality and productivity of the Nation's waters. Our review and study of standards to date has reinforced our conclusion that the implementation of this policy requires a standard substantially in accordance with the following:

Waters whose existing quality is better than the established standards as of the date on which such standards become effective will be maintained at their existing high quality. These and other waters of your State will not be lowered in quality unless and until it has been affirmatively demonstrated to the State water pollution control agency and the Department of the Interior that such change is justifiable as a result of necessary economic or social development and will not interfere with or become injurious to any assigned uses made of, or presently possible in, such waters. This will require that any industrial, public or private project or development which would constitute a new source of pollution or an increased source of pollution to high quality waters will be required, as part of the initial project design, to provide the highest and best degree of waste treatment available under existing technology, and, since these are also Federal standards, these waste treatment requirements will be developed cooperatively.

Selected language in your standards submissions which addresses itself to these points presently reads as follows:

". . . The proposed criteria shall serve as guidelines to control pollution and to maintain the best quality which will result in an equitable balance of social and economic benefits to the State. It is realized that the criteria cannot be considered as permanently fixed. Future changes in cultural activities, the development of additional quality data, enhancement of

existing quality by further removals of dissolved solids, and improvements in waste treatment technology may necessitate revisions of the criteria . . ."

I find significant similarities of viewpoint between these respective provisions and wish to commend your State for their adoption. I believe, however, that our mutual desire to carry out the purposes and intent of the Act would be more fully served through modification of your present language to reflect the entire substance of the provision I have set forth above. I would therefore appreciate receiving your early concurrence with regard to incorporating such a comparable provision as a part of the enforceable standards of your State. Please advise, in addition, the time when the procedure for this purpose can be initiated and completed.

I am at this time excepting from my approval the dissolved oxygen criteria for all interstate waters whose beneficial uses as specified in the Oklahoma standards submissions include "fish and wildlife propagation" and "Small-mouth Bass fishery." I am instructing my people to meet with your officials as soon as possible to discuss possible upgrading of these criteria to yield increased protection for these important resource uses. It is my hope that this mutual effort will result in identification of those streams and waters which can support dissolved oxygen values higher than the 4 mg/l presently specified, and I am optimistic that Oklahoma can adopt such higher values so that I will be able to approve the dissolved oxygen criteria in the very near future.

With regard to recreation on Oklahoma's interstate waters, I recommend that the standards be clarified at an early date to yield clear designations for primary and secondary contact recreation uses, and lead to establishment and adoption of appropriate numerical criteria, including fecal coliform values, to support the secondary contact uses as well. These measures would provide increased protection for Oklahoma's invaluable water-based recreation resources.

I further recommend that the State re-examine the temperature change limits applicable to the stretch of the Illinois River below Tenkiller Lake dam presently used as a "put-and-take" trout fishery with a view toward lowering the present 5 degree Fahrenheit differential change maximum, or eliminating it altogether, so that no artificial heat additions will place this resource in jeopardy.

With respect to the oil field brine pollution problems experienced in a number of your river basins, I assume that the State will continue its current efforts and press vigorously to eliminate oil field brine discharges to surface waters.

In the further course of my review of your standards submissions, I noted that Oklahoma has a number of state agencies which have water pollution control responsibilities, and whose activities in this regard are currently coordinated and planned by a State Water Quality Coordinating Committee

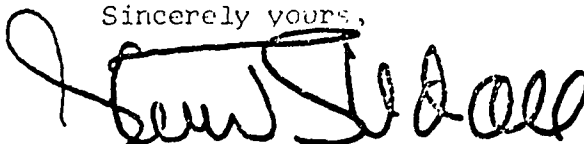
operating under Executive Order. Such divided responsibilities may increase the difficulties in implementing the standards. If the activities of the Coordinating Committee do not assure effective program relationships, I would urge you to seek legislation to create a single State agency for water pollution control.

I also note that your standards submissions specify that the State of Oklahoma will submit to the Federal Water Pollution Control Administration on or before January 1, 1969, certain additional materials essential to the implementation of the standards I am approving today. These include a complete listing of industries which discharge wastes to interstate waters as well as time schedules and other pertinent information on achieving necessary treatment and control measures to abate pollution from these sources.

The successful implementation of the standards is, of course, the key to accomplishing our mutual goals of protecting and enhancing the quality and productivity of Oklahoma's waters. Adherence to the degree of waste treatment specified and the time schedule proposed in the implementation plan is very important if we are to achieve these goals. The annual State program plan, which your State water pollution control agency prepares and submits to the Federal Water Pollution Control Administration in connection with our grant program can provide a basis for updating information on the status of implementing the standards. Your water pollution control officials will soon be hearing from the Federal Water Pollution Control Administration regarding details on ways in which we can best cooperate in carrying out the objectives of the water quality standards program.

Lastly, it is evident that our waste treatment and water pollution control technology will advance and knowledge of water quality requirements for water uses will improve, and the collection of water quality data will make more information available to assure more accurate assignment of water quality criteria. As this new knowledge becomes available, we will further expect to cooperate with the State of Oklahoma in making necessary amendments to the standards that have been theretofore approved. It will be our pleasure to continue to work together to protect, upgrade and enhance the quality of the water of your fine State.

Sincerely yours,

A handwritten signature in dark ink, appearing to read "Stewart Udall", written in a cursive, flowing style.

Secretary of the Interior

Honorable Dewey F. Bartlett
Governor of Oklahoma
Oklahoma City, Oklahoma 73105

AMENDMENTS TO THE WATER QUALITY STANDARDS
FOR THE STATE OF OKLAHOMA, 1968

Anti-degradation Statement

Amend the first paragraph of the State of Oklahoma Water Quality Coordinating Committee Water Quality Criteria for the Salt Fork of the Arkansas above the Great Salt Plains, the Cimarron River above the Little Salt Plains, the North Canadian River above Canton Reservoir, the South Canadian River above the Noble, Oklahoma gauge, and all interstate tributaries, and all succeeding sections of water quality criteria for the various interstate stream systems, by adding sentences following the second sentence so that the new paragraphs will read as follows (the added material is underlined):

The Water Quality Criteria for the Salt Fork of the Arkansas, Cimarron, North Canadian and South Canadian Rivers, and interstate tributaries, are based on the present and potential uses, and on existing quality data. The proposed criteria shall serve as guidelines to control pollution and to maintain the best quality which will result in an equitable balance of social and economic benefits to the state. It is recognized that certain of the waters under consideration possess an existing quality, which is better than the minimum standards established. The quality of those waters will be maintained unless and until it has been affirmatively demonstrated to the state through public hearings that other uses and different standards are justifiable as a result of necessary economic or social development. It will be required that the highest and best technology be employed to maintain the high quality of the waters. The interest of the Federal Government in interstate waters is recognized and this interest will be protected in accordance with the provisions of the Oklahoma Statutes. In implementing these standards, the Federal Government will be kept advised and will be provided with such information as needed to discharge its responsibilities under the Federal Water Pollution Control Act, as Amended. It is realized that the criteria cannot be considered as permanently fixed. Future changes in cultural activities, the development of additional quality data, the enhancement of existing quality by further removal of dissolved solids, and improvements in waste treatment technology may necessitate revisions of the criteria. The proposed criteria are applicable at all times and at all flows, except as otherwise indicated.

Recreational Areas

Amend paragraph C-2b, Specific Criteria for recreational use, and all succeeding sections of criteria for the various interstate stream systems concerning recreational areas, by adding to the last sentence and a new sentence which reads as follows (the additional material is underlined):

Provided, however, that the fecal coliform shall not exceed a geometric mean of 200/100 ml, nor shall more than 10% of total samples during any 30-day period exceed 400/100 ml in primary contact areas. In areas other than primary contact recreation (secondary areas), the fecal coliform content (either MPN or MF count) should not exceed a geometric mean of 1,000/100 ml, nor equal or exceed 2,000/100 ml in more than 10% of the samples.

Dissolved Oxygen Criteria

Amend paragraph C-9, Specific Criteria for dissolved oxygen, and all succeeding sections of criteria for the various interstate stream systems concerning dissolved oxygen, by adding to the first sentence (the added material is underlined): with the further exception that all interstate waters designated as small-mouth bass fisheries shall have a minimum dissolved oxygen concentration of 5 mg/l.

Put-and-Take Trout Fishery

Amend the first paragraph of Section 1, Illinois and Neosho Rivers, and Interstate Tributaries, A-Water Uses, by adding a clause to the first sentence so that the revised sentence reads as follows (the added material is underlined):

The Illinois and Neosho Rivers and interstate tributaries are used for fish and wildlife propagation, aesthetics, recreation, public water supply, hydro-electric power, agriculture, and to receive treated wastes, with the exception that no waste or effluent will be discharged within the reach below Tenkiller Dam on the Illinois River downstream to the bridge on Highway No. 64 until such time as it is established by public hearings that such prohibition is not in the best interest of the State of Oklahoma.

Approved by the Oklahoma Water Resources Board
September 9, 1969

Approved by the Department of Pollution Control
November 12, 1969

OKLAHOMA STATUTES PERTAINING
TO WATER POLLUTION
IN FORCE DECEMBER 31, 1970

Citation		Agency Responsible	
2 O.S. 1961	§ 3-81		Agricultural
2 O.S. 1970 Supp.	§ 3-82	Penalty	Agricultural
2 O.S. 1967 Supp.	§ 3-83		Agricultural
2 O.S. 1965 Supp.	§ 3-84		Agricultural
2 O.S. 1961	§ 3-85		Agricultural
2 O.S. 1961	§ 3-86	Penalty	Agricultural
2 O.S. 1969 Supp.	§ 9-201		Agricultural
2 O.S. 1969 Supp.	§ 9-202		Agricultural
2 O.S. 1969 Supp.	§ 9-203		Agricultural
2 O.S. 1969 Supp.	§ 9-204		Agricultural
2 O.S. 1969 Supp.	§ 9-205		Agricultural
2 O.S. 1969 Supp.	§ 9-206		Agricultural
2 O.S. 1969 Supp.	§ 9-207		Agricultural
2 O.S. 1969 Supp.	§ 9-208		Agricultural
2 O.S. 1969 Supp.	§ 9-209		Agricultural
2 O.S. 1969 Supp.	§ 9-210		Agricultural
2 O.S. 1969 Supp.	§ 9-211	Penalty	Agricultural
2 O.S. 1969 Supp.	§ 9-212	Penalty	Agricultural
11 O.S. 1961	§ 293		General
11 O.S. 1968 Supp.	§ 293.1		General
11 O.S. 1968 Supp.	§ 293.2		General
17 O.S. 1969 Supp.	§ 159.14		General
17 O.S. 1969 Supp.	§ 159.16	Penalty	General
17 O.S. 1969 Supp.	§ 159.17	Penalty	General
22 O.S. 1970 Supp.	§ 1111		General
22 O.S. 1968 Supp.	§ 1112		General
22 O.S. 1970 Supp.	§ 1113	Penalty	General
29 O.S. 1961	§ 108		Wildlife Conservation Department
29 O.S. 1961	§ 109		Wildlife Conservation Department
29 O.S. 1961	§ 113		Wildlife Conservation Department
29 O.S. 1963 Supp.	§ 409	Penalty	Corporation Commission
45 O.S. 1970 Supp.	§ 851,		General
	Article I(b)		
45 O.S. 1970 Supp.	§ 851,		General
	Article III		
47 O.S. 1968 Supp.	§ 177.2		Corporation Commission
47 O.S. 1968 Supp.	§ 177.3		Corporation Commission
52 O.S. 1961	§ 86.2		Corporation Commission
52 O.S. 1961	§ 86.3		Corporation Commission
52 O.S. 1961	§ 102	Penalty	Corporation Commission
52 O.S. 1961	§ 116	Penalty	Corporation Commission
52 O.S. 1965 Supp.	§ 139		Corporation Commission

Citation			Agency Responsible	
52 O.S. 1965 Supp.	§ 140		Corporation Commission	
52 O.S. 1961	§ 141		Corporation Commission	
52 O.S. 1965 Supp.	§ 142		Corporation Commission	
52 O.S. 1961	§ 143	Penalty	Corporation Commission	
52 O.S. 1961	§ 144		Corporation Commission	
52 O.S. 1961	§ 145		Corporation Commission	
52 O.S. 1961	§ 146		Corporation Commission	
52 O.S. 1961	§ 147		Corporation Commission	
52 O.S. 1961	§ 148		Corporation Commission	
52 O.S. 1970 Supp.	§ 309		Corporation Commission	
52 O.S. 1970 Supp.	§ 310		Corporation Commission	
52 O.S. 1965 Supp.	§ 311		Corporation Commission	
52 O.S. 1965 Supp.	§ 312		Corporation Commission	
52 O.S. 1965 Supp.	§ 313		Corporation Commission	
52 O.S. 1965 Supp.	§ 314		Corporation Commission	
52 O.S. 1965 Supp.	§ 315		Corporation Commission	
52 O.S. 1965 Supp.	§ 316		Corporation Commission	
52 O.S. 1965 Supp.	§ 317		Corporation Commission	
52 O.S. 1970 Supp.	§ 318		Corporation Commission	
52 O.S. 1970 Supp.	§ 319		Corporation Commission	
63 O.S. 1967 Supp.	§ 1-20		Department of Health	
63 O.S. 1963 Supp.	§ 1-90		Department of Health	
63 O.S. 1963 Supp.	§ 1-902		Department of Health	
63 O.S. 1963 Supp.	§ 1-903		Department of Health	
63 O.S. 1963 Supp.	§ 1-904		Department of Health	
63 O.S. 1963 Supp.	§ 1-905		Department of Health	
63 O.S. 1963 Supp.	§ 1-906		Department of Health	
63 O.S. 1963 Supp.	§ 1-907		Department of Health	
63 O.S. 1963 Supp.	§ 1-908		Department of Health	
63 O.S. 1963 Supp.	§ 1-909	Penalty	Department of Health	
63 O.S. 1963 Supp.	§ 1-910		Department of Health	
63 O.S. 1963 Supp.	§ 1-911		Department of Health	
63 O.S. 1963 Supp.	§ 1-912		Department of Health	
63 O.S. 1963 Supp.	§ 1-913		Department of Health	
63 O.S. 1969 Supp.	§ 1-1009	Penalty	Department of Health	
63 O.S. 1963 Supp.	§ 1-1010		Department of Health	
63 O.S. 1963 Supp.	§ 1-1701	Penalty	Department of Health	
74 O.S. 1961	§ 351c		Water Resources Board	
82 O.S. 1961	§ 486		Water Resources Board	
82 O.S. 1961	§ 901		Water Resources Board	
82 O.S. 1961	§ 902		Water Resources Board	
82 O.S. 1968 Supp.	§ 903		Water Resources Board	
82 O.S. 1961	§ 904		Water Resources Board	
82 O.S. 1961	§ 905		Water Resources Board	
82 O.S. 1961	§ 906		Water Resources Board	
82 O.S. 1961	§ 907		Water Resources Board	
82 O.S. 1968 Supp.	§ 908		Water Resources Board	
82 O.S. 1961	§ 909		Water Resources Board	
82 O.S. 1961	§ 910	Penalty	Water Resources Board	
82 O.S. 1968 Supp.	§ 911		Water Resources Board	
82 O.S. 1961	§ 912		Water Resources Board	
82 O.S. 1961	§ 913		Water Resources Board	
82 O.S. 1961	§ 914		Water Resources Board	

Citation	Agency Responsible
82 O.S. 1967 Supp. § 921	Water Resources Board
82 O.S. 1967 Supp. § 922	Water Resources Board
82 O.S. 1967 Supp. § 923	Water Resources Board
82 O.S. 1967 Supp. § 924	Water Resources Board
82 O.S. 1967 Supp. § 925	Water Resources Board
82 O.S. 1968 Supp. § 931	Department of Pollution Control
82 O.S. 1968 Supp. § 932	Department of Pollution Control
82 O.S. 1968 Supp. § 933	Department of Pollution Control
82 O.S. 1968 Supp. § 934	Department of Pollution Control
82 O.S. 1968 Supp. § 935	Department of Pollution Control
82 O.S. 1968 Supp. § 936	Department of Pollution Control
82 O.S. 1968 Supp. § 937	Department of Pollution Control
82 O.S. 1968 Supp. § 938	Department of Pollution Control
82 O.S. 1968 Supp. § 939	Department of Pollution Control
82 O.S. 1967 Supp. § 1072	Water Resources Board
82 O.S. 1965 Supp. § 1401,	Water Resources Board
Article I(d)	
82 O.S. 1965 Supp. § 1401,	Water Resources Board
Article II(h)	
82 O.S. 1965 Supp. § 1401,	Water Resources Board
Article IX	
82 O.S. 1970 Supp. § 1451	Water Resources Board
82 O.S. 1970 Supp. § 1452	Water Resources Board
82 O.S. 1970 Supp. § 1454	Water Resources Board
82 O.S. 1970 Supp. § 1455	Water Resources Board
82 O.S. 1970 Supp. § 1456	Water Resources Board
82 O.S. 1970 Supp. § 1457	Water Resources Board
82 O.S. 1970 Supp. § 1458	Water Resources Board
82 O.S. 1970 Supp. § 1459	Water Resources Board

Penalty

Citation	Agency Responsible
52 O.S. 1965 Supp. § 140	Corporation Commission
52 O.S. 1961 § 141	Corporation Commission
52 O.S. 1965 Supp. § 142	Corporation Commission
52 O.S. 1961 § 143	Corporation Commission
52 O.S. 1961 § 144	Corporation Commission
52 O.S. 1961 § 145	Corporation Commission
52 O.S. 1961 § 146	Corporation Commission
52 O.S. 1961 § 147	Corporation Commission
52 O.S. 1961 § 148	Corporation Commission
52 O.S. 1970 Supp. § 309	Corporation Commission
52 O.S. 1970 Supp. § 310	Corporation Commission
52 O.S. 1965 Supp. § 311	Corporation Commission
52 O.S. 1965 Supp. § 312	Corporation Commission
52 O.S. 1965 Supp. § 313	Corporation Commission
52 O.S. 1965 Supp. § 314	Corporation Commission
52 O.S. 1965 Supp. § 315	Corporation Commission
52 O.S. 1965 Supp. § 316	Corporation Commission
52 O.S. 1965 Supp. § 317	Corporation Commission
52 O.S. 1970 Supp. § 318	Corporation Commission
52 O.S. 1970 Supp. § 319	Corporation Commission
63 O.S. 1967 Supp. § 1-206	Department of Health
63 O.S. 1963 Supp. § 1-901	Department of Health
63 O.S. 1963 Supp. § 1-902	Department of Health
63 O.S. 1963 Supp. § 1-903	Department of Health
63 O.S. 1963 Supp. § 1-904	Department of Health
63 O.S. 1963 Supp. § 1-905	Department of Health
63 O.S. 1963 Supp. § 1-906	Department of Health
63 O.S. 1963 Supp. § 1-907	Department of Health
63 O.S. 1963 Supp. § 1-908	Department of Health
63 O.S. 1963 Supp. § 1-909	Department of Health
63 O.S. 1963 Supp. § 1-910	Department of Health
63 O.S. 1963 Supp. § 1-911	Department of Health
63 O.S. 1963 Supp. § 1-912	Department of Health
63 O.S. 1963 Supp. § 1-913	Department of Health
63 O.S. 1969 Supp. § 1-1009	Department of Health
63 O.S. 1963 Supp. § 1-1010	Department of Health
63 O.S. 1963 Supp. § 1-1701	Department of Health
74 O.S. 1961 § 351c	Water Resources Board
82 O.S. 1961 § 486	Water Resources Board
82 O.S. 1961 § 901	Water Resources Board
82 O.S. 1961 § 902	Water Resources Board
82 O.S. 1968 Supp. § 903	Water Resources Board
82 O.S. 1961 § 904	Water Resources Board
82 O.S. 1961 § 905	Water Resources Board
82 O.S. 1961 § 906	Water Resources Board
82 O.S. 1961 § 907	Water Resources Board
82 O.S. 1968 Supp. § 908	Water Resources Board
82 O.S. 1961 § 909	Water Resources Board
82 O.S. 1961 § 910	Water Resources Board
82 O.S. 1968 Supp. § 911	Water Resources Board
82 O.S. 1961 § 912	Water Resources Board
82 O.S. 1961 § 913	Water Resources Board
82 O.S. 1961 § 914	Water Resources Board

Citation	Agency Responsible
82 O.S. 1967 Supp. § 921	Water Resources Board
82 O.S. 1967 Supp. § 922	Water Resources Board
82 O.S. 1967 Supp. § 923	Water Resources Board
82 O.S. 1967 Supp. § 924	Water Resources Board
82 O.S. 1967 Supp. § 925	Water Resources Board
82 O.S. 1968 Supp. § 931	Department of Pollution Control
82 O.S. 1968 Supp. § 932	Department of Pollution Control
82 O.S. 1968 Supp. § 933	Department of Pollution Control
82 O.S. 1968 Supp. § 934	Department of Pollution Control
82 O.S. 1968 Supp. § 935	Department of Pollution Control
82 O.S. 1968 Supp. § 936	Department of Pollution Control
82 O.S. 1968 Supp. § 937	Department of Pollution Control
82 O.S. 1968 Supp. § 938	Department of Pollution Control
82 O.S. 1968 Supp. § 939	Department of Pollution Control
82 O.S. 1967 Supp. § 1072	Water Resources Board
82 O.S. 1965 Supp. § 1401, Article I(d)	Water Resources Board
82 O.S. 1965 Supp. § 1401, Article II(h)	Water Resources Board
82 O.S. 1965 Supp. § 1401, Article IX	Water Resources Board
82 O.S. 1970 Supp. § 1451	Water Resources Board
82 O.S. 1970 Supp. § 1452	Water Resources Board
82 O.S. 1970 Supp. § 1454	Water Resources Board
82 O.S. 1970 Supp. § 1455	Water Resources Board
82 O.S. 1970 Supp. § 1456	Water Resources Board
82 O.S. 1970 Supp. § 1457	Water Resources Board
82 O.S. 1970 Supp. § 1458	Water Resources Board
82 O.S. 1970 Supp. § 1459	Water Resources Board

Penalty

Penalty

APPENDIX IIa

W A T E R R E S O U R C E S
P L A N N I N G E N G I N E E R I

DEFINITION:

Under general supervision, performs responsible engineering work in a long-range comprehensive planning program for the development of the water and related land resources of Oklahoma; performs related work as required.

EXAMPLES OF WORK PERFORMED:

Performs engineering work involved in the collection of basic data on surface water, ground water, water quality, climatology, hydrology, geology, land classification, topography, mineral resources, crops, industry and population; and the preparation and printing of plans and reports on a regional basis to be submitted to Washington.

Reviews plans for the construction of dams or other appurtenances for irrigation, power, flood control, or any other use of water that will obstruct or alter the flow of water in natural streams, with the exception of certain Federal Government projects.

Consults with representatives of local, regional, state and federal agencies concerning water use and water conservation studies being made.

Participates in local, regional, state and interstate conferences and in public information programs on water problems and water conservation.

Prepares technical reports analyzing water problems.

MINIMUM QUALIFICATIONS:

1. Graduation from an accredited college or university with a degree in Civil Engineering;

OR

possession of a current certificate of registration as an "Engineer-in-Training" issued by the Oklahoma State Board of Registration for Professional Engineers and Land Surveyors shall be considered qualifying. (Applicants having registration in a state other than Oklahoma will be required to become registered with the State of Oklahoma Board of Registration for Professional Engineers and Land Surveyors within six (6) months after appointment. Registration in Oklahoma must be completed before permanent status may be gained.)

2. Considerable knowledge of civil engineering, including mathematics, physics, hydrology, drafting and mapping with special emphasis on planning and research; all as evidenced by a passing grade on an appropriate examination.

(Continued on page 2. Page 1 of 2 pages.)

OKLAHOMA: CODE: 6105 ADOPTED: 7-15-68 REVISED:

3. Ability to establish and maintain effective working relationships with the public, and state and federal agencies; to present facts, data and opinions clearly and concisely, both orally and in writing; to exercise mature professional judgment and determine sound courses of action; to conduct several projects simultaneously; all as evidenced by an investigation and/or interview.

W A T E R R E S O U R C E S
P L A N N I N G E N G I N E E R I I

DEFINITION:

Under direction, performs advanced hydrological engineering work to gather basic data to be used in planning a program for the development of the water and related land resources of Oklahoma; performs related work as required.

EXAMPLES OF WORK PERFORMED:

Collects and tabulates basic data on surface water, ground water, water quality, climatology, hydrology, geology, land classification, topography, mineral resources, crops, industry and population.

Prepares hydrological reports on streams showing the average annual flow for each, the minimum low flow and the peak high flow, low flow duration curves and tables, magnitude and frequency of flood flows, climatological data on weather, rainfall, temperature, snowfall, severe storms, critical drouth periods; prepares data for computer analysis.

Locates present and potential reservoir sites on streams, computes the maximum storage, the safe yield of water, and quality; prepares maps and plans showing locations of each.

Prepares maps and charts showing ground water areas and the quality and quantity of water being used.

Inventories the amount of water available for all purposes at the present, and predicts the time when this will be inadequate to meet all needs.

Outlines work projects for the drafting department of the Water Resources Board.

Attends meetings of administrative and technical personnel; attends meetings of the Engineering Advisory Committees on inter-state water compact negotiations between the State of Oklahoma and the adjoining states; and the Arkansas-White-Red River Basins Inter-Agency Committee.

MINIMUM QUALIFICATIONS:

1. Graduation from an accredited college or university with a degree in Civil Engineering and four (4) years of successful full-time paid employment in professional engineering or hydrology;

OR

a Master's Degree in Civil Engineering shall substitute for two (2) years of the required experience;

OR

(Continued on page 2. Page 1 of 2 pages.)

OKLAHOMA: CODE: 6106 ADOPTED: 7-15-68 REVISED:

possession of a current certificate of registration as a "Professional Engineer" issued by the Oklahoma State Board of Registration for Professional Engineers and Land Surveyors shall be considered qualifying. (Applicants having registration in a state other than Oklahoma will be required to become registered with the State of Oklahoma Board of Registration for Professional Engineers and Land Surveyors within six (6) months after appointment. Registration in Oklahoma must be completed before permanent status may be gained.);

OR

FOR PROMOTIONAL PURPOSES ONLY: three (3) years of full-time paid employment as a Water Resources Planning Engineer I with the Agency shall be considered as qualifying.

2. Thorough knowledge of civil engineering theory and practices applicable to water resources development with special emphasis on planning and research; all as evidenced by a passing grade on an appropriate examination.

3. Ability to establish and maintain effective working relationships with the public, and state and federal agencies; to present facts, data and opinions clearly and concisely, both orally and in writing; to interpret complex laws and rules and regulations; to exercise independent judgment in the field; to conduct several projects simultaneously; all as evidenced by an investigation and/or interview.

W A T E R R E S O U R C E S
P L A N N I N G E N G I N E E R I I I

DEFINITION:

Under general direction, performs highly responsible work in planning and supervising a long-range comprehensive program designed to further the development of the water and related land resources of Oklahoma; performs related work as required.

EXAMPLES OF WORK PERFORMED:

Plans, coordinates and directs work in evaluating the water and related land resources for the State of Oklahoma.

Supervises the preparation of maps and charts showing the soil classification, irrigated areas and soils that can be irrigated; reports the water used and the additional amount necessary to irrigate all possible irrigable land.

Attends meetings of administrative and technical personnel; of the Engineering Advisory Committees on inter-state water compact negotiations between the State of Oklahoma and the adjoining states; of the Arkansas-White-Red River Basins Inter-Agency Committee.

Supervises the collection and tabulation of basic data on water, land and human resources.

Coordinates the activities of the agency with all other agencies, local, State, or Federal, which are involved in the use and development of the water and land resources of the State of Oklahoma.

Supervises the work of the engineering and drafting departments of the Water Resources Board.

MINIMUM QUALIFICATIONS:

1. Graduation from an accredited college or university with a degree in Civil Engineering and eight (8) years of successful full-time paid employment in professional engineering or hydrology;

OR

a Master's Degree in Civil Engineering shall substitute for two (2) years of the required experience;

OR

(Continued on page 2. Page 1 of 2 pages.)

OKLAHOMA: CODE: 6107

ADOPTED: 7-15-68

REVISED:

possession of a current certificate of registration as a "Professional Engineer" issued by the Oklahoma State Board of Registration for Professional Engineers and Land Surveyors and four (4) years of successful full-time paid employment in professional engineering or hydrology shall be considered qualifying. (Applicants having registration in a state other than Oklahoma will be required to become registered with the State of Oklahoma Board of Registration for Professional Engineers and Land Surveyors within six (6) months after appointment. Registration in Oklahoma must be completed before permanent status may be gained.);

OR

FOR PROMOTIONAL PURPOSES ONLY: three (3) years of full-time paid employment as a Water Resources Planning Engineer II with the Agency shall be considered as qualifying.

2. Extensive knowledge of engineering theory and techniques as applicable to the planning and research involved in water and related land resources development; considerable knowledge of the principles of effective supervision; all as evidenced by a passing grade on an appropriate examination.
3. Ability to establish and maintain effective working relationships with the public, and state and federal agencies; to express and maintain personal initiative and integrity; to exercise mature judgement in analyzing situations and determine sound courses of action; to organize and conduct several activities simultaneously; all as evidenced by an investigation and/or an interview.

W A T E R R E S O U R C E S
P O L L U T I O N C O N T R O L S P E C I A L I S T I

DEFINITION:

Under immediate supervision, on a training basis, performs a variety of specialized technical evaluations of environmental pollution control problems, assists in all phases of water pollution control programs conducted by the Oklahoma Water Resources Board; performs related duties as required.

EXAMPLES OF WORK PERFORMED:

Confers with industrial management and their representatives, as part of a statewide industrial survey, to determine industrial waste disposal practices.

Assists in conducting inspections, analyzing waste water and maintains surveillance of approved industrial treatment facilities.

Assists Pollution Control Specialists in stream and reservoir surveys by collecting and enumerating Aquatic flora and Fauna, assists in the collection and analysis of water samples, assists in conducting time-flow studies.

Assists in the investigations of public complaints when related to industrial pollution control.

Under close supervision, inspects construction of industrial waste treatment facilities.

Routinely collects samples from designated areas.

Performs related work as required.

MINIMUM QUALIFICATIONS:

1. Graduation from an accredited college or university with a major or its equivalent number of hours in geology, chemistry, biology, limnology, sanitary science, environmental science, chemical engineering, public health engineering or other closely related field of study.
2. General knowledge of biology, chemistry, sanitary and chemical engineering principles; some knowledge of environmental sanitation principles; water sampling methods and analytical procedures; all as evidenced by a passing grade on an appropriate examination.
3. Ability to conduct routine inspections and investigations in various phases of pollution control; to express himself clearly and effectively in written and oral reports and communications; to accept and follow instructions from supervisors; to deal tactfully with the public; all as evidenced by an investigation and/or interview.

W A T E R R E S O U R C E S
P O L L U T I O N C O N T R O L S P E C I A L I S T I I

DEFINITION:

Under general supervision, performs technical engineering work of a complex nature on water pollution control programs conducted by the Oklahoma Water Resources Board; performs related duties as required.

EXAMPLES OF WORK PERFORMED:

Makes surveys and inspections and maintains surveillance of work in all phases of water pollution.

Collects samples of water from streams and wells for chemical analysis, gauges stream flow, runs analyses in the field on water to determine the pH and dissolved oxygen content of samples, also to determine the presence of chlorides; assists in mobile laboratory studies.

Meets with civic, professional, lay and governmental groups in the interest of pollution abatement relating to public health and stream pollution.

Maintains surveillance of all industries not discharging effluent into a municipal disposal system; confers with the industry engineers and chemists in methods, planning and treatment of waste materials that are to be discharged into streams with particular interest into packing plants, feed lots, pulp and paper mills, fertilizer plants, power plants, oil and gasoline plants, secondary recovery in the oil industry, salt water disposal systems in producing oil fields.

Makes periodic surface water measurements of small creeks or streams to determine flow or availability of water for irrigation in connection with the issuance of permits; holds hearings on surface water applications; insures that stream systems are not overappropriated.

Assists in making reservoir studies on water stratification and sedimentation.

MINIMUM QUALIFICATIONS:

1. Graduation from an accredited college or university with major course work or an equivalent number of hours in geology, chemistry, biology, limnology, sanitary science, environmental science, public health engineering, chemical engineering, or other closed related field of study, and one (1) year of successful full-time paid employment in water-quality control or pollution abatement work;

OR

a Master's Degree in one of the areas of study listed in the paragraph above shall be considered as qualifying.

(Continued on page 2. Page 1 of 2 pages.)

OKLAHOMA: CODE: 6195 ADOPTED: 6-6-67 REVISED: 11-23-70

2. Considerable knowledge of water supply and sewage treatment; of industrial waste disposal methods; of the laws and regulations of the State of Oklahoma relating to public health and pollution abatement; of methods of checking land titles and easements in county records; all as evidenced by a passing grade on an appropriate examination.

3. Ability to make inspections and investigations on all phases of pollution; to write a clear and concise report with recommendations or corrective measures; to accept and follow instructions from supervisor; to deal tactfully with the public; to express ideas clearly; all as evidenced by an investigation and/or an interview.

LABORATORY MANUAL HELPER

DEFINITION:

Under immediate to general supervision, performs routine, non-technical, repetitive work in a Laboratory; performs related work as required.

EXAMPLES OF WORK PERFORMED:

Cleans culture tubes, pipets, test tubes, petri dishes and dilution vials by soaking in water or sulphuric acid, electric brush, electric eraser and/or automatic dishwasher.

Places laboratory glassware in an electric dry heat oven for sterilization.

Places sterilized glassware in racks for further use.

Washes rubber corks; puts corks in racks for drying and storing.

Keeps laboratory kitchen orderly and presentable by washing equipment and storing supplies.

Trains part-time and summer employees to perform the duties in the laboratory kitchen.

MINIMUM QUALIFICATIONS:

1. Ability to follow simple oral and written instructions; to establish and maintain effective working relationships with others; all as evidenced by an investigation and/or interview.
2. Applicants must possess normal manual dexterity to perform the above work.

C A R T O G R A P H I C D R A F T S M A N I I

DEFINITION:

Under direction, performs work of a highly skilled and technical nature in the preparation of cadastral, planimetric, topographic and/or other types of maps, graphs and charts and assists in instructing and supervising subordinate personnel; performs related work as required.

EXAMPLES OF WORK PERFORMED:

Receives materials from other branches and divisions such as sketches, descriptive logs and correspondence and makes appropriate entries on maps such as roads added and abandoned, length, and route number or physical improvements such as reservoirs, towns, water and sewer systems, etc.

Revises graphic route logs and draws features such as type of road, intersections, railroads, etc.

Plots additions and deletions on maps, prepares special sketches such as proposed layouts, etc.

Checks completed work of subordinate employees for neatness, accuracy and proper placement of features, advises on procedures and methods; instructs new and less skilled personnel in the work.

MINIMUM QUALIFICATIONS:

1. Graduation from high school and five (5) years of progressively responsible full-time paid employment in cartographic drafting work;

OR

an equivalent combination of education and experience, substituting the successful completion of one (1) year's study at an accredited college, university or technological school affiliated with an accredited college or university which included six (6) semester hours in any combination of cartography, drafting, mechanical drawing or closely related courses, for each year of the required experience, with a maximum substitution of two (2) years;

OR

FOR PROMOTIONAL PURPOSES ONLY: Eighteen (18) months of full-time paid employment as a Cartographic Draftsman I shall be considered as qualifying.

2. Thorough knowledge of cartographic drafting techniques including map and chart interpretation; considerable knowledge and skill in freehand sketching and graphic interpretation of written and oral information; general knowledge of basic engineering mathematics; some knowledge of the principles of effective supervision; all as evidenced by a passing grade on an appropriate examination.

(Continued on page 2. Page 1 of 2 pages.)

OKLAHOMA: CODE: 5278 ADOPTED: 7-18-63 REVISED: 4-28-70

3. Ability to establish and maintain effective working relationships with others; to supervise the work of others; to express ideas clearly both orally and in writing; all as evidenced by an investigation and/or interview.

D R A F T S M A N I I

DEFINITION:

Under immediate supervision, performs moderately complex and difficult drafting work; performs related work as required.

EXAMPLES OF WORK PERFORMED:

Traces in ink, bridge and/or highway plan sheets which have previously been detailed in pencil.

Plots topography, contours, and cross-sections from field survey notes.

Details simpler components of bridge structures.

Places signs, striping and other traffic control devices and structures on highway plans.

Solves simple drainage problems.

Places earthwork template on cross-sections.

Letters in ink, title sheets, title boxes, notes, and special provisions on plans.

Operates calculators and adding machines in computing and checking quantities of materials, structure lengths and other calculations.

Operates Wrico and Leroy lettering equipment.

MINIMUM QUALIFICATIONS:

1. Graduation from high school and one (1) year of full-time paid employment in drafting work;

OR

an equivalent combination of education and experience, substituting one (1) successfully completed year of college work including six (6) semester hours in any combination of the following course work, mathematics, basic engineering, physical science, physics and/or drafting for each year of the required experience;

OR

the satisfactory completion of a drafting curriculum from a technological school affiliated with an accredited college or university may be substituted on a year for year basis for the required working experience, with a maximum substitution of one (1) year.

(Continued on page 2. Page 1 of 2 pages.)

OKLAHOMA: CODE: 5298 ADOPTED: 4-60 REVISED: 8-1-66

2. General knowledge of mathematics including algebra, plane and solid geometry, and basic trigonometry; of basic engineering drafting principles, techniques, and equipment; some knowledge of land survey terminology; all as evidenced by a passing grade on an appropriate examination.

3. Ability to establish and maintain effective working relationships with others; to follow written and oral instructions; all as evidenced by an investigation and/or an interview.

GinA
SDH

L A B O R A T O R Y H E L P E R

DEFINITION:

Under supervision to assist the laboratory technician as required, and to perform related duties as assigned.

EXAMPLES OF WORK PERFORMED:

Opens specimen containers; records specimens, numbers specimens. prepares specimen containers for packing and shipping; packs and ships specimen containers; assists in preparing culture media; cleans and sterilizes glassware; opens suspected rabid animal heads; cares for laboratory animals.

MINIMUM QUALIFICATIONS:

1. Graduation from a standard four-year high school, or equivalent education, with courses in high school science.
2. General knowledge of the elementary principles of high school science, of elementary laboratory methods and equipment, as evidenced by a passing grade in a practical written test.
3. Ability to work with others and to follow instructions; accuracy, speed, dependability, resourcefulness, personal initiative and integrity.

APPENDIX IIb

M A N A G E R , P O L L U T I O N A B A T E M E N T

DEFINITION:

Under general direction, interprets, administers and enforces Oklahoma Corporation Commission policies, rules and regulations on matters pertaining to pollution abatement in the oil and gas industry; performs related work as required.

EXAMPLES OF WORK PERFORMED:

Causes investigations to be initiated on all complaints concerning industry related pollution and handles to conclusion.

Maintains files on pollution complaints until the pollution is corrected and dismissed; issues shutdown orders or show cause hearings if necessary to enforce regulations.

Serves as trial examiner for pollution hearings as required.

Serves as liaison with other governmental agencies, legislative committees, and the public on matters pertaining to pollution abatement.

Prepares reports, special studies, and makes recommendations pertaining to pollution abatement.

MINIMUM QUALIFICATIONS:

1. Statutory Requirements 52 OS 149 (c) 7: Graduation from an accredited university with a Bachelor of Science Degree and at least five (5) years practical experience in the production of oil and gas.
2. Considerable knowledge of oil and gas drilling operations, of pollution abatement processes, of State and Federal rules and regulations pertaining to pollution control, of technical report writing; all as evidenced by a passing grade on an appropriate examination.
3. Ability to establish and maintain effective working relationships with others, to organize and conduct several activities simultaneously, to explain and interpret statutes, rules and regulations, to make recommendations based on facts or knowledge obtained through research and investigations; all as evidenced by an investigation and/or an interview.

M A N A G E R O F F I E L D O P E R A T I O N S ,
O I L A N D G A S C O N S E R V A T I O N D I V I S I O N
(CORPORATION COMMISSION)

DEFINITION:

Under general direction, directs and coordinates the activities of the district offices and field activities of the Conservation Division with respect to both oil and gas conservation and the prevention of pollution; performs related work as required.

EXAMPLES OF WORK PERFORMED:

Directs, coordinates and supervises the activities of the District Offices in the enforcement of oil and gas conservation and pollution rules and regulations.

Advises District Offices in the interpretation of statutes, rules and regulations.

Consults with and advises the Director of Conservation and other administrative personnel in matters relating to field operations, investigations, and other activities.

Reviews reports submitted by field personnel and determines action to be taken.

Authorizes purchase of equipment, materials and services for district offices.

Plans and assists in training of field personnel.

Reviews expense claims, requisitions, invoices, and other records of field personnel.

Prepares and delivers speeches to trade, royalty and other interested groups.

MINIMUM QUALIFICATIONS:

1. STATUTORY REQUIREMENTS: (52 O.S. 149, d) Graduation from an accredited college or university with a Bachelor of Science Degree and five (5) years practical experience in the production of oil and gas, or in the alternative, shall have at least seven (7) years experience in work equivalent to that of a district drilling or production superintendent in the oil and gas industry.

2. Thorough knowledge of oil and gas field operations; of the rules and regulations governing the drilling and production of oil and gas wells; general knowledge of supervisory methods and techniques; of office and personnel administration; of public relations as pertain to a regulatory program; all as evidenced by a passing grade on an appropriate examination.

(Continued on page 2. Page 1 of 2 pages.)

OKLAHOMA: CODE: 4707 ADOPTED: 5-1-69 REVISED:

Page 2 - MANAGER OF FIELD OPERATIONS, OIL AND GAS CONSERVATION DIVISION
(CORPORATION COMMISSION)

3. Ability to plan, coordinate and supervise the activities of departmental personnel; to establish and maintain effective working relationships with associates, subordinate personnel, industrial representatives, the public; to interpret and explain statutes, rules and regulations; to make recommendations based on facts or knowledge obtained through research and investigations; all as evidenced by an investigation and/or an interview.

S E N I O R P E T R O L E U M E N G I N E E R ,
O I L A N D G A S C O N S E R V A T I O N D I V I S I O N
(CORPORATION COMMISSION)

DEFINITION:

Under direction, assists in planning, supervising, and performs professional petroleum engineering work in the enforcement of rules and regulations pertaining to oil and gas production; performs related work as required.

EXAMPLES OF WORK PERFORMED:

Performs engineering studies and prepares reports concerning oil and gas production, exploration, pollution abatement, drilling, testing, and plugging of wells, and general conservation practices.

Reviews engineering data, test results, and other reports submitted by the petroleum industry and Corporation Commission field employees; makes recommendations for action to be taken.

Assists in the planning, scheduling, taking and recording of field measurements such as well production tests, gas/oil ratio surveys; bottom hole pressure surveys and others.

Prepares technical reports to be used as evidence in legal hearings; may give expert testimony; serves as technical advisor to Trial Examiners.

Performs engineering work for division departments and field offices.

Advises industry and the public of Corporation Commission rules, regulations and policies.

Serves as Manager - Technical Department in his absence.

MINIMUM QUALIFICATIONS:

1. (Statutory Requirements: 52 OS 149 [g]) Shall be a graduate of an accredited college or university, with a Bachelor of Science Degree in petroleum engineering and at least five (5) years experience as a petroleum engineer.

2. Considerable knowledge of the principles and practices of petroleum engineering; of the methods and practices of oil and gas production; general knowledge of technical report writing; of record keeping; of public relations as related to a regulatory program; some knowledge of supervisory methods; all as evidenced by a passing grade on an appropriate examination.

3. Ability to establish and maintain effective working relationships with others; to organize and conduct several activities simultaneously; to effectively supervise subordinates; to gather and interpret information accurately; all as evidenced by an investigation and/or an interview.

P E T R O L E U M E N G I N E E R

DEFINITION:

Under general supervision, performs professional petroleum engineering duties in the enforcement of Corporation Commission rules and regulations pertaining to oil and gas production and conservation.

EXAMPLES OF WORK PERFORMED:

Performs engineering and geological studies and prepares reports concerning oil and gas production, exploration, pollution abatement, drilling, testing, and plugging of wells, and general conservation practices.

Reviews engineering data, test results, and other reports submitted by the petroleum industry and by inspectors of the Corporation Commission, makes recommendations for action to be taken.

Performs engineering and geological work for other divisions of the Corporation Commission as assigned.

Schedules allocated gas well tests; checks unallocated gas well tests as requested; notifies operators and gas purchasers concerning testing their wells.

Witnesses, conducts, and records well production tests, gas-oil ratio surveys, bottom hole pressure surveys, and other field measurements.

Advises representatives of the petroleum industry and the general public on Corporation Commission regulations, rules and policies pertaining to oil and gas production and conservation.

MINIMUM QUALIFICATIONS:

1. (Statutory Requirements: 52 OS 149 [h]) Graduation from an accredited college or university, with a Bachelor of Science Degree in engineering.
2. Considerable knowledge of the principles, practices, and applications of petroleum engineering; of the methods and techniques of oil and gas production; some knowledge of technical report writing; of record keeping; all as evidenced by a passing grade on an appropriate examination.
3. Ability to express facts and opinions clearly and concisely, both orally and in writing; to conduct several projects simultaneously; to establish and maintain effective working relationships with others; all as evidenced by an investigation and/or an interview.

SENIOR PETROLEUM GEOLOGIST

DEFINITION:

Under direction, performs professional petroleum geological duties in the enforcement of Corporation Commission rules and regulations pertaining to oil and gas production, conservation, and pollution abatement; performs related work as required.

EXAMPLES OF WORK PERFORMED:

Performs geological studies and prepares reports concerning oil and gas production, exploration, pollution abatement, drilling, testing, and plugging of wells, and general conservation practices.

Reviews geologic data, test results, and other reports submitted by the petroleum industry and Corporation Commission field employees; makes recommendations for action to be taken.

Assists as needed in the planning, scheduling, taking and recording of field measurements such as well production tests, gas/oil ratio surveys, bottom hole pressure surveys, and others.

Prepares geological maps and technical reports to be used as evidence in legal hearings; may give expert testimony; serves as technical advisor to Trial Examiners.

Performs geological work for the various Divisions of the Corporation Commission and for the District Offices as needed.

Advises the petroleum industry and the general public of Corporation Commission rules, regulations, and policies.

Serves as Division Head in his absence.

MINIMUM QUALIFICATIONS:

1. Statutory Requirements (52 OS 149 - g): Graduation from an accredited college or university with a Bachelor of Science Degree in geology and shall have five (5) years practical experience in petroleum geology.
2. Thorough knowledge of the principles and practices of petroleum geology; of the methods and practices of oil and gas production; general knowledge of technical report writing, of record keeping, of public relations as related to a regulatory program; some knowledge of supervisory methods; all as evidenced by a passing grade on an appropriate examination.
3. Ability to establish and maintain effective working relationships with others; to organize and conduct several activities simultaneously; to effectively supervise subordinates; to gather and interpret information accurately; all as evidenced by an investigation and/or an interview.

P E T R O L E U M G E O L O G I S T

DEFINITION:

Under general supervision, performs professional petroleum geological duties in the enforcement of Corporation Commission rules and regulations pertaining to oil and gas production, conservation, and pollution abatement; performs related work as required.

EXAMPLES OF WORK PERFORMED:

Performs engineering and geological studies and prepares reports concerning oil and gas production, exploration, pollution abatement, drilling, testing, and plugging of wells, and general conservation practices.

Reviews engineering and geologic data, maps electric logs, test results and other reports submitted by the petroleum industry and Corporation Commission field employees; makes recommendations for action to be taken.

Assists in the witnessing, conducting and recording of field measurements.

Performs hydrological studies as necessary and as requested by the public and governmental agencies.

Prepares geological maps and technical reports to be used as evidence in legal hearings; may give expert testimony; serves as technical advisor to Trial Examiners.

Works with and cooperates with the Oklahoma Geological Survey and other groups in the preparation of stratigraphic section charts and other studies.

Advises the petroleum industry and the general public of Corporation Commission rules, regulations, and policies.

MINIMUM QUALIFICATIONS:

1. STATUTORY REQUIREMENTS: 52 OS 149 (h): Graduation from an accredited college or university with a Bachelor of Science Degree in Geology.
2. Considerable knowledge of the principles, practices, and applications of petroleum geology; of the methods and techniques of oil and gas production; some knowledge of technical report writing; of record keeping; all as evidenced by a passing grade on an appropriate examination.
3. Ability to express facts and opinions clearly and concisely, both orally and in writing; to conduct several projects simultaneously; to establish and maintain effective working relationships with others; all as evidenced by an investigation and/or an interview.

D I S T R I C T M A N A G E R ,
O I L A N D G A S C O N S E R V A T I O N D I V I S I O N
(CORPORATION COMMISSION)

DEFINITION:

Under direction, supervises field and office personnel in the enforcement of state laws and rules and regulations of the Corporation Commission pertaining to the development, operation, and production of oil and gas; performs related work as required.

EXAMPLES OF WORK PERFORMED:

Plans, assigns and supervises the activities of office and field personnel.

Schedules, conducts, witnesses and approves well tests.

Witnesses and approves well plugging operations.

Directs inspection of earthen pits, salt water disposal facilities, and other potential sources of pollution.

Explains and interprets rules and regulations of the Corporation Commission to representatives of the oil and gas industries, land owners, and the general public.

Prepares reports, recommendations and suggested procedures of field activities.

Informs Pollution Abatement Division Manager of pollution activities in assigned district.

MINIMUM QUALIFICATIONS:

1. STATUTORY REQUIREMENTS: (52 OS 149, 1) Graduation from an accredited college or university with a Bachelor of Science Degree in Petroleum Engineering and shall have five (5) years practical experience in the production of oil and gas;

OR

in lieu of a college degree, shall have ten (10) years experience in the production of oil and gas, of which five (5) years experience shall be in a supervisory capacity equivalent to that of a district drilling or production foreman in the oil and gas industry.

2. Considerable knowledge of oil and gas field operations, of the rules and regulations governing the drilling and production of oil and gas wells; general knowledge of office and personnel administration; of public relations as pertain to a regulatory program; all as evidenced by a passing grade on an appropriate examination.

(Continued on page 2. Page 1 of 2 pages.)

OKLAHOMA: CODE: 5687 ADOPTED: 5-1-69 REVISED:

3. Ability to plan, supervise and coordinate activities of subordinate personnel; to interpret and explain policies, practices, rules and regulations; to collect and evaluate engineering and geological data; to make recommendations based on knowledge and facts obtained through research and investigations; to establish effective working relationships with superiors, subordinates, industry representatives, land owners, and the public; all as evidenced by an investigation and/or an interview.

D I S T R I C T O F F I C E A S S I S T A N T ,
O I L A N D G A S C O N S E R V A T I O N D I V I S I O N
(CORPORATION COMMISSION)

DEFINITION:

Under direction, performs administrative work in the management of a district office as an assistant to the manager; performs related work as required.

EXAMPLES OF WORK PERFORMED:

Assists in the preparation of work schedules.

Receives information concerning pollution, well production, well plugging, and related operations, and relays the information to District Managers and Field Inspectors.

Maintains records and files of information received.

Maintains personnel records such as milage and subsistence claims, vacation and sick leave.

Explains rules and regulations governing the oil and gas industry to the public, land owners, and industry representatives.

Maintains supplies of office and other stock.

Serves as dispatcher to field personnel.

Prepares reports concerning district activities.

MINIMUM QUALIFICATIONS:

1. STATUTORY REQUIREMENTS: (52 O.S. 149, j) Graduation from high school or business college and three (3) years practical experience in office administration.

2. General knowledge of the methods and practices of office administration; of report writing and record keeping; some knowledge of oil and gas production practices; all as evidenced by a passing grade on an appropriate examination.

3. Ability to establish and maintain effective working relationships; to express self orally and in writing; to comprehend and carry out oral and written instructions; all as evidenced by an investigation and/or an interview.

O I L A N D G A S C O N S E R V A T I O N
D I V I S I O N F I E L D I N S P E C T O R

DEFINITION:

Under general supervision, makes inspections, investigations and witnesses tests in the enforcement of the rules, regulations and orders of the Corporation Commission relating to oil and gas conservation and the prevention of pollution; performs related work as required.

EXAMPLES OF WORK PERFORMED:

Supervises, witnesses, tests, and records data on well production potential, casing setting, cementing, bottom hole pressure, gas-oil ratio.

Investigates pollution complaints, confers with oil company personnel, land owners, and officials of other state agencies concerning such complaints, makes recommendations based on the findings; advises complainant of action taken.

Checks field operations upon receipt of notice of intention to drill, workover, plug and abandon wells to insure compliance with Commission rules and regulations.

Inspects production and drilling practices to insure that rules and regulations pertaining to drilling, casing, cementing, plugging and abandonment, salt water disposal, use of earthen pits, and other operations utilized by the petroleum industry are complied with; reports violations.

Investigates applications for various permits and recommends approval or disapproval.

MINIMUM QUALIFICATIONS:

STATUTORY REQUIREMENTS 52 O.S. 149 (K)

1. Graduation from high school and three (3) years of experience in a supervisory capacity in oil field production and drilling operations, which could include drilling foreman or production foreman.
2. General knowledge of oil field drilling and production methods and practices; of the methods and procedures of investigative work; of record keeping; some knowledge of the rules and regulations pertaining to oil and gas production and pollution.
3. Ability to conduct investigations; to secure and present evidence both orally and in writing; to follow oral and written instructions; to analyze statements and situations accurately; to establish and maintain effective working relationships with associates, land owners, oil company representatives, and the general public, all as evidenced by a passing grade on an appropriate examination.

APPENDIX IIc

Gina
DPH

CHIEF OF ENVIRONMENTAL HEALTH SERVICES

DEFINITION:

Under the general direction of the Commissioner of Health, to perform work of exceptional engineering and administrative difficulty and responsibility in promoting, developing, and supervising a state-wide program of environmental sanitation, and to perform related duties.

EXAMPLES OF WORK PERFORMED:

Formulates the policies of Environmental Health Services, reviews and approves plans and specifications for all engineering projects; correlates work of the service with other work of the department; prepares and submits tentative budgets; serves as consulting engineer for the department on all engineering matters; confers with city, county, state, and federal officials where work of the service is involved; prepares articles, pamphlets, bulletins and talks for public distribution; establishes standards to be used in selection, assignment and evaluation of personnel; establishes standards of performance; plans and conducts staff conferences and meetings of advisory groups; establishes an inservice training program; reviews periodic service ratings.

MINIMUM QUALIFICATIONS:

1. (a) Graduation from a college or university, with a Bachelor's Degree in engineering, preferably in a course accredited by the Engineering Council for Professional Development. Preference will be given to the candidate with a degree in sanitary or public health engineering.
 - (b) Successful completion of one year of postgraduate study in a recognized school of public health engineering.
 - (c) Seven years within the last ten years of full-time paid experience under supervision, in the field of sanitary or public health engineering, two years of which must have been of special professional and administrative capacity in public health engineering.
 - (d) Eligibility for registration as a professional engineer in the State of Oklahoma, such registration to be completed within the probationary period.
2. Thorough knowledge of the principles and practices of public health engineering, as well as the laws and regulations of the State of Oklahoma concerning sanitation; ability to plan and direct activities of personnel within the service; ability to interpret engineering data and details of projects of considerable scope.

(Continued on page 2. Page 1 of 2 pages.)

OKLAHOMA: CODE: 6191 ADOPTED: 1-1-62 REVISED:

3. Demonstrated capacity for leadership, ability to address the public on matters related to public health, ability to plan and work with people, tact, personal initiative and integrity, as evidenced by an investigation and a passing grade in an oral interview.

GinA
SDH

DIRECTOR, DIVISION OF
WATER QUALITY CONTROL

DEFINITION:

Under the general direction of the Chief of Environmental Health Services, is responsible for a state-wide program of water quality control, coordinates this program with others in the Department of Health, and performs related duties as assigned.

EXAMPLES OF WORK PERFORMED:

Plans, promotes, and supervises a state-wide program of water quality control.

Interprets and administers statutes and regulations relating to water quality and water pollution control.

Gives consultation and direction on the development of water quality standards, standards for water and waste water treatment; the preparation, implementation and interpretation of water supply and waste treatment facility design regulations, and the State Water Pollution Control Plan.

Plans and supervises river basin surveys.

Consults with other state, federal, and local agencies for coordinating activities, planning, and implementing multi-agency plans for water quality control.

Makes necessary reports and surveys for the evaluation of the program, prepares budget, and supervises program staff.

Performs related duties as assigned.

MINIMUM QUALIFICATIONS:

1. (a) Possession of a Master's Degree in sanitary engineering or public health, and eight (8) years full-time paid employment in environmental health, three (3) years of which shall have been in work directly related to water quality control;

OR

an additional year of the described employment in environmental health may be substituted for each semester of the required graduate work.

(b) Eligibility for registration as a professional engineer in the State of Oklahoma. (Registration must be completed within six (6) months after date of employment.)

(Continued on page 2. Page 1 of 2 pages.)

OKLAHOMA: CODE: 6077 ADOPTED: 5-15-69 REVISED:

2. Thorough knowledge of the codes governing water supplies, waste water, and water treatment; of community needs and trends; knowledge of engineering principles as they are applied to water quality control, as evidenced by a passing grade on a written examination.

3. Ability to organize and execute work in an efficient and effective manner; to coordinate and supervise the activities of a number of employees; initiative and tact, as evidenced by an investigation.

DEFINITION:

Under the direction of the Chief Sanitary Engineer, to assist in developing, planning and supervising a state-wide program of environmental sanitation, or to supervise a program within the field of environmental sanitation, and to perform related duties as assigned.

EXAMPLES OF WORK PERFORMED:

Assists the Chief Sanitary Engineer in formulating policies; reviews and approves plans and specifications for engineering projects; works with the Chief Sanitary Engineer and other principal engineers to correlate all sanitary engineering programs; serves as consulting engineer to other public health programs; confers with city, county, state and federal officials in engineering matters; prepares articles, makes talks and carries out other education activities; assists in developing sanitary engineering standards; inspects engineering projects involving public health and renders consultant service to such projects; assists the Chief Sanitary Engineer in supervision of personnel of the Engineering Division, or under his direction supervises personnel assigned to a program within the division, and performs other related duties.

MINIMUM QUALIFICATIONS:

1. (a) Graduation from a college or university, with a Bachelor's Degree in engineering, preferably in a course accredited by the Engineering Council for Professional Development. Preference will be given to the candidate with a degree in chemical, sanitary, or public health engineering.

(b) Successful completion of one (1) year of post-graduate work in chemical, civil, sanitary, or public health engineering, or in general public health;

OR

FOR PROMOTIONAL PURPOSES ONLY: two (2) additional years approved experience in the field of sanitary or public health engineering for the post-graduate work stipulated herein.

(c) Eight (8) years in the last fifteen (15) years of full-time paid experience of progressively important professional and administrative nature in the fields of sanitary or public health engineering.

(d) A candidate must not have passed his 36th birthday at the time of his first full-time paid employment in public health work.

(e) Professional engineer's license in Oklahoma.

2. Thorough comprehensive knowledge and familiarity with the principles and practices of sanitary and public health engineering, including water supply, sewage treatment and disposal, malaria control, milk production, and industrial hygiene; thorough knowledge of the causes and control of filth-borne diseases; knowledge of the laws, rules and regulations of the State of Oklahoma relating to public health; knowledge of relationships between local, state and national health organizations; considerable knowledge of current literature pertaining to sanitation; and ability to prepare and present technical papers in a creditable manner, all as evidenced by a passing grade in a written examination.

3. Demonstrated capacity for leadership, instructional ability, ability to plan and work with people, tact, personal initiative and integrity, as evidenced by an investigation and a passing grade in an oral interview.

S E N I O R E N G I N E E R

DEFINITION:

Under the supervision of the Chief Engineer or Director of a program requiring the services of a Senior Engineer, to carry out responsible work in planning and supervising subsidiary public health engineering programs, sanitary engineering programs, or other related engineering programs and to perform related work.

EXAMPLES OF WORK PERFORMED:

Plans, promotes and supervises public health engineering or sanitary engineering, or related engineering programs; makes investigations, inspections, surveys and reports involving water and sewage systems, stream pollution, malaria control, industrial hygiene and milk plants; reviews and recommends action to be taken on plans and specifications for engineering projects; conducts research investigations; conducts a sanitation program in a major city-county health department; addresses meetings on matters related to public health and educational work in the interest of public health.

MINIMUM QUALIFICATIONS:

1. (a) Graduation from a college or university, with a Bachelor's Degree in engineering, preferably in a course accredited by the Engineering Council for Professional Development. Preference will be given to the candidate with a degree in chemical, sanitary, or public health engineering.

(b) Eight (8) years in the last twelve (12) years of full-time paid experience of progressively important professional and administrative nature in the fields of sanitary or public health engineering;

OR

any combination of education and experience, substituting the equivalent of one (1) academic semester of post-graduate study in chemical, civil, sanitary or public health engineering for one (1) year of the eight (8) years required with a maximum substitution for two (2) years.

(c) A candidate must not have passed his 41st birthday at the time of his first full-time paid employment in public health work.

(d) Professional engineer's license in Oklahoma.

(Continued on page 2. Page 1 of 2 pages.)

OKLAHOMA: CODE: 6151 ADOPTED: 7-1-54 REVISED: 5-10-65

2. Thorough comprehensive knowledge and familiarity with the principles and practices of sanitary and public health engineering, including water supply, sewage treatment and disposal, malaria control, milk production, and industrial hygiene; thorough knowledge of the causes and control of filth-borne diseases; knowledge of the laws, rules and regulations of the State of Oklahoma relating to public health; knowledge of relationship between local, state and national health organizations; considerable knowledge of current literature pertaining to sanitation; and ability to prepare and present technical papers in a creditable manner, all as evidenced by a passing grade in a written examination.

3. Demonstrated capacity for leadership, instructional ability, ability to plan and work with people, tact, personal initiative and integrity, as evidenced by an investigation and a passing grade in an oral interview.

ENGINEER

DEFINITION:

Under supervision to do professional engineering work in public health engineering programs, and sanitary engineering programs, and to perform related duties as assigned.

EXAMPLES OF WORK PERFORMED:

Makes inspections, surveys, and reports on water and sewer systems, industrial waste disposal, stream pollution problems, drainage and malaria control projects, industrial plants, milk plants, assists in drafting and enforcing public health regulations; serves as consultant to county and district health departments; compiles engineering data, prepares reports, plans and specifications for engineering projects; interprets laboratory reports on water, sewage, milk, etc.; makes laboratory studies, etc.; conducts a sanitation program in a local or district health unit; aids in training engineering and sanitation personnel; investigates sanitary condition of swimming pools, mosquito breeding areas, and complaints of insanitary conditions; confers with local health and civic officials on matters pertaining to sanitation; addresses meetings; and performs educational work in the interest of the public health sanitation program.

MINIMUM QUALIFICATIONS:

1. (a) Graduation from an accredited college or university with a degree in engineering, preferably in a course accredited by the Engineering Council for Professional Development. Preference will be given to the candidate with a degree in chemical, sanitary, or public health engineering.
- (b) Four (4) years, within the past seven (7) years, of full-time paid employment in engineering work, three (3) years of which shall be in the field of sanitary engineering or public health engineering;

OR

any combination of education and experience, substituting the equivalent of one (1) academic year of post-graduate study in chemical, civil, sanitary, or public health engineering for one (1) year of the four (4) years required with a maximum substitution of one (1) year.

(c) A candidate must not have passed his 36th birthday at the time of his first full-time paid employment in the field of public health work.

(d) Eligibility for registration as a professional engineer in the State of Oklahoma. Registration must be completed within the probationary period.

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OKLAHOMA: CODE: 6041 ADOPTED: 7-1-54 REVISED:

2. General knowledge of water supply and sewage treatment, malaria control, milk production and industrial hygiene, engineering specifications and practices; knowledge of the laws and regulations of the State of Oklahoma relating to public health; ability to collect and correlate engineering data, and interpret same in preparing reports, plans, or specifications; knowledge of relationship between the various health agencies; ability to prepare and present papers or discussions before groups of people, and to plan and execute work with speed and efficiency, all as evidenced by a passing grade in a written examination.

3. Good health and good personality, aptitude for leadership, instructional ability, ability to plan and work with people, tact, personal initiative and integrity, as evidenced by an investigation and a passing grade in an oral interview.

A S S I S T A N T E N G I N E E R

DEFINITION:

Under supervision to do engineering work in public health engineering programs and in sanitary engineering programs, and to perform related duties as assigned.

EXAMPLES OF WORK PERFORMED:

Makes minor surveys, inspections and prepares reports on water purification plants, sewage and industrial waste treatment and disposal works; reviews, under supervision, plans and specifications for water and sewage systems, swimming pools, food processing plants, etc.; collects water and sewage samples for chemical and bacteriological examination; makes simple stream pollution and industrial hygiene investigations; assists in mobile laboratory studies; handles correspondence and performs drafting relating to assigned work; meets with civic, professional, lay and governmental groups in the interest of minor engineering projects relating to public health; conducts a sanitation program and carries out the duties of a sanitarian in a local or district health unit; and performs duties relating to all of the foregoing.

MINIMUM QUALIFICATIONS:

1. (a) Graduation from an accredited college or university with a Bachelor's Degree in engineering, preferably in a course accredited by the Engineering Council for Professional Development. Preference will be given to the candidate with a degree in chemical, sanitary, or public health engineering.

(b) A candidate must not have passed his 36th birthday at the time of his first full-time paid employment in public health work.

2. General knowledge of the basic principles of sanitary and public health engineering; some knowledge of the causative agents and means of transmission and control of common communicable diseases including those diseases transmissible from animals to man; ability to make sanitary inspections and investigations; and ability to write clear and intelligent reports, all as evidenced by a passing grade in a written examination.

3. Good health and good personality that will command attention and hold the respect of individuals, public officials, professional and lay groups; ability to accept and willingly follow instructions from supervisor, ability to deal tactfully with the public, express ideas clearly; integrity and a sense of loyalty, all as evidenced by an investigation and a passing grade in an oral interview.

GinA
SDH

PUBLIC HEALTH ENGINEERING AIDE I

DEFINITION:

Under supervision, to do technical work in environmental engineering programs and to perform related duties as assigned.

EXAMPLES OF WORK PERFORMED:

Makes minor surveys, inspections, and prepares reports on water wells, water transmission lines, slow sand filter water treatment plants, swimming pools, sewage collecting systems, sewage pumping stations, slow sand filter sewage plants and sewage stabilization ponds. Under supervision of an engineer, reviews plans and specifications for swimming pools, water and sewage transmission lines, water wells, slow sand filters for water or sewage treatment; collects water and sewage samples for chemical and bacteriological examination; makes simple reservoir and stream pollution investigations; assists in mobile laboratory studies; performs drafting relating to assigned work and performs duties relating to all of these activities as assigned.

MINIMUM QUALIFICATIONS:

1. (a) Satisfactory completion of two (2) years of work in an accredited college or university with mathematics or science background leading to a degree in engineering or natural science, including a minimum of twelve (12) semester hours in any combination of math, engineering, or natural science.

(b) A candidate must not have passed his 30th birthday at the time of his first full-time employment in environmental health work.
2. General knowledge of the basic principles of engineering and engineering math. Ability to write clear and intelligent reports, all as evidenced by a passing grade on a written examination.
3. Good health and a good personality that will hold the respect of individuals, public officials, and the general public; ability to accept and willingly follow instructions from a supervisor; ability to deal tactfully with the public, express ideas clearly; possess integrity and a sense of loyalty, all as evidenced by an investigation.

GinA
SDH

PUBLIC HEALTH ENGINEERING AIDE II

DEFINITION:

Under supervision, to do technical work in environmental engineering programs and to perform related duties as assigned.

EXAMPLES OF WORK PERFORMED:

Makes minor surveys, inspections, and prepares reports on water wells, water transmission lines, slow sand filter water treatment plants, swimming pools, sewage collecting systems, sewage pumping stations, slow sand filter sewage plants and sewage stabilization ponds. Under supervision of an engineer, reviews plans and specifications for swimming pools, water and sewage transmission lines, water wells, slow sand filters for water or sewage treatment; collects water and sewage samples for chemical and bacteriological examination, makes simple reservoir and stream pollution investigations, assists in mobile laboratory studies, performs drafting relating to assigned work, and performs related duties as assigned.

MINIMUM QUALIFICATIONS:

1. (a) Satisfactory completion of two (2) years of work in an accredited college or university with mathematics or science background leading to a degree in engineering or natural science, including a minimum of twelve (12) semester hours in any combination of math, engineering, or natural sciences.
(b) A candidate must not have passed his 41st birthday at the time of his first full-time employment in environmental health work.
(c) At least three (3) years of experience of a technical nature under the direction of a registered engineer or sanitarian.
2. Considerable knowledge of engineering and engineering math. Ability to write clear and intelligent reports, all as evidenced by a passing grade on a written examination.
3. Good health and good personality that will hold the respect of individuals, public officials, and the general public; ability to accept and willingly follow instructions from a supervisor; ability to deal tactfully with the public; express ideas clearly; possess integrity and a sense of loyalty, all as evidenced by an investigation.

E N V I R O N M E N T A L
P R O G R A M S P E C I A L I S T I

DEFINITION:

Under general supervision, performs technical work in one of the following environmental areas: water quality control, air pollution control, solid waste control, environmental housing, urban planning, occupational or radiological health, or general sanitation.

EXAMPLES OF WORK PERFORMED:

Conducts surveys and inspections to determine minimum compliance with statutes, makes necessary reports and records, and provides consultation to communities and local groups.

Provides consultative services in speciality area of environmental management to county health departments and municipalities.

Assists in the review of plans and specifications for proposed facilities, such as water and waste water treatment plants and sanitary sewage systems, for conformity with minimum design requirements.

Assists in interpretation of grants construction programs.

Aids in the development of recommended standards, regulations, criteria, and codes for environmental management and interprets statutes and codes.

Keeps technical records and reports.

Participates in licensure programs.

Performs related duties as assigned.

MINIMUM QUALIFICATIONS:

1. Possession of a Master's Degree with major emphasis in environmental health field to which assigned;

OR

substitution may be made for the required graduate work at the rate of one (1) year's full-time paid professional employment in an environmental health program for each semester of graduate work, provided the undergraduate work includes a major or its equivalent in physical or biological science.

2. Considerable knowledge of the environmental field of speciality; knowledge of public health codes as they relate to environmental health; of the collection, analysis, and interpretation of survey data; of current literature pertaining to environmental management; and working knowledge of chemical and biological analysis, as evidenced by a passing grade in a written examination.

(Continued on page 2. Page 1 of 2 pages.)

OKLAHOMA: CODE: 2508 ADOPTED: 7-15-69 REVISED:

3. Ability to meet and work with individuals and groups; to organize and execute work in an efficient manner; tact, initiative and integrity, as evidenced by an investigation.

DEFINITION:

Under direction, to organize and direct chemical work; to assume responsibility for the accuracy and reliability of all tests made; to supervise and assist in the training of laboratory trainees; and to conduct research problems as assigned.

EXAMPLES OF WORK PERFORMED:

Plans and directs chemical work; plans and directs the work of laboratory trainees in Chemistry; supervises and participates in the chemical analyses of water, milk and food products; makes examinations of foods and drugs for poisons, adulterants and misbranding; analyzes liquor for alcoholic content; tests autopsy specimens for poisons, and blood for alcohol; prepares reagents, stains and solutions; makes certain other chemical tests and analyzes food, drugs and industrial hygiene specimens; makes required reports.

MINIMUM QUALIFICATIONS:

1. (a) Successful completion of four (4) year course leading to a Bachelor's degree in an accredited college or university, including or supplemented by, courses equivalent to a major in chemistry, including courses in analytical chemistry, food and drug analysis, sanitary chemistry and related subjects.

(b) Successful completion of at least one (1) year of graduate study with a major in chemistry.

(c) Four (4) years within the past eight (8) years of full-time paid experience in chemistry including three (3) years in a recognized public health, food and drug, industrial or military laboratory, performing tests in public health or related chemistry.

Two (2) years of acceptable experience in a supervisory or administrative capacity in a public health laboratory can be substituted for the year of graduate study;

OR

two (2) years of applicable graduate study leading to a Doctor's degree may be substituted for three (3) years of this required experience.

2. Thorough knowledge of current literature and practice of chemistry as related to public health laboratory work; thorough knowledge of the most recent chemical techniques and procedures; thorough knowledge of the fundamentals of chemistry of water and sewage, and the analyses of industrial hygiene specimens; knowledge of Pure Food and Drug Laws, both State and Federal, and a general knowledge of toxicology, as evidenced by a passing grade in a written examination.

3. Ability to plan and direct the work of a public health chemical laboratory; ability to prepare and present technical papers in a credible manner; ability to work with others; dependability, resourcefulness, personal initiative and integrity, as evidenced by an investigation and a passing grade in an oral interview.

C H E M I S T

DEFINITION:

Under direction, to perform with precision, speed and accuracy, the most difficult chemical test and procedures, using the most recent techniques and procedures; to supervise the work of assistants; to determine the accuracy and reliability of all tests made; and to perform related duties as assigned.

EXAMPLES OF WORK PERFORMED:

Supervises and participates in the chemical examination of water, milk and food products; makes examination of foods and drugs for poisons, adulterants and misbranding; analyzes liquors for alcoholic content; tests autopsy specimens for poisons and blood for alcohol; prepares re-agents, stains and solutions; makes certain other chemical tests and analyzes food, drugs and industrial hygiene specimens; makes required reports.

MINIMUM QUALIFICATIONS:

1. (a) Successful completion of a four year course, leading to a Bachelor's Degree, in an accredited college or university, including or supplemented by, courses equivalent to a major in chemistry, which must have included analytical chemistry and should include food and drug analysis and sanitary chemistry, and related subjects.
- (b) Two (2) years full-time paid experience in a chemical laboratory, of which one (1) year must have been in a public health laboratory under qualified supervision or substituting one (1) successfully completed year of graduate study leading to a Master's Degree in chemistry for one (1) year of the required experience, with a maximum substitution of one (1) year.
2. Considerable knowledge of current literature and practice of chemistry as related to public health laboratory work; thorough knowledge of the most recent chemical techniques and procedures; a general knowledge of the fundamentals of chemistry and analytical chemistry as applied to food and drugs, and chemistry of water and sewage, as evidenced by a passing grade in a written examination.
3. Ability to work with others, dependability, resourcefulness, personal initiative and integrity, as evidenced by an investigation and a passing grade in an oral interview.

A S S I S T A N T C H E M I S T

DEFINITION:

Under supervision to perform with precision, speed, and accuracy chemical tests using the most recent approved techniques and procedures, and to perform related duties as assigned.

EXAMPLES OF WORK PERFORMED:

Participates in the chemical examination of water, sewage, industrial waste, milk, and food products; participates in the examination of foods and drugs for poisons, adulterants and misbranding; assist in making inspections, surveys and reports concerning water and sewage treatment plant operation, industrial waste disposal and stream pollution, and food processing plants; makes required reports and performs related duties as assigned.

MINIMUM QUALIFICATIONS:

1. Successful completion of a four-year course, leading to a Bachelor's degree, in an accredited college or university, including or supplemented by courses equivalent to a major in chemistry and which shall have included course work in biology and/or physics.
2. Some knowledge of the fundamentals of chemistry and analytical chemistry as applied to food and drugs, and chemistry of water and sewage; some knowledge of the most recent chemical techniques and procedures; ability to collect, correlate, and interpret laboratory data in preparation of reports; ability to prepare and present papers or discussions for official or public meetings; ability to plan and execute work with speed and efficiency as evidenced by a passing grade in a practical written examination.
3. Ability to plan and work with people, tact, personal initiative and integrity, as evidenced by a passing grade in an oral interview.

SDH
Gina

PUBLIC HEALTH ADMINISTRATOR,
NON-MEDICAL

DEFINITION:

Under the general direction of the Commissioner of Health or appropriate service chief, plans, develops, and executes a state-wide program for a major division in the Department of Health.

EXAMPLES OF WORK PERFORMED:

Manages a staff of professional and technical personnel. Seeks and draws upon other public and voluntary organizations and universities for services, consultation, and skills.

Defines the concepts, methodology, and administrative procedures for planning, coordinating, evaluating, and conducting a major public health program operation. Plans and directs preparation of budgets for that program.

Participates in planning and accomplishing integration of program operations with other programs in the department.

Consults with and assists local health officers concerning implementation of operations in the appropriate program area.

Establishes close relationships with professional and community groups interested in the program.

Analyzes and evaluates program implementation and effectiveness.

Schedules work programs and activities for office and field staff.

Advises and assists in the creation and organization of regional, district, area, and local activities within the program.

MINIMUM QUALIFICATIONS:

1. Possession of a doctorate degree in public health or health-related field;

OR

completion of all course work leading to a doctorate in public health, public administration, biostatistics, epidemiology, or sociology, and one (1) year full-time paid employment in a teaching capacity in a college or university in the field of specialty or one (1) year full-time paid employment in an administrative capacity of which a major facet shall have consisted of responsibility in an appropriate public health program;

OR

(Continued on Page 2. Page 1 of 2 pages.)

OKLAHOMA: CODE: 2643 ADOPTED: 3-1-69 REVISED:

possession of a Master's Degree in public health, public administration, biostatistics, epidemiology, or sociology, and five (5) years full-time paid employment in a responsible professional or administrative position in public health, two (2) years of which shall have included responsibility in the area to which assigned.

2. Thorough knowledge of the principles and practices of public health administration; knowledge of budgetary procedures; considerable knowledge of the principle functions of official and voluntary agencies available to public health and work relationships among these agencies; knowledge of current social and economic conditions, particularly as they relate to public health; considerable knowledge of public health problems and conditions and the methods of assessment of these problems, all as evidenced by a passing grade on a written examination.

3. Ability to get along with and work with people; to exercise good judgment in evaluating situations and in making decisions; to organize and execute work in an efficient manner; personal initiative and integrity, as evidenced by an investigation.

S A N I T A R I A N S E R I E S

DISTINGUISHING FEATURES OF THE SERIES:

This series includes all classes of positions, the principal duties of which are to plan, promote, and execute a general environmental sanitation program in the local health departments.

CLASSES IN THE SERIES:

CLASS CODE:

6283
6284
6285

CLASS TITLE:

Sanitarian I
Sanitarian II
Sanitarian III

OKLAHOMA

S A N I T A R I A N I

DEFINITION:

Under supervision of the Director of a Local Health Department, to plan, promote, and execute a general environmental sanitation program in a local health department, and to perform related duties as assigned.

EXAMPLES OF WORK PERFORMED:

Makes surveys, inspections and reports on food stores, garbage collection and disposal services, bedding plants, food manufacturing and processing plants, private and semi-public water supplies and sewage disposal facilities, dairies, pasteurization plants, private and public schools, tourist camps, hotels, swimming pools, public eating and drinking establishments, mosquito breeding area; represents department before local groups concerning environmental sanitation; keeps records and reports; solicits cooperation and assistance of local civic clubs and governmental agencies, and performs related duties as assigned.

MINIMUM QUALIFICATIONS:

1. (a) Graduation from an accredited college or university with at least eighteen (18) semester hours work in physical, natural biologic sciences and/or public health.
- (b) Candidate must have reached his 21st birthday and not have passed his 41st birthday at the time of his first full-time paid employment in public health work.
2. Considerable knowledge of the causative agents and means of transmission and control of common communicable diseases, milk and food sanitation, the importance of water purification and proper sewage and waste disposal; some knowledge of food poisoning, diseases that can be transmitted from animals to man, control of rodent and insect vectors, protection of water supplies, basic principles of water purification and sewage disposal, garbage collection and disposal, plumbing, ventilation, lighting, housing, physiology, industrial hygiene, home safety, swimming pool sanitation, and vital statistics, all as evidenced by a passing grade in a written examination.
3. Ability to plan and work with people, ability to meet and converse with persons on matters related to public health, ability to organize and direct large group activities, tact, personal initiative and integrity, as evidenced by a passing grade in an oral interview.

S A N I T A R I A N I I

DEFINITION:

Under supervision of the Director of a Local Health Department, to plan, promote, and execute a general environmental sanitation program in a local health department, and to perform related duties as assigned; or, under direction of the Chief of Sanitary Engineer, to execute an environmental sanitation program in special fields as assigned.

EXAMPLES OF WORK PERFORMED:

Makes surveys, inspections, and reports on: private or semi-public water supplies and sewage disposal facilities, dairies, pasteurization plants, private and public schools, camps, hotels, and rooming houses, swimming pools, food handling establishments, mosquito breeding areas, frozen food locker plants, and bedding manufacturers, renovators, and retailers; represents department before local groups concerning environmental sanitation; keeps records and reports; solicits cooperation and assistance of local civic clubs and governmental agencies.

MINIMUM QUALIFICATIONS:

1. (a) Graduation from an accredited college or university with at least eighteen (18) semester hours work in physical natural biologic sciences and/or public health;

OR

FOR PROMOTIONAL PURPOSES ONLY: an equivalent combination of education and experience, substituting one (1) year of full-time paid employment in the field of public health sanitation, or responsible employment in food handling or drug industries, or personal selling for one (1) year of the required education, with a maximum substitution of four (4) years.

(b) Four (4) years within the last eight (8) years of full-time paid employment under adequate supervision in the field of environmental sanitation or public health or sanitary engineering. A successfully completed semester of graduate study in the field of public health, or Sanitary Science, at an accredited college or university may be substituted for one (1) year of required experience with a maximum substitution for two (2) years of experience.

(c) Candidate must not have passed his 41st birthday at the time of his first full-time paid employment in public health work.

2. Knowledge of sanitation practices and procedures, knowledge of the laws, rules and regulations governing health work in the State of Oklahoma, particularly in regard to sanitation and communicable diseases, as evidenced by a practical written examination in these subjects.

3. Ability to plan and to work with people; ability to meet and converse with persons or groups of persons on matters related to public health; tact, personal initiative and integrity, as evidenced by an investigation and a passing grade in an oral interview.

S A N I T A R I A N I I I

DEFINITION:

Under general supervision of the Chief Sanitary Engineer and the immediate supervision of respective program supervisors of sanitation programs, to give consultant service concerning phases of sanitation, to render sanitation services on a state-wide basis and to perform related work as assigned;

OR

in a local health department employing nine or more full-time classified employees, under the supervision of the Local Health Officer to plan, promote and execute an environmental sanitation program; to supervise the other sanitation personnel of the organization and to perform related duties as assigned.

EXAMPLES OF WORK PERFORMED:

Assists local sanitarians to carry out local sanitation programs; makes surveys and reports on sanitation problems; makes epidemiological investigations in outbreaks of communicable disease; makes inspections of dairies and milk producers in compliance with the state's Fluid Milk Market Act; carry out special sanitation work, especially in areas not served by full-time local health departments; confer with public officials and private individuals with regard to technical sanitation problems.

In a local health department, works with the Health Officer to plan a sanitation program, supervise the work of other sanitation personnel in the organization; promotes sanitation programs with public officials and private citizens; trains new sanitation personnel.

MINIMUM QUALIFICATIONS:

1. Graduation from an accredited college or university with at least eighteen (18) hours work in a physical, natural biologic sciences and/or public health;

OR

FOR PROMOTIONAL PURPOSES ONLY: any equivalent combination of education and experience, substituting one year of full-time paid employment in the field of public health sanitation, or responsible employment in food handling or drug industries, or personal selling for one year of the required education with a maximum substitution of four years.

(Continued on page 2. Page 1 of 2 pages.)

OKLAHOMA: CODE: 6285 ADOPTED: 2-1-57 REVISED: 7-1-64

Six years within the last twelve years of full-time paid employment in the field of public health sanitation, industrial, milk, malarial, or water and sewage sanitation. Such experience must have been in a field in which general supervision was exercised by a federal, state or municipal health service. At least three years within the past seven must have been in the field of public health sanitation. A successfully completed year of graduate study in the field of public health or sanitary science at an accredited college or university may be substituted for one year of required experience with a maximum of one year.

A candidate must not have passed his 41st birthday at the time of his first full-time paid employment in public health work.

2. Knowledge of sanitation practices and procedures; knowledge of the laws, rules and regulations governing health work in the State of Oklahoma, particularly, in regard to sanitation and communicable diseases, as evidenced by a practical written examination in these subjects.

3. Aptitude for leadership; ability to plan and work with people; ability to meet and converse with persons or groups of persons on matters related to public health; instructional ability, tact, personal initiative and integrity, as evidenced by an investigation and a passing grade in an oral interview.

E N T O M O L O G I S T

DEFINITION:

Under direction of the Director of the Sanitary Engineering Division to initiate and assist in the development of projects for the control of arthropod-borne and rodent-borne human diseases; to furnish technical guidance in pesticidal application and in environmental sanitation measures for the control of arthropods and rodents; of public health importance under endemic, epidemic, or disaster conditions; to supervise and assist in the training of others assigned to this program; and to conduct epidemiological and other studies and surveys as assigned.

EXAMPLES OF WORK PERFORMED:

Under general supervision, plans, conducts, and evaluates surveys of arthropod, rodent abundance, and of breeding, feeding and resting sites and other related environmental factors; conducts epidemiological studies of arthropod-borne or rodent-borne diseases as assigned; makes recommendations concerning the elimination or abatement of breeding or harborage sites; recommends equipment, pesticides, and techniques of application required for safe, effective distribution of pesticides for the control of arthropods and rodents of public health importance. Provides educational material and other assistance to local health department personnel and others interested in developing and maintaining control programs. Performs routine identifications of arthropod and rodent specimens of public health importance. Maintains complete records of work performed; submits reports and performs other duties as assigned.

MINIMUM QUALIFICATIONS:

1. (a) Graduation from an accredited college or university with a minimum of thirty (30) semester hours of biological sciences or public health, including fifteen (15) semester hours of entomology or invertebrate zoology, and courses in bacteriology and chemistry.

(b) Four (4) years within the last ten (10) years of successful full-time paid employment in the fields of entomology or public health sanitation. College teaching or research at the college level in entomology or related fields or graduate work in zoology or public health may be substituted, at the rate of one (1) year teaching research, or graduate work, for one (1) year of the required experience, with a maximum substitution of four (4) years.

2. Thorough knowledge of current literature and practice in the fields of biology and public health sanitation, and of current procedures and techniques used in the control of arthropod-borne and rodent-borne human diseases; considerable knowledge of current social and economic conditions in relation to environmental sanitation; a general knowledge of public health administration, epidemiology, ecology, bacteriology, and general chemistry.

(Continued on page 2. Page 1 of 2 pages.)

OKLAHOMA: CODE: 2433 ADOPTED: 3-15-55 REVISED:

3. Ability to plan and work with others, dependability, resourcefulness, tact, initiative, integrity, and an aptitude for leadership, as evidenced by a passing grade in an oral interview.

Gina
SDH

L A B O R A T O R Y H E L P E R

DEFINITION:

Under supervision to assist the laboratory technician as required, and to perform related duties as assigned.

EXAMPLES OF WORK PERFORMED:

Opens specimen containers; records specimens, numbers specimens, prepares specimen containers for packing and shipping; packs and ships specimen containers; assists in preparing culture media; cleans and sterilizes glassware; opens suspected rabid animal heads; cares for laboratory animals.

MINIMUM QUALIFICATIONS:

1. Graduation from a standard four-year high school, or equivalent education, with courses in high school science.
2. General knowledge of the elementary principles of high school science, of elementary laboratory methods and equipment, as evidenced by a passing grade in a practical written test.
3. Ability to work with others and to follow instructions; accuracy, speed, dependability, resourcefulness, personal initiative and integrity.

APPENDIX III

TO: OKLAHOMA STATE DEPARTMENT OF HEALTH
ENVIRONMENTAL HEALTH SERVICES
WATER QUALITY CONTROL DIVISION
3400 NORTH EASTERN
OKLAHOMA CITY, OKLAHOMA 73105

OPERATION REPORT OF WATER

GENERAL

DATE	DAY OF WEEK	WEATHER			FLOW			RAW SEWAGE												
		TEMPERATURE °F	RAINFALL INCHES	CLOUD CONDITION	TOTAL FLOW 1,000 GPD	BY-PASSED HRS. OR GALS.	RECIRCULATED 1,000 GPD	SCREENING CU FT./DAY	GRIT CU. FT./DAY	TEMPERATURE °F	P H	SETTLEABLE SOLIDS - ML/L	SUSPENDED SOLIDS - MG/L	B O D 5 DAY 20° C - mg/L			TEMPERATURE °F	DISSOLVED OXYGEN - MG/L	RELATIVE STABILITY-DAYS	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
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REMARKS _____

TOWN: _____

MONTH OF _____

GENERAL DATA

[illegible]

Power Costs _____

Labor Costs _____

Chemicals _____

Repairs _____

TOTAL COSTS _____

I hereby certify
of my knowledg

Signed _____

Title _____

MONTH OF _____ 19 _____

Title _____

Interstore Charge Order

From _____

To _____

Date _____

[illegible]

Received by _____

AN EVALUATION OF WATER POLLUTION CONTROL

IN AND BY THE STATE OF OKLAHOMA

by Walter Derby Johnson

Major Professor: Dr. Jim E. Reese

In the past decade the quality of the environment has increasingly become a topic of discussion and study in the United States. One of the foremost issues concerns the preservation of America's vast water resources. Economic growth since World War II resulted in a heretofore unheard of demand for water. This demand was not just for water but rather for clean water. Unfortunately, the need for quality water at its point of inflow was not matched by concern for its condition at the point of outflow. Water has characteristically been included in the realm of "free economic goods." It has not been realized that water forms a closed **ecological system**. Its total quantity, in various forms, is fixed. Deterioration of its quality has the same effect as depletion of its quantity. Downstream users were being forced to pay higher and higher prices for removal of substances deposited by upstream polluters. The external diseconomies associated with water usage set the stage for outside intervention. This culminated in the passage of the Federal Water Quality Act of 1965. The act required the states to set up specific water quality standards for interstate streams within their boundaries by July 1, 1967. If they failed to comply, standards would be established by the federal government.

This study examines Oklahoma's response to the Water Quality Act. The state is currently engaged in an active program of industrial attraction. Adequate supplies of clean water for production, consumption, and recreation are essential to the success of this program. The status of Oklahoma's water quality efforts will have a direct effect on the state's growth potential.

This work initially describes the evolution of water pollution control laws in Oklahoma on an agency basis from territorial days to the months immediately preceding the passage of the federal law. The restructuring of the legal and organizational framework to conform with the federal requirements is then analyzed. A thorough examination is made of the financial status of the state's water quality control program. Both direct expenditures for personnel, supplies, monitoring and contractual agreements and indirect expenditures from the tax rebate program

are considered, as well as the sources of these funds. Emphasis is then placed upon what these expenditures have purchased in the way of manpower, surveillance, and enforcement. The manpower commitment is examined in light of personnel requirements, time allotments and staff expansion. The actual surveillance and enforcement records of the respective agencies are then compared to the original intent of the program.

Following the investigation of the present system alternatives are advanced for its reorganization. The end objective is to establish a program whereby avoidance of pollution through planning will replace abatement activity, and the improvement of stream quality rather than its maintenance is achieved.