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AN ANALYSIS OF THE PRODUCTION AND DISTRIBUTION
OF ELECTRIC POWER BY THE
GRAND RIVER DAM AUTHORITY

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AN ANALYSIS OF THE PRODUCTION AND DISTRIBUTION
OF ELECTRIC POWER BY THE
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CHAPTER I

INTRODUCTION

The Grand River Dam Authority is unique in that it is the only Oklahoma agency, technically a state owned corporate entity created by Acts of the Oklahoma State Legislature, authorized to build, construct, finance, and operate electrical energy production projects and to distribute the energy produced through contracts with those desiring such energy. The customers of the Authority have been quite diverse in their classification by type and have included industries, municipal and federal public authorities, publicly owned electric utilities of municipalities and cooperatives, and privately owned electric utilities.

The Grand River Dam Authority was the second such agency in the United States and was patterned in part after the Lower Colorado River Authority in Texas which was started a few years prior to the creation of the Oklahoma Authority.

In its improved legal form the Grand River Dam Authority has since served as a basic pattern for other similar projects which particularly include the Santee-Cooper Hydro-Electric and Navigation System in South Carolina and a somewhat similar project, the Corporacion Peruana Del Santa, which is now being developed in Peru.

The Authority is also unique in that it is the only state owned agency that has been authorized by the Congress of the United States to finance and construct a multipurpose dam project. This authorization is described in detail under Markham's Ferry Dam in Chapter II.

After a preliminary discussion of the possible areas of information available on the Grand River Dam Authority, it was decided that the production and distribution of electrical energy was one of the more fundamental studies to be desired. Such an investigation would not only delimit the area to be covered, but would also serve as a pilot study for additional research undertaken in the future. It is recognized that additional studies of the many facets of the Grand River Dam Authority will be necessary to provide a comprehensive picture of the subject as a whole since adequate coverage would be virtually impossible in a single study. Other suggested areas of investigation will be discussed later in this chapter.

The active dam projects of the Grand River Dam Authority serve the multiple purposes of power production,

flood control, and recreational facilities. Some aid is given to navigation in the Arkansas River, and there are some irrigation developments in the geographical area. The Grand River Dam Authority itself is more basically concerned with the production and distribution of electrical energy. Inasmuch as the Authority is a continuing body it was necessary to limit the time covered by the study. The period to be covered includes the production and distribution of energy during the preliminary operations of late 1940 and most of 1941 and the operation of the agency from September 1, 1946 through December 31, 1957. Operations during the war emergency period of November 21, 1941 through August 31, 1946 were under the control of the Federal government. The production of energy at the Pensacola Dam project and its distribution in this period will be reported upon in another study which will be completed at a later date. This study is being made on the Southwestern Power Administration which operated the Pensacola project, along with other similar projects, during this war period.

A historical study was also included when it was discovered that such a history was available only in a piecemeal form which was not normally accessible to the general public. The first part of this history, presented in Chapter II, is essentially based on newspaper reports of the earlier attempts to develop power from the Grand (Neosho) River and continues with the Congressional and Legislative

Acts that later provided for survey studies, construction, and operation of the actual projects. No attempt is made in this study to enter into the many political disputes that evolved nor to justify any side of the publicly owned versus privately owned electric utility question.

In a pilot study of a single feature of a research problem as broad in scope as the Grand River Dam Authority it is only natural that other areas of study have suggested themselves as the research progressed. Such future studies might include: The economic development of the area after the creation of the Grand River Dam Authority; the flood control features and benefits of the Pensacola Dam; the flood control possibilities of the proposed Markham's Ferry Dam; a study of the parks and recreational features that have developed; an evaluation of the project in terms of aid to the development and extension of the Rural Electric Administration; and an analysis of the general classes of individuals who lost their land and homes in the building of the project versus the gain made by others in the economic development that resulted from the project. Another study could be made on public utility interests versus private utility interests. Finally a study of the many political conflicts that have developed in connection with the operation and growth of the Grand River Dam Authority would be most interesting. This list is certainly not exhaustive, but it does indicate the need for future studies.

Research Procedure

The first step in the investigation was an examination of the published material available in public libraries. The libraries searched included: the Geological, Engineering, Business, and Central Libraries of the University of Oklahoma; the Oklahoma State Historical Library in Oklahoma City; and the Oklahoma Library Commission located in the State Capitol Building. As a result of this research, it was discovered that although the physical properties of the Pensacola Dam project were mentioned in several of the histories of the State of Oklahoma, there was little or no mention of the Grand River Dam Authority or its functions. However, a number of pamphlets issued by the Oklahoma State Planning and Resources Board contained information on Oklahoma's efforts to plan for the best utilization of its water resources.

An initial visit to the Water Resources Division of the Oklahoma Planning and Resources Board proved very rewarding. The cooperation of the staff was excellent, and their assistance made possible a complete search of their publications, correspondence, and general files. This work required approximately ten days of direct research. One of the more important sources of information found in this office was a nearly complete file of the annual audit reports prepared by independent Certified Public Accountants on the operations of the Authority. These reports were loaned to the writer for study at his convenience.

The attempt to locate the two missing volumes of these audit reports led to the discovery that one issue was on loan to the State Legislative Council. The other issue was not available at the State Capitol. Copies of these audit reports are also mailed to the Governor's and Attorney General's offices, but these have not been filed properly over the years and except for four random issues on file in the Oklahoma Library Commission all appear to have been lost or misplaced.

The next step was a search of the library of the Oklahoma Publishing Company in Oklahoma City, Oklahoma. Over two weeks of research were required to study the indices, clippings, and files of the Daily Oklahoman and Oklahoma City Times. This library contained a very complete set of clippings on the Grand River Dam Authority and many related subjects, for the years covering the early 1920's to 1940 inclusive, and from 1951 to the end of 1957. The articles issued in the years 1941 to 1950 inclusive, were merely listed on index cards and to obtain details of this material it was necessary to go to the original newspapers of this period.

After a review and cross indexing of the material procured to this date a final outline of the subject was prepared. This outline indicated the areas of information still needed to present a complete picture of the production and distribution of electrical energy by the Grand River Dam Authority.

Two trips to the headquarters of the Authority in Vinita, Oklahoma, one in mid-January, 1958, of five days duration, and the second early in February, 1958, of four days duration, served to complete the file of information except for a few details which were obtained by correspondence and telephone calls.

Organization of the Chapters

As indicated earlier, Chapter II of the study is a presentation of the background and legislation which resulted in the construction and operation of the project now under the control of the Grand River Dam Authority. The arrangement of the material is essentially chronological and is divided into two periods. The first is the attempted development by privately owned interests and the second is the period of planning, construction, and operation by publicly owned sources. This later period is subdivided into sections pertaining to the Pensacola Dam Hydroelectric Project, the Choteau Steam Generating Plant, and the Financing Programs of the Grand River Dam Authority.

Chapter III is an analysis of the annual production and purchase of electrical energy by the Authority. Production is studied in terms of the factors contributing to the output of both hydroelectric and steam generated energy and the amount of energy purchased. In addition the chapter contains an analysis of the average and total costs of each source of energy.

Chapter IV is an analysis of the annual distribution of the electrical energy sold by the Grand River Dam Authority by types and classes of customers.

Chapter V contains the summary and conclusions.

CHAPTER II

HISTORY OF THE GRAND RIVER DAM AUTHORITY AND RELATED PROJECTS

This is man's deed
Glorious and eternal
These towers and walls
Remember
Dreams of young men
Magnificent in hope
The long and crowded hours
When patient skill
Daring to create
Formed and shaped the plan
And labor's heavy round
Brave constancy of toil
Making the vision real
The plan complete¹

These immortal words are cast in a bronze plaque imbedded in concrete that is a part of the "longest multiple arch dam in the world."² The Pensacola Dam stems the flow of the Grand River and stretches between the towns of Langley and Disney in northeastern Oklahoma.

. . . In 1938, the plans for the erection of the dam on Grand River were completed, and a loan of \$20,000,000 from the Federal Government was secured for carrying on

¹Plaque at the Pensacola Dam.

²Brochure prepared for Pensacola Dam dedication ceremony.

the project. The longest multiple-arch dam in the world--one mile long and 150 feet high--was completed, the gates of the dam were closed, and the storage of water began in March, 1940.³

The lake which was formed on Grand River was later officially named, by an Act of the Eighteenth Legislature of the State of Oklahoma on May 12, 1941, the "Lake O' the Cherokees,"⁴--though perhaps it is more commonly referred to as Grand Lake--and was the largest lake in the southwest at the time of its construction.

The Neosho and Spring Rivers act as the main tributaries and provide a watershed that comprises a drainage area of 12,660 square miles, of which 6,285 are in Kansas, 2,995 are in Missouri, 2,965 are in Oklahoma, and 415 are in Arkansas. The watershed has a length of about 260 miles and a maximum width of about 100 miles near the Kansas, Oklahoma line where Spring and Elk Rivers contribute their waters. The stream length of the Neosho River is approximately 460 miles and is headed in central Kansas, Morris County, and flows in a general southeasterly direction to near the town of Wyandotte, in northeastern Oklahoma, where it is joined by Spring River. It is at this point that the stream takes on the name, Grand River, which it carries until it junctions with the Arkansas River near Fort Gibson, Oklahoma.

³Muriel H. Wright, Our Oklahoma (Guthrie, Okla.: Cooperative Publishing Co., 1949), p. 305.

⁴Session Laws of Oklahoma (1941), Title 82, Ch. 8b, p. 475.

The Grand River Dam Authority is limited to the control of the Pensacola Dam project, the Choteau Steam Generating Plant, the proposed Markham's Ferry Dam project, and a questionable legal claim to the headwater rights at the Fort Gibson Dam project.

Private Development Attempts

Now that the geographical setting of the dam has been discussed, it would be well to go back to the early history of the Grand (Neosho) River basin.

The area comprising the Neosho basin was probably first visited by white man when Father Padilla came as a missionary to the Quivirans about 1542. There is no record of other white men having set foot in this territory until the visits of the French fur traders nearly 200 years later. Through the Louisiana Purchase in 1803 this territory became a part of the United States and was visited by some of the expeditions sent out to explore the newly acquired land. Council Grove became an important post on the Santa Fe trail following the treaty with the Indians in 1825.⁵

As soon as the basin area began to be settled by the white man the need for an adequate reliable water supply became apparent and, as growth of the area came about, these needs became increasingly important.

The water problems of the Neosho basin are brought about by the extreme variations in the available water supply. On an average there flows from the Neosho river basin each year about one and one-half million acre-feet of water. While this volume is almost one hundred times the combined maximum demand of all the municipalities

⁵Kansas State Board of Agriculture, Report on the Progress on a State Plan of Water Resources Development by the Division of Water Resources (Topeka, Kansas: Kansas State Bd. of Agri., December, 1942), LXI, No. 252, 11.

now using the river as a source of supply, there are times when these same municipalities suffer severely from lack of available water.⁶

That there was a need in the Grand River area for a controlled and adequate supply of water and the power that could be produced from this water, is recorded in studies of Oklahoma which report "The idea of harnessing the Grand River, which is fed by streams in Kansas and the Missouri Ozarks, was first thought of in 1891,"⁷ and "Such a project (Pensacola Dam) had been talked about as early as 1907."⁸

Apparently, however, there had been dreams and even constructive thoughts on the harnessing of the river long before this as a state newspaper reported at the time of the start of construction on the Pensacola Dam in 1938:

The idea for the dam was planted in the mind of Henry Holderman, of route 3, Vinita, as a boy by his father, Marion Holderman. Today, cursed by many, classed as a 'nut' by others, Henry Holderman retains not one item from which he could collect anything for his idea. Penniless, his home mortgaged beyond recovery, he does not even retain the rights to the river bed, obtained by him from a representative of the Cherokee tribe, a claim branded as worthless by those in authority; a claim which has passed into the hands of another, who will, in all likelihood, make the fact known before the dam is completed; a claim that is worse than worthless to Henry Holderman.

A victim of his own carelessness, Henry Holderman, now nearing 70, may realize his life's ambition, but he will be forgotten, in fact is already forgotten, before that time.

⁶Ibid., p. 18.

⁷Ruth Kent et al., Oklahoma, A Guide to the Sooner State (Norman, Okla.: University of Oklahoma Press, 1957), p. 238.

⁸Wright, loc. cit.

It was Holderman's idea. He spent thousands of dollars trying to get it built through private capital, and failed. The men who worked with him, many of whom are now living, are forgotten, although several times they stood on the threshold of realization; were almost in a position to become wealthy through its construction.⁹

Perhaps one of the best reports of the first true comprehension of a dream to dam the Grand River is recorded in a newspaper article quoting H. H. Furguson, Public Works Administration project engineer, at the time of completion of the Pensacola Dam:

It was back in 1892 that Henry Holderman, then a young man riding the cattle range for his father, first saw the potential power possibilities of a dam across the Grand river. The realization came to him one summer day when, pulling up his horse on the edge of a bluff overlooking the river, he sat in contemplation of its ominous flood 200 feet below.

Slowly, in his mind's eye, he painted the picture of a giant barrier stretching across the two edging bluffs, and he could see the turbulent water below crashing against the barrier, hurtling across the valley, then flooding back in defeat over the sprawling lowlands to form a vast inland lake.

On the banks of his imaginary lake he saw a great power plant rise, and, with its completion, he saw new cities and new industries spring up.

That was the vision, and Holderman in time imbued all northeastern Oklahoma with his enthusiasm.¹⁰

The first recorded attempt of action to finance such a project that the writer has been able to discover, was reported in a feature article on the original townsite of Bernice, Oklahoma, which was being buried as the waters of the Lake O' the Cherokees rose after the completion of the dam.

⁹Muskogee Daily Phoenix (Muskogee, Oklahoma, 10-2-38).

¹⁰Tulsa World (Tulsa, Oklahoma, 2-4-40).

They recall the heart-breaking struggle of Henry Holderman who lives on the same Ketchum farm where he first conceived the idea of the huge power project.

In 1896 the Cherokee managed to interest Eastern capitalists in plans prepared by an engineer friend. Indian Territory law prohibited property owned by white men, so the project was permitted to die.¹¹

In 1899, after traveling over most of the world and having been instrumental in aiding in the development of water-power projects in Europe, Holderman returned to his homeland and again decided that there should be a large dam across the Grand River near his old home.

With two young engineers who knew their business, Holderman started in a little houseboat down the Neosho river, putting in at Iola, Kan., and drifting from there to the mouth of the Grand river near Fort Gibson. All along the route they surveyed the river, obtaining facts and figures on the fall, the speed, and testing all the likely locations for dam sites where power might be generated.

At the place which Holderman decided the dam should be built they spent about two weeks surveying the banks, testing the bluff sides, seeking solid footing for a dam, and convinced themselves that it was practical. Trees still show blazings where they marked them and the rocks were marked in such a manner that they still disclose the site of the first survey.¹²

Another dreamer of the development of power from a dam on Grand River began to formulate active plans shortly after this survey and the results of his actions are recorded as follows:

And now that the project at long last has won its way through Congress and been approved by President Roosevelt, longtime residents of the Grand River county are reviving fond recollections of 'Uncle Bob' Knight, a part-Cherokee,

¹¹Daily Oklahoman (Oklahoma City, Oklahoma, 10-17-37).

¹²Ibid., 5-19-35, Sect. D, p. 1.

who first envisioned the huge project and had so much faith in it he left his home at Vinita and built a house on the river's banks, where he spent the rest of his life.

Robert Dew Knight knew, prior to 1907, that some day a dam would be built on Grand River--a great plant that would generate power and serve to irrigate the potentially rich lands rising out of the valley in northeast Oklahoma.

Mr. Knight was an educated man and knew how to interest men with money in his dream. One of these men was Cyrus S. Avery of Tulsa, and together they acquired a charter indorsed as "Articles of Agreement and Incorporation of the Grand River Power Co. of Vinita, Indian Territory.

Soon afterward the Westinghouse Electric Company became interested, investigated the site, found it practicable, and agreed to take over the holdings of the company and build the huge dam.

Unfortunately, the panic of 1907 overtook the company. It became involved in fiscal difficulties, the corporation at Grand River lapsed. The project, for a time was forgotten by most.¹³

Many plans and reports were made by engineers and investigators in this period. These include those by H. Von Schon, 1905; T. H. Creden, 1906; C. E. Nightingale, 1909; H. S. Hackbrech and H. C. Hoagland, 1910; along with those of W. H. Rosecrans, J. Wm. Link, and J. N. Gilbert in 1912.

The next proposal to construct the project was in the period prior to World War I.

Holderman first interested officials of the old M. O. & G. railroad, and they went so far as to lay the surveys and the plans before David Lloyd George in London, and he agreed to underwrite it, but about that time the World war broke out and it fell again.¹⁴

In 1920 Holderman, with T. L. Rippey, Royal D.

¹³Ibid., 10-17-37.

¹⁴Ibid., 5-19-35.

Salisbury, C. H. Fenstermacher, W. C. Collins, A. C. Peace, and F. F. Farbro, organized a new company known as the Grand River Hydro-electric Company.

They went to Chicago, arranged to finance the dam project, which then was to cost about \$20,000,000; but when the time came to close the deal it was found that the financiers were about to issue \$40,000,000 in bonds, and Holderman and his associates turned it down.¹⁵

Though discouraged they continued to attempt financing and later New York and Montreal bankers gave consideration to Holderman's claims, but finally decided against the project.

Then followed a series of events in which Holderman's company was active: On June 19, 1922, they filed an application with the State Engineer for a permit to appropriate the entire flow of Grand River in Mayes County, Oklahoma; on September 22, 1922, the State Engineer approved and endorsed the permit; on June 18, 1923, the company filed a new application to appropriate the entire flow of Grand River for the purpose of generating electrical energy at three different points on the river; on June 1, 1924, the State Engineer approved and endorsed the new permit.

In the summer of 1924, a T. B. Waddell made a trip down the Grand River from the mouth of Spring River looking for dam and reservoir sites and reported on August 2, 1924, that he had found four points on the stream where low head plants might be built, and that, while further investigation might prove them interesting, conditions in general were unfavorable.

¹⁵Ibid.

However, late in 1925 both the Grand River Hydro-electric Company and the Public Service Company of Oklahoma made requests for the right to harness the water power of Grand River. The Grand River Hydroelectric Company's time to construct a 159 foot dam near Ketchum had expired due to a two and one-half year statutory limitation requiring completion of one-fifth of the work on such a project within this period and the Public Service Company of Oklahoma applied for a permit to build a 40 foot dam above the other site. The State Drainage and Irrigation Commission reported that the small dam would be a waste as the overall plan of the Grand River Hydro-electric Company was to eventually develop the entire river, but no permits or extensions were issued.

In 1926, J. F. Robinson, a millionaire mine owner and operator in the Miami, Oklahoma district, applied to the State Drainage and Irrigation Commission for a permit to construct four dams on Grand River, one 150 feet high and the other three to average about 40 feet in height. These dams would generate 274,000 horsepower of electricity, insure a six foot channel for navigation of the Arkansas River from the mouth of Grand River to the Mississippi River, as well as preventing future flood damage. A permit was issued to Robinson for this work on October 5, 1926, by the State Drainage and Irrigation Commission.

In November 1927, the permit was extended for another year after \$100,000 had been spent on the completion of the preliminary data and survey. However, Robinson's health began to fail and, after encountering difficulty in financing his project, he decided to transfer his interests to a Wash Hudson and his associates. This group of Tulsa financiers received approval of the transfer, by the State Drainage and Irrigation Commission, in November, 1928. This organization of financier-developers were later incorporated as the Grand-Hydro Corporation and the original Robinson permit was transferred, for the third time, with the approval of the State commission in November, 1929. Other permits for extensions of time limits were later requested and approved for the Grand Hydro Corporation.

At the time of the first transfer of the permit from Robinson there had been a strong denial that Insull interests were behind this latest financing attempt. They later were involved and, no doubt, would have completed the project except that "on the very day the initial check to cover land purchases was received, the Insull empire collapsed."¹⁶

In later years, after the creation of the Grand River Dam Authority, which will be described in detail later in this chapter, the Grand Hydro Corporation filed suit against the Authority for payment for water rights presumably

¹⁶Tulsa World, loc. cit., 2-4-40.

granted to the Company by the State but a court decree held:

. . . that if Grand Hydro acquired any rights under its said approved application, it has transferred and conveyed the same to the Grand River Dam Authority by virtue of its assignment of January 10, 1938.¹⁷

Another suit concerning Grand Hydro Corporation was in condemnation proceedings filed by the Authority to determine the proper payment for land confiscated and used by the Authority in the construction and operation of the facilities at Pensacola Dam.

A final judgement for \$800,000 in favor of Grand Hydro was affirmed by the Oklahoma Supreme Court¹⁸ in 1947. After a deduction from the \$800,000 judgement of \$281,802.74, which had been deposited with the court by the Authority, this left a balance of \$518,197.26, plus interest at the rate of 6 percent from January 17, 1940, due the Company from the Authority. On May 17, 1949, the Authority purchased all the capital stock of Grand Hydro Corporation for \$650,000. Following the purchase the company released its claim against the Authority and was then liquidated.¹⁹

¹⁷City of Tulsa v. Grand-Hydro, Dist. Court of Mayes County, Decree Number 5263.

¹⁸Grand River Dam Authority v. Grand-Hydro, 200 Okla. 157 (1947).

¹⁹Robt. E. Garnett & Co., Certified Public Accountants, Audit Report for the Year Ended December 31, 1949; Grand River Dam Authority, Vinita, Oklahoma (Tulsa, Oklahoma, 1950) p. 6-7.

Note. Inasmuch as the Audit Reports on the GRDA have had several authors, as explained in Chapter III, future reference to these reports will be as follows: Audit Report, 19--, p. --.

Public Development

The fundamental Federal Act in regards to the conservation and use of water in the United States was the Federal Water Power Act of 1920.²⁰ This Act provided for the Federal Power Commission and gave it, among other powers, the power to issue 50 year licenses for the improvement, navigation, and development of water power.

Later, various studies were authorized and after surveys the following reports were issued:²¹ (1) The U. S. Army Engineers, in House Document Number 308, reported studies which included the feasibility of power projects at Pensacola, Markham's Ferry and Fort Gibson on the Grand River in Oklahoma; (2) the President's Committee on Water Flow, in House Document Number 395 of June 4, 1934, reported on reservoir projects to be included in their comprehensive plan for flood control, navigation, irrigation, and power. These projects included those at Pensacola, Markham's Ferry, and Fort Gibson whose purposes would primarily be for flood control but would have secondary usefulness for power production; (3) the Mississippi Valley Committee of the Public Works Administration included the same three dams in their tentative plan for river development with power and

²⁰U. S., Statutes at Large, XLI, Part 1, p. 1063-1077.

²¹Oklahoma State Planning Board, A Compendium of Maps and Charts Pertaining to State Planning in Oklahoma. State Capitol, Oklahoma City, Oklahoma., 1936 p. 98-101.

recreation as the basic purpose for development. The Pensacola Reservoir was classified as a Class A project while the Markham's Ferry and Fort Gibson Reservoirs were classified as Class B projects.

The Flood Control Act of 1936²² authorized and directed the Secretary of War "to cause preliminary examinations and surveys for flood control . . . at Pensacola Reservoir, Oklahoma." In 1938, this authorization was expanded in Public Law Number 761²³ to provide funds for the flood control part of approved multipurpose dams.

Public Law Number 597²⁴ granted to the Authority all United States and Indian lands in Ottawa, Delaware, Craig, and Mayes Counties below an elevation of 750 feet above mean sea level as was required for the Grand River Dam Reservoir.

Public Law Number 228, approved August 18, 1941, further expanded the Act of June 28, 1938, above, by a modification "to include the reservoirs in the Grand (Neosho) River Basin in Oklahoma . . ."²⁵

The Grand River Dam Authority was created when Governor Marland signed into law on April 26, 1935, Senate Bill Number 395.²⁶ This Act created a Conservation and Reclamation

²²U. S., Statutes at Large, XLIX, Part 1, p. 1570-1597.

²³Ibid., LII, Part 1, p. 1215-1226.

²⁴Ibid., LIV, Part 1, p. 303.

²⁵Ibid., LV, Part 1, p. 638-651.

²⁶Session Laws of Oklahoma (1935), Ch. 70, Art. 4, p. 350-358.

District which included the following Oklahoma counties: Adair, Cherokee, Craig, Creek, Delaware, Mayes, MacIntosh, Muskogee, Nowata, Okmulgee, Osage, Ottawa, Rogers, Sequoyah, Tulsa, Wagoner, and Washington; however, Osage, Rogers and Washington Counties were later removed from the District by House Bill Number 3.²⁷ The Authority was empowered as a governmental agency to control, store, preserve, and distribute the waters of the Grand River and its tributaries for irrigation, power and other useful purposes; to reclaim and irrigate the arid and other lands needing irrigation; and to conserve and develop the forests, water, and hydro-electric power of the State of Oklahoma. It was also given power to borrow money by issuing tax exempt bonds, at an interest rate not to exceed six percent per annum, to enable the Authority to build and operate the proposed project. However, the aggregate principal amount of these bonds was limited to \$15,000,000.00.

Administration of the Authority consisted of a nine member Board of Directors with the Governor, the Attorney General, and the Commissioner of Labor each appointing three members. The term of the Authority was to expire July 1, 1937 unless extended and headquarters of the district was designated as Vinita, Oklahoma, but the location was subject to change by the Directors.

²⁷Ibid., (1936-1937) Ch. 70, Art. 2.

The three directors named by Governor Marland were: R. P. Colley, Tulsa, for a three year term; George W. Schaefer, Vinita, for a two year term, and E. H. Lightner, Claremore, for a term expiring January 1, 1941. State Labor Commissioner Murphy named the following directors: Guy Crouse, Wagoner, for a term expiring January 1, 1937; Olin Perkins, Henryetta, for a term expiring January 1, 1939; and M. Duncan, Muskogee, for a term expiring January 1, 1941. Mac Q. Williamson, attorney general, did not designate terms for, but appointed J. A. Robinson, Miami; Owen Butler, Grove, and J. Howard Langley, Pryor.

Pensacola Dam Hydroelectric Project

After an opinion was obtained from the Attorney General as to whether the Oklahoma State Planning Board could legally make a lump sum contract with J. M. Maurer, to be paid out of the then present fiscal year general funds, for a survey and economic study of the dams to be constructed by the Grand River Dam Authority, the Directors of GRDA presented a request for financial assistance to the Oklahoma State Planning Board. This request was approved by the members of the Board on May 9, 1935²⁸ and on June 7 they approved a resolution to enter into a contract with Dr. James M. Maurer, from the staff of the University of Tulsa, to provide the information needed by the Grand River Dam

²⁸Minutes of Meeting, May 9, 1935, Oklahoma State Planning Board, Oklahoma City, Oklahoma.

Authority.²⁹ The more important features of this contract were as follows:

. . . For the consideration of \$5,000.00 to be paid by the Oklahoma State Planning Board, Mr. Maurer agrees to make an economic survey and study with particular reference to consumer demand for electrical energy which may be produced by water power in the following counties in Oklahoma: . . .

. . . Survey to be completed on or before December 17, 1935, and agrees to supplement the compilation with studies and suggestions at anytime when requested by the party of the first part. In the event the said survey is completed before December 17, 1935, the party of the second part agrees to expand such survey to include a study of natural resources and possibilities of industrial development in counties above named, if such expansion is desired and requested by Oklahoma State Planning Board . . .³⁰

Dr. Maurer proceeded to go to work on the agreement and, after organizing a staff which was assigned to the various phases of work required, proceeded to Washington, D. C. to confer with officials there.

A preliminary report on the survey was submitted early in July and the final report completed in August, 1935. The Maurer report also served as the foundation for a report submitted by the Water Division of the National Resources Board to President Franklin D. Roosevelt. Some of the more important conclusions presented in these reports were as follows:

²⁹Ibid., June 7, 1935.

³⁰Contract between Oklahoma State Planning Board and James M. Maurer, June 17, 1935.

1. The Pensacola project has flood control, water supply, and recreational benefits which are positive and justify Federal aid.

2. The project is economically feasible and desirable from a stand point of power production alone.

3. It is expected that the power developed at Pensacola will be absorbed gradually as business returns to normal and as rates are lowered.

4. The feasibility of the project is well established on the basis of a demand by present users and without considering any demand from new industries, new commercial activity, active promotion of rural electrification and the expected increase in demand through air conditioning.³¹

The Act³² creating the Grand River Dam Authority in 1935 prohibited the Authority from engaging in the retail marketing of hydroelectric power and restricted the sale to wholesale purposes only. This prohibitive feature, which made the project ineligible for Federal cooperation, was removed when the Sixteenth Legislature (1937) amended the law by House Bill Number 3,³³ which on its approval on January 28, 1937, gave the Authority the power to retail hydroelectric power. This Act cleared the way for Federal participation in the project.

In Senate Bill Number 299,³⁴ the legislature extended the term of the Authority to July 1, 1939 and indefinitely thereafter if the project had been commenced by that date.

³¹James M. Maurer, An Economic Survey of the Pensacola Hydro-Electric Project, September, 1935.

³²Session Laws of Oklahoma (1935), Ch. 70, Art. 4, p. 350-358.

³³Ibid., Ch. 70, Art. 2, p. 481.

³⁴Ibid.

At the Governor's request a fund of \$7,000.00 was set aside by the Oklahoma State Planning and Resources Board on August 3, 1937 to be used in making further investigations and securing additional information that might be needed relative to the Grand River hydroelectric project. Actually, only \$1,176.25 was needed and spent prior to the receipt of the Federal grant for the project.

On September 16, 1937, Grand River Dam Authority actually became a reality when President Roosevelt approved a twenty million dollar Public Works Administration allocation for a large hydroelectric project near Pensacola, on Grand River, in northeastern Oklahoma. Of this allocation \$8,437,000.00 was in the form of a grant and \$11,563,000.00 was a loan to the Grand River Dam Authority.

One of the prime purposes behind the Public Works Administration grant and loan was, of course, to offset some of the unemployment that was still stalking the entire nation. Those concerned with unemployment in Oklahoma felt that most of the labor used in the project should be from Oklahoma, but this could not always be so, even on local jobs, as many of the contractors were from other states and brought in their regular crews. The shortage of Oklahoma labor with the special skills needed also required the importation of many workers from other areas. However, the project did serve in the employment of many who would otherwise perhaps have been unemployed and on relief:

An army of men, reaching a maximum enrollment of about 3,000, built the project. Behind those in the front rank, however, were other battalions not visible from vista houses erected by the authority. They worked in forests providing lumber; in mines and steel mills turning out the pipe, piling, steel for the cofferdam, reinforcing, and hundreds of other items. Dozens of foundries whose fires otherwise might have been banked were busily engaged in making their share of expensive equipment to be used at the damsite; men worked on farms producing food for the workmen. At least one railroad was re-vitalized through the medium of unprecedented revenue from materials hauled over the line.³⁵

The formal offer and the terms under which the Authority could spend the money were sent to the Authority in October, 1937. These terms included an agreement by the Authority that the construction would meet Public Works Administration standards, all necessary state and national laws were to be complied with, and a limitation on the date construction would be started. A test suit, of the 1935 Act creating the Grand River Dam Authority and subsequent amendments, was requested by Harold L. Ickes, Secretary of Interior and Director of the Public Works Administration. This suit was to especially determine, among other items, the legality of using revenues from the hydroelectric plant, irrigation water, and any other revenues in the retirement of the bonds to be issued by the Authority.

On October 16, 1937, the Directors of the Authority accepted the stipulations of the Public Works Administration set up in connection with the offered grant and loan. In

³⁵Daily Mayes County Democrat, Pryor, Oklahoma, November, 1940--Anniversary, Historical and Progress Edition, Sect. E, p. 1.

November, with the approval of the Public Works Administration, R. V. L. Wright, of Avalon, California, was chosen general manager of the Grand River Dam Authority.³⁶

To satisfy the Federal Emergency Administration of the Public Works Administration that the Grand River Dam Authority was constitutional and that it was vested with the power to issue revenue bonds under the loan and grant agreement with the Government and that it might construct the Pensacola Dam and hydroelectric plant on the Grand River as well as acquire the rights to use the water of the Grand River, on February 1, 1938 the Supreme Court sustained the Authority's right to exercise the powers with which it was vested.³⁷ This gave absolute right to control, store, and use the waters of the Grand River for the purpose of the project except for specified amounts allocated to the town of Fort Gibson and the cities of Muskogee and Wagoner.

Early in 1938, the Public Works Administration advanced \$65,000.00 to the Grand River Dam Authority and shortly thereafter bids were advertised on the first two projects of the dam. These contracts were let as follows: Contract Number 1, for the removal of 300,000 cubic yards of earth and stone excavation on the two spillways, was let to M. E. Gilloiz, Monett, Missouri, and Contract Number 2,

³⁶Daily Oklahoman, November 23, 1937.

³⁷Sheldon v. Grand River Dam Authority et al., 182 Okla. 24; 76 P. 2d 355 (1938).

for core drilling to bed rock to determine the structural strength of the rock strata for the dam foundation, was let to Sprague and Henwood, Scranton, Pennsylvania.

A second advance grant, in the amount of \$226,000.00, was received from the Public Works Administration in March, 1938 and several preliminary contracts were let in the months following.³⁸

On June 28, 1938 the contract for the main dam and power house was let to the Massman Construction Company, Kansas City, Missouri for \$9,332,960.00 with the stipulation that the work was to be completed by July 11, 1939. This contract necessitated the largest construction bond ever to be written in the United States up to that date and required 18 companies for its execution.³⁹

The dam and spillways make up, as previously stated, the longest multiple arch dam ever undertaken up to that time. It is 6,585 feet long, 150 feet high, 200 feet wide at the base, and is composed of a series of 52 buttresses, each 24 feet wide, and 51 arches, each 60 feet wide. There are two spillways, each of which is 860 feet long and contain 21 Taintor gates. These gates are each 25 feet high and 36 feet long in the main spillway and 15 feet high and 37 feet long in the east spillway.

³⁸Audit Report, 1938, p. 2.

³⁹Daily Mayes County Democrat, loc. cit.

At full capacity level, of 755 foot elevation, the surface area of the lake is 60,000 acres and the capacity is 2,200,000 acre-feet. At the power pool elevation of 745 feet the surface area is still 46,500 acres and the capacity is 1,680,000 acre-feet. At this lower level the length of the pool is 60 miles and it has a shoreline length of more than 1,000 miles.

Senate Bill Number 139 of 1939⁴⁰ amended the original act which created the Grand River Dam Authority by changing the number of members on the Board of Directors from nine to five with the Governor to appoint all members. After the passage of Senate Bill Number 139 on April 8, 1939, the Governor appointed the following to serve as the new Board of Directors: R. P. Colley, Tulsa; M. Duncan, Muskogee; H. Eichenberger, Okmulgee; Ray McNaughton, Miami; and Earl Ward, Pryor. Along with a number of other administrative changes in 1939, R. V. L. Wright resigned as general manager and was temporarily replaced by R. L. Davidson, general counsel, who served as acting general manager until the appointment and approval of Thomas P. Clonts as general manager in February, 1940. At the expiration of the term of any of these Directors provision was made in the Act for the Governor to appoint a new director whose term would be for six years.

⁴⁰Session Laws of Oklahoma (1939), Ch. 70, Art. 2, pp. 559-561.

Other changes in the Act pertained to oaths to be taken by and fees and expenses to be paid to the members of the Board of Directors. The Directors were also limited to the single position as Director and could not hold any other position concurrently with the Grand River Dam Authority.

Another change was in House Bill 653⁴¹ which authorized the District to issue up to \$25,000,000.00 in revenue bonds bearing interest at not to exceed a six percent rate. Ten million dollars of this amount was to be used in the construction of dams and transmission lines at or near Markham's Ferry and Fort Gibson.

The Federal Power Commission issued its License Number 1494 on July 26, 1936 to the Authority. This license specified that the top of the power pool was to be at elevation 745 feet and that the flood control pool was to be above that elevation. The dam was originally constructed to provide for the storage of water to elevation 755 feet; however, the Grand River Dam Authority was not required to purchase reservoir lands above elevation 750 feet, and consequently the initial development only provided for flood control storage between elevations 745 and 750 feet.

On July 26, 1940 the Public Works Administration offered to increase its original grant of \$8,437,000.00 to \$10,050,000.00 and its loan of \$11,563,000.00 to \$12,700,000.00.

⁴¹Ibid., (1939), Ch. 70, Art. 3, pp. 561-565.

This offer was accepted by the Board of Directors of the Grand River Dam Authority on August 13, 1940.⁴² On September 29, 1940 the completion of the project was announced and power delivery was started on a local basis (see Table 15), but the final construction work on transmission lines was needed before the power project could be put into full operation.

The Public Works Administration loan and grant agreement was amended on August 2, 1941 and increased the provisions to a grant of \$11,113,636.00 and a loan of \$14,000,000.00. This increased the funds allotted for the construction of the project from \$20,000,000.00 to \$25,113,636.00.

As the year 1941 progressed, the War in Europe became more critical and defense requirements in the United States necessarily continued to expand. Finally, at the request of the Federal Works Agency, the Chairman of the Federal Power Commission wrote a letter⁴³ to President Roosevelt stating: that the needs of the War Department required the full use of the Pensacola Dam facilities; that the Authority was in financial difficulty; and suggested that the President should put the project under Federal operation by using his authority under Section 16 of the Federal Power

⁴²Minutes of Board of Directors Meeting, August 13, 1940, Grand River Dam Authority.

⁴³Letter from Ieland Olds, Chairman, Federal Power Commission to President Franklin D. Roosevelt, Washington, D. C., November 12, 1941.

Act which is quoted as follows:

Temporary Use by Government of Project Works for National Safety; Compensation for Use--when in the opinion of the President of the United States, evidenced by a written order addressed to the holder of any license hereunder, the safety of the United States demands it, the United States shall have the right to enter upon and take possession of any project, or part thereof, constructed, maintained, or operated under said license, for the purpose of manufacturing nitrates, explosives, or munitions of war, or for any other purpose involving the safety of the United States, to retain possession, management, and control thereof for such length of time as may appear to the President to be necessary to accomplish said purposes, and then to restore possession and control to the party or parties entitled thereto; and in the event that the United States shall exercise such right it shall pay to the party or parties entitled thereto just and fair compensation for the use of said property as may be fixed by the commission upon the basis of a reasonable profit in time of peace, and the cost of restoring said property to as good condition as existed at the time of taking over thereof, less the reasonable value of any improvements that may be made thereto by the United States, and which are valuable and serviceable to the licensee.⁴⁴

The above letter to the President was followed by a War Department memorandum⁴⁵ to President Roosevelt which concurred with the recommendations of the Federal Power Commission.

On November 19, 1941, President Franklin D. Roosevelt issued Executive Order Number 8944 which included the following:

Pursuant to section 16 of the Federal Power Act, I hereby order and direct that the project now being constructed, maintained, and operated by you in the State

⁴⁴U. S., Statutes at Large, XLI, Part 1, p. 1072.

⁴⁵Memorandum from Robert P. Patterson, Under Secretary of War to President Franklin D. Roosevelt, Washington, D. C., November 13, 1941.

of Oklahoma under a license (Project No. 1494) held by you under the Federal Power Act, be surrendered to, and entered upon, taken possession of, managed, and operated by the Federal Works Administrator, acting for and on behalf of the United States, through such person or persons as he may designate, for the reasons, the purpose and the time, and upon the conditions set forth in the Executive Order issued by me simultaneously with this order, a copy of which Executive Order is attached as a part of this order.

NOW, THEREFORE, by virtue of the power vested in me by the Constitution and the statutes of the United States, and particularly by section 16 of the Federal Power Act, is hereby ordered as follows:

1. The Federal Works Administrator, acting for and on behalf of the United States, through such person or persons as he may designate, is hereby authorized and directed immediately to enter upon, and take possession of, manage, and operate, the project above mentioned for the purpose of generating and supplying power for the manufacture of explosives or munitions of war or otherwise necessary to the safety and defense of the United States, and for other purposes involving the safety of the United States.

2. The Federal Works Administration shall retain possession, management, and control of said project until such time as it shall appear to the President that further retention of the project by the United States is unnecessary for the accomplishment of the above stated purposes, and thereupon, shall restore possession and control of the project to the party or parties then entitled thereto.

3. The Federal Works Administrator shall pay just and fair compensation for the use of the property of the Authority as may be fixed by the Federal Power Commission upon the basis of a reasonable profit in time of peace, and shall also pay the cost of restoring the property to as good condition as existed at the time of taking over thereof, less the reasonable value of any improvements that may be made by the United States and which are valuable and serviceable to the licensee.

4. The Federal Works Administrator may employ, without compliance with the requirements of the Civil Service Rules, such personnel as may be necessary to carry out the provisions of this order, and may exercise any existing contractual or other rights of the Authority, and take such other steps as may be necessary to carry out the provisions of this order.

Under the requirements of the Executive Order, Douglas Wright, acting director of the power division of the Public

Works Administration, was designated as the Administrative representative of the Federal Works Administration to assume control of the remaining construction and the operation of the Grand River project on November 21, 1941.

An agreement was reached with the Federal Works Agency on December 16, 1941 which provided for a payment of \$1,000.00 per month, as an advance payment or rental due the Authority for the use of the project. This agreement was made with the understanding that the payments would be used to maintain the essential corporate functions of the Authority and the prosecution and defense of litigation in which the Authority was or might become involved.⁴⁶

In December, 1941 the War Department, under provisions of Public Law Number 123,⁴⁷ initiated the acquisition of additional land to permit the storage of flood waters in the Pensacola reservoir to an elevation of 755 feet. In compliance with a directive issued by President Roosevelt on February 19, 1943 the acquisition and control of this additional land was transferred to the Federal Works Agency.

Senate Bill Number 88 of the Nineteenth Legislature, which was approved on April 12, 1943, amended the provisions of 82 Oklahoma Statutes 1941, to read as follows: "The Governor is hereby authorized and empowered to remove any

⁴⁶Audit Report, 1942, p. 3.

⁴⁷U. S., Statutes at Large, LIX, Part 1, p. 321.

or all of the members of the board of directors of the Grand River Dam Authority."⁴⁸

On July 30, 1943, the President issued Executive Order 9366 which transferred the operating control of the Pensacola project, including the additional land acquisition above, from the Federal Works Agency to the Department of Interior. The actual operation of the project was assigned to the jurisdiction of the Southwestern Power Administration which continued its operation in conjunction with power projects at Norfolk and Denison Dams until the Pensacola project was returned to state control.

The monthly payment agreement between the Federal Works Agency and the Grand River Dam Authority was amended on January 3, 1945, to provide that, effective January 1, 1945, the monthly advances to the Authority were to be increased from \$1,000.00 to \$3,500.00 so as to enable the Authority to make an investigation in conjunction with the Department of Interior on the following questions: (a) the government's liability for rental of the Pensacola project during the period of government control, (b) a determination of the Authority's obligation to the government in respect of any improvements to the project constructed by the government during the period of government control, (c) the respective obligations of the United States and the Authority

⁴⁸Session Laws of Oklahoma (1942), Title 82, Ch. 8, p. 258.

regarding items due from the Authority to the government under its revenue bond issue, and (d) the question of depreciation on Authority-owned property during the period of government control.

The January 3, 1945, agreement, above, was amended again on December 1, 1945 to provide a payment of \$6,500.00 to the Authority for the months of December, 1945 and January, 1946, and the sum of \$7,500.00 each succeeding month until the Pensacola Dam project is returned to the Authority by the government. Part of this increase was to further the investigation above, while the balance was to aid in building up an organization that would be capable of taking over and efficiently operating the project upon its release by the government.⁴⁹

In accordance with Public Law number 743⁵⁰ signed by President Harry S. Truman on July 31, 1946, an agreement or contract generally referred to as the "Turnback Settlement Agreement," was executed between the Secretary of Interior and the Grand River Dam Authority for the return of all Authority property held by the government under Executive Order of the President.

Essentially, the contract provided that the government would turn back all the property still held by it which had been seized from the Authority in November, 1941; that

⁴⁹Audit Report, 1945, p. 4.

⁵⁰U. S., Statutes at Large, LX, Part 1, pp. 743-744.

all the government owned flowage easements below the 750 foot elevation in Pensacola reservoir and substantially all the property that had been acquired by the government, during its operation of the project, by disbursements from special trust accounts set up by it for the project would be delivered to the Authority; that \$12,700,000.00 in four percent revenue bonds held by the government would be surrendered for cancellation and substantially all the unexpended funds which the government had derived from the seizure and operation of the project would be paid over to the Authority. The Agreement also provided that the Authority would issue \$14,000,000.00 of its Grand River Dam Authority 2 1/2 percent, Series A, Revenue Bonds to the government; that the Authority would pay interest on \$12,700,000.00 at the rate of 4 percent to November 21, 1941, and at the rate of 2 1/2 percent from November 21, 1941 to July 1, 1946; that interest at the rate of 2 1/2 percent would be paid on the \$1,300,000.00 excess of new bonds over old bonds from January 1, 1946; that the Authority would convey to the government flowage easements above 750 foot elevation on all of its lands and that the Authority would forgive and waive any claims for rental, damages, etc., for the use of the property by the government during its period of control. The effective date the above properties, bonds, etc., would be delivered or exchanged, was September 1, 1946.

The resumption of full control and operation of the facilities by the State Authority was effected, as per the agreement above, and shortly thereafter the headquarters of the Grand River Dam Authority were reestablished in Vinita from Tulsa where they had been located, during the period of governmental control, in order to be more closely associated with the offices of the Southwestern Power Administration there.⁵¹

House Bill Number 562,⁵² which was approved on February 14, 1955, altered the term of office of any new members first taking office so that their term would either expire at the end of any unexpired term of the preceeding member or, if the term is expired then the new term will be for a period of seven years. Other changes stipulated that there could not be more than one Director, at any given time, from a county and also stated that an individual was not eligible to serve as a Director if he had been employed by a private utility within the preceeding three years.

Choteau Steam Generating Plant

Early in 1946 the Authority had submitted a bid on the power facilities of the Oklahoma Ordnance Works, near Choteau and Pryor, Oklahoma. This bid contained an offer to pay \$750,000.00 in new 2 1/2 percent revenue bonds for the

⁵¹Daily Oklahoman, September 13, 1946.

⁵²Session Laws of Oklahoma (1955), Title 82, Ch. 8, pp. 474-476.

desired facilities, or pay a cash rental of \$75,000.00 annually, with all rental payments to apply on an option to purchase the property at any time during the lease agreement for the sum of \$750,000.00.

In a letter dated February 26, 1948, Q. B. Boydstun, General Counsel of the Authority, informed the Grand River Dam Authority auditors as follows:

During the calendar year of 1947, the War Assets Administration offered for sale the steam generating plant and water plant at the Oklahoma Ordnance Works. On July 15, 1947, bids were received by the War Assets Administration for these facilities. The Authority bid the fair value, as established by the Government, in the amount of \$3.5 million. The Public Service Company of Oklahoma bid \$2,535,000.00 and the City of Tulsa bid \$801,000.00. The Authority's bid was made as an instrumentality of the State of Oklahoma and as a priority bidder. The Public Service Company of Oklahoma protested and objected to the sale being made and confirmed to the Authority, asserting that the Authority could not legally acquire the same. The Subcommittee of the House of Representatives investigating sales of war surplus property held a public hearing and investigation in the early part of December, 1947. The report of this committee was not unfavorable and the War Assets Administration had indicated that the sale will be made to the Authority. The Authority proposes to pay the purchase price by the issuance and sale of revenue bonds. The Authority also proposes to extend and improve the generating facilities at the steam plant and also add an additional unit at the Pensacola Plant.⁵³

The Authority formally took over the Choteau steam plant in April, 1948 under a rental basis, which was 4 percent per annum on the \$3,500,000.00 purchase price. It was not until May of 1949 that payment was made and the sale completed.

⁵³Audit Report, 1947, pp. 19-20.

Two additional steam generating units, one 10,000 kilowatts and the other 15,000 kilowatts, were added to the Choteau plant in 1950 to increase its total output to 45,000 kilowatts. The sixth and final generating unit was added to the Pensacola plant in 1952 along with the completion of additions and extensions of substation and transmission facilities. These were all made possible with the refinancing program of 1949 which is described in detail later in this chapter.

Fort Gibson Dam

The site of the Fort Gibson Dam project is on the Grand (Neosho) River, in Cherokee and Wagoner Counties, Oklahoma, about eight miles above the mouth of the river. It is a multipurpose dam and serves the purposes of flood control, hydroelectric power production, recreation, irrigation, and is to aid in future plans for navigation of the Arkansas River up to the mouth of the Grand River.

The dam proper is 3,855 feet long and 38 feet high and has a spillway that contains 30 Tainter gates, each of which are 40 feet long and 35 feet wide. The lake covers 19,000 acres of land and backs up nearly 40 miles to provide 225 miles of shoreline. This lake provides 233,000 acre-feet of storage for flood control and 187,000 acre-feet for storage to the top of the power pool.

Though the State had allocated all water rights of Grand River to the Grand River Dam Authority under state

statutes and the Authority had gone so far as to make land purchases and install a transmission line and substation at the damsite, the Federal government went ahead on the construction of the Fort Gibson Dam, at the time when the Authority was still in Federal control under the President's executive order, under the Flood Control Act of 1941.⁵⁴

In 1943 Edward P. Marshall, general counsel of the Authority, informed the War Department as follows:

. . . the water rights in the Grand River had been appropriated to it [GRDA] by the Oklahoma Legislature and that the Authority may not acquiesce in the appropriation of those rights by the War Department in the proposed construction of the dams at Markham's Ferry or Fort Gibson unless just compensation is made.⁵⁵

Construction was started on the Fort Gibson dam in the 1947 fiscal year under the supervision of the U. S. Army Engineers and was completed late in 1949, but water was not permitted to fill the reservoir until late in 1952 as trees still had to be cleared, and the relocation made of a railroad, two highways, 60 miles of utility lines and many graves.

The presently installed capacity⁵⁶ of the hydro-electric generators at Fort Gibson Dam is 45,000 kilowatts

⁵⁴U. S., Statutes at Large, LV, Part 1, pp. 638-651.

⁵⁵Audit Report, 1943, p. 4.

⁵⁶U. S., Congress, Senate Document Number 13, Development of Water and Land Resources of the Arkansas-White and Red River Basins, 85th Cong., 1st Sess., 1957, p. 92.

and an ultimate installed capacity of 67,500 kilowatts is provided for. The Southwestern Power Administration is in control of the operation of the hydraulic plant.

In 1954 the Authority filed a claim with the Federal Power Commission against the Government for benefits received and to be received, at the Government's Fort Gibson Dam and reservoir project, from the Authority's headwater improvements at the Pensacola Dam. This action was taken under Subsection (f) of Section 10 of the Federal Water Power Act of 1920 which states in part as follows:

. . . whenever any licensee hereunder is directly benefited by the construction work of another licensee, . . . the licensee so benefited shall reimburse the owner of such reservoir for any such part of the annual charges for interest, maintenance, and depreciation thereon as the commission shall deem equitable.⁵⁷

After another period of waiting the Authority filed suit against the Government in the U. S. Court of Claims in Washington, D. C. for \$10,000,000.00. This suit is based on the fifth and tenth amendments of the Federal Constitution which prohibits the taking of property without due process of law and grants to the states all powers not specifically given to the Federal government. As of May 31, 1958 there had been no decision rendered in this suit.

Markham's Ferry Dam

Public Law Number 516, approved May 17, 1950 by

⁵⁷U. S., Statutes at Large, XLI, Part 1, pp. 1063-1077.

President Harry S. Truman, provided for the installation of penstocks and similiar facilities for the development of hydroelectric power in any dam authorized under the Act and specifically included:

. . . the project for flood control and other purposes on the Grand (Neosho) River and its tributaries in Oklahoma, Kansas, Missouri, and Arkansas, is hereby authorized substantially in accordance with the recommendations of the Chief of Engineers in H. D. 442 - 80th Congress second session, at an estimated cost of \$36,220,000.⁵⁸

In August, 1951, Senators Kerr and Monroney, of Oklahoma, introduced a bill in the United States Senate to provide for the construction of the Markham's Ferry Dam by the Grand River Dam Authority rather than by the United States Army Engineers. This bill was finally passed as Public Law Number 476⁵⁹ and was approved on July 6, 1954 by President Dwight D. Eisenhower.

For the first time a state agency, the Grand River Dam Authority, was authorized by the Congress of the United States to build a combination flood control and power project. The Act authorized the Federal government to provide \$6,500,000.00 of the total cost of the project as payment for the flood control features of the reservoir.

In June, 1955, the Federal Power Commission approved the construction of Markham's Ferry Dam in Mayes County,

⁵⁸Ibid., LXIV, Part 1, p. 174.

⁵⁹Ibid., LXVIII, Part 1, pp. 450-451.

Oklahoma. This approval authorized the installation of three 15,000 kilowatt generators with provisions for the later installation of two additional 15,000 kilowatt generators to provide an eventual total generating capacity of 75,000 kilowatts. The dam is to be 3,900 feet long and 90 feet high and will back up a total of 420,000 acre-feet of water, 233,000 of which will be used for flood control and 187,000 for power.

After engineering studies the proposed dam was considered to be more feasible if a "pumpback" arrangement could be used in connection with the dam. This plan called for creating a series of reservoirs above the Markham's Ferry reservoir and the installation of combination pump-generators which would lift the water into the higher reservoirs at night and then generate electricity when the water flowed back through into Markham's Ferry reservoir during the day. This would increase the hydroelectric potential of the dam from a maximum of 75,000 kilowatts to over 100,000 kilowatts. The report proposed that the Grand River Dam Authority would sell firm power in the day time and purchase off-peak power to run the pumps at night. This sale and purchase agreement is the fundamental part of a contract between the Grand River Dam Authority and the Public Service Company of Oklahoma that has been the subject of a bitter fight between those favoring the Authority selling and buying from publicly owned utilities and those favoring

private utility interests. Politics has, of course, entered into this picture in many instances and it is hard to distinguish at times, what the issues are and where the lines of fighting are formed.

Under the present bond indenture the bondholders must be assured that any expansion of the present issue of bonds is financially feasible and will not only pay off the new bonds but make the old bonds even more secure. To do this it seems imperative, if the Markham's Ferry dam is to be built, that a firm type of contract must be had on the power to be developed before such assurances can be foreseen. Though public power interests are generally against the contract in question it is also true that the Public Service Company of Oklahoma has been the only source to offer a firm contract that will permit financing the construction.

E. W. Beck and Associates were selected by Stranahan, Harris & Company, Toledo, Ohio, which is the fiscal agent and financial advisor of the Grand River Dam Authority, to make an engineering study on the feasibility of the proposed Public Service Company of Oklahoma contract. The initial report on this study was unfavorable unless certain changes were made in the agreement, but after the contract was revised the final report was satisfactory.⁶⁰

In the course of legislation to raise the bond limitation a study was made for the Senate on this contract

⁶⁰Daily Oklahoman, October 16, 1956.

by Henry Blalock, Washington, D. C. consulting engineer. This report was unfavorable in every way, but suggested, however, that a similar contract be made with the KAMO Electric Cooperative of Vinita, Oklahoma. There still was no offer from the Cooperative and Governor Gary pointed out to the legislature that bids had been open for approximately two years and only the one contract had been forthcoming. Finally, after approval of the contract by the Legislative Conference Committee early in May, 1957, Senate Bill Number 268⁶¹ authorized the Authority to enter into contracts for the sale of power and the issuance of additional bonds. Both of these provisions were needed before finances could be provided to build the dam.

Also in May, 1957, a fifteen man study group, with five men each appointed by Governor Gary, the Senate, and the House of Representatives, was appointed to act as an advisory committee to study the power contract negotiations of the Grand River Dam Authority. This group later hired an Oklahoma City engineer, W. H. Stueve, to study the proposed contract and he reported unfavorably on the contract late in July.

Early in August, the Board of Directors of the Grand River Dam Authority formally signed the disputed contract after a 4 - 2 vote by the Directors. A test suit on the legality of the contract under statutes regulating the

⁶¹Session Laws of Oklahoma (1957), Title 82, Ch. 8a, pp. 562-569.

Authority was filed and on December 17, 1957, the Oklahoma Supreme Court adjudged the contract to be valid under the law.⁶²

The previously discussed enlargement of the power facilities of the Markham's Ferry reservoir requires approval of the Federal Power Commission in the modification of the existing license and as of May 31, 1958, such a modification had failed to materialize.

Another hurdle that must be crossed before actual construction can be started on the dam, after the Federal Power Commission approval, is the approval of the additional bond issue by the General Services Administration of the Federal government who held \$13,365,000.00 in Grand River Dam Authority Series B Revenue Bonds as of December 31, 1957. This is by far the largest single block of bonds outstanding and it is felt by many that the issue on their decisions will be split by the same, previously discussed, public versus private utility interest question.

The final problem in the financing of the dam is the basic one of the actual sale of the bonds to the public and will undoubtedly present many problems when this stage in the planning is reached.

⁶²Petition of Grand River Dam Authority for Declaratory Judgement Determining Validity of Contracts With Public Service Company of Oklahoma, 320 P. 2a 706 (1957).

Financing Programs of the Grand River Dam Authority

In 1938, the Board of Directors of the Grand River Dam Authority, under authority conferred by the creating act, authorized an issue of bonds known as the "GRDA 4 Percent Revenue Bonds". These bonds were originally limited to an aggregate principal amount of \$12,500,000.00 but as an agreement was later made with the Public Works Administration for additional financing the Board of Directors amended their previous resolution and increased the aggregate principal amount of these bonds to \$15,000,000.00 on January 6, 1941 (see Table 1).

This change in the bond issue necessitated the execution of an Amendatory and Supplemental Indenture which provided, among other things, that the Authority would create a sinking fund from the net revenues of the project's operation sufficient to liquidate the bonds and pay the interest thereon.⁶³

None of these bonds were redeemed on their maturity dates as the Government had seized control of the project, as previously described, on November 21, 1941. However, in accordance with the Turnback Agreement all of the first issue of bonds were cancelled and on September 1, 1946 new 2 1/2 percent Series "A" bonds, dated January 1, 1946, were issued (see Table 2). The bonds maturing on January 1, 1948

⁶³Audit Report, 1940, p. 15.

and 1949 were redeemed on their maturity dates and in a refunding procedure on May 17, 1949 the balance of \$13,800,000.00 of this bond issue was cancelled.

TABLE 1

AUTHORIZED AND ISSUED VALUE, ISSUED TOTALS AND MATURITY
DATES, GRAND RIVER DAM AUTHORITY 4 PERCENT
REVENUE BONDS OF APRIL 1, 1938

Maturing On April 1 As Follows	Authorized (annually)	Issue Value (annually)	Issued Totals
1943	\$ 70,000	\$ 63,000	\$ 63,000
1944 to 1947 Inc.	110,000	100,000	400,000
1948 to 1951 Inc.	210,000	200,000	800,000
1952 to 1956 Inc.	320,000	300,000	1,500,000
1957 to 1961 Inc.	430,000	400,000	2,000,000
1962 to 1966 Inc.	540,000	500,000	2,500,000
1967 to 1972 Inc.	650,000	600,000	3,600,000
1973	800,000	700,000	700,000
1974	800,000	800,000	800,000
1975	800,000	800,000	800,000
1976	900,000	837,000	837,000
Total			<u>\$14,000,000</u>

Source: Audit Report for the Year Ended December 31, 1941; Grand River Dam Authority, Vinita, Oklahoma. (Robt. E. Garnett & Co., Certified Public Accountants, Tulsa, Oklahoma) pp. 17-18.

On May 2, 1949, the Board of Directors of the Authority passed a resolution, under the authority of Oklahoma Statutes,⁶⁴ authorizing the issuance of "Grand River Dam Authority Revenue Bonds" in the aggregate amount of \$24,800,000.00. These bonds provided \$13,800,000.00 for

⁶⁴Session Laws of Oklahoma (1945), Title 82, Ch. 8, p. 409.

the refunding of the 1946 revenue bonds above, and \$11,000,000.00 for the acquisition of additional facilities (see Table 3). The designation "Series A" was applied to \$11,000,000.00 of these bonds, of which \$1,700,000.00 has never been authenticated nor issued. These Series A bonds were all dated October 1, 1948. Of the bonds issued \$1,700,000.00 bear 3 1/2 percent interest and the balance of \$7,600,000.00 bear interest at 3 1/4 percent. These bonds were sold to underwriters for cash on May 17, 1949.

TABLE 2

AUTHORIZED AND ISSUED VALUE, ISSUED TOTALS AND MATURITY DATES, GRAND RIVER DAM AUTHORITY 2 1/2 PERCENT SERIES A REVENUE BONDS OF JANUARY 1, 1946

Maturing January 1 As Follows	Authorized (annually)	Issue Value (annually)	Issued Totals
1948 to 1950 Inc.	\$100,000	\$100,000	\$ 300,000
1951	200,000	200,000	200,000
1952 to 1961 Inc.	300,000	300,000	3,000,000
1962 to 1971 Inc.	400,000	400,000	4,000,000
1972 to 1984 Inc.	500,000	500,000	6,500,000
1985 and 1986	500,000		
Total			\$14,000,000

Source: Audit Report for the Year Ended December 31, 1947; Grand River Dam Authority, Vinita, Oklahoma. (Robt. E. Garnett & Co., Certified Public Accountants, Tulsa, Oklahoma) p. 16.

The Series B bonds of this issue amounted to \$13,800,000.00. All of the Series B bonds are dated October 1, 1948 and mature October 1, 1988. They bear interest at

TABLE 3

MATURITY VALUES AND DATES, INTEREST RATES, BY SERIES,
GRAND RIVER DAM AUTHORITY REVENUE BONDS OF OCTOBER 1, 1948

Series A		
Maturing October 1, As Follows	Interest Rate (percent)	Amount Maturing Annually
1952	3 1/2	145,000
1953	3 1/2	165,000
1954	3 1/2	185,000
1955	3 1/2	205,000
1956	3 1/2	230,000
1957	3 1/2	245,000
1958	3 1/2	255,000
1959	3 1/2	270,000
1960	3 1/4	275,000
1961	3 1/4	280,000
1962	3 1/4	290,000
1963 and 1964	3 1/4	300,000
1965 to 1967 Inc.	3 1/4	310,000
1968 to 1972 Inc.	3 1/4	315,000
1973 to 1977 Inc.	3 1/4	330,000
1978	3 1/4	2,000,000
		<u>\$ 9,300,000</u>

Series B		
Maturity Date	Interest Rate (percent)	Amount Maturing
October 1, 1988	2 1/2	\$13,800,000

Source: Audit Report for the Year Ended December 31, 1949; Grand River Dam Authority, Vinita, Oklahoma. (Robt. E. Garnett & Co., Certified Public Accountants, Tulsa, Oklahoma) p. 13.

the rate of 2 1/2 percent per annum. These bonds were exchanged for the old series of bonds on May 17, 1949.⁶⁵

The Authority has redeemed bonds of this series as follows; Series A, \$1,188,000.00 and Series B, \$435,000.00 (see Table 4).

In addition to the \$25,000,000.00 in bonds, now authorized for the Grand River Dam Authority to issue, Senate Bill Number 71, which was approved April 21, 1949, provided for an additional \$25,000,000.00 to be issued by the Authority for "constructing, installing, or acquiring dams and/or hydro-electric power plants at Markham's Ferry and/or Fort Gibson. . ."⁶⁶

Senate Bill Number 268 of May 22, 1957 provided major changes in the Authority's scope by (1) authorizing an increase in the bond limit from \$50,000,000.00 to \$110,000,000.00 and (2) an authorization for the Authority, within specified limits, to contract for the sale and purchase of power.⁶⁷

As a summary, the \$14,000,000.00 issued of the Grand River Dam Authority 4 Percent Revenue Bonds of April 1, 1938 were completely refinanced by the Grand River Dam Authority 2 1/2 Percent Revenue Bonds of January 1, 1946. Bonds maturing January 1, 1948 and 1949, in the amount of \$100,000.00

⁶⁵Audit Report, 1949, p. 13.

⁶⁶Session Laws of Oklahoma (1949), Title 82, Ch. 8, pp. 633-641.

⁶⁷Ibid., (1957), Title 82, Ch. 8a, pp. 562-569.

TABLE 4

GRAND RIVER DAM AUTHORITY REVENUE BONDS OF OCTOBER 1, 1948
REDEEMED, BY SERIES, AS OF DECEMBER 31, 1957

Series A		
Year Redeemed	Maturity Date	Amount Redeemed
1952	October 1, 1952	\$ 145,000
1952	October 1, 1973	4,000
1952	October 1, 1976	5,000
1952	October 1, 1978	4,000
1953	October 1, 1953	165,000
1954	October 1, 1954	185,000
1955	October 1, 1955	205,000
1956	October 1, 1956	230,000
1957	October 1, 1957	245,000
		<u>\$1,188,000</u>
Series B		
Year Redeemed	Maturity Date	Amount Redeemed
1952	October 1, 1988	\$ 60,000
1953	October 1, 1988	65,000
1954	October 1, 1988	70,000
1955	October 1, 1988	75,000
1956	October 1, 1988	80,000
1957	October 1, 1988	85,000
		<u>\$ 435,000</u>

Source: Audit Report for the Year Ended December 31, 1957; Grand River Dam Authority, Vinita, Oklahoma, (Campbell & Adkison, Certified Public Accountants, Miami, Oklahoma), p. 5, Exhibit D.

each were retired in 1948. The retirement of these bonds reduced the amount outstanding to \$13,800,000.00 as of December 31, 1949. A new issue of bonds known as Grand River Dam Authority Revenue Bonds of October 1, 1948 were issued on May 17, 1949. Of this issue, Series A bonds in the amount of \$9,300,000.00 were sold to underwriters for cash, and Series B bonds in the amount of \$13,800,000.00 were exchanged for the old issue of bonds of a similar amount that were held by the Federal government.

As of December 31, 1957 the total bonds outstanding include \$8,112,000.00 Series A bonds held by private investors and \$13,365,000.00 Series B bonds held by the Federal government (see Table 5).

TABLE 5

SUMMARY, GRAND RIVER DAM AUTHORITY BONDS AUTHORIZED,
ISSUED, AND OUTSTANDING TO DECEMBER 31, 1957

Series Date	Series	Authorized	Issued	Total Outstanding
Apr. 1, 1938		\$15,000,000	\$14,000,000	none
Jan. 1, 1946		15,000,000	14,000,000	none
Oct. 1, 1948		11,000,000	9,300,000	\$ 8,112,000
Oct. 1, 1948		13,800,000	13,800,000	13,365,000
	Total Outstanding			\$21,477,000

Sources: Tables 1 through 4.

CHAPTER III

AN ANALYSIS OF THE PRODUCTION AND PURCHASE OF ELECTRICAL ENERGY

The following analysis of the production and purchase of electrical energy in the operations of the Grand River Dam Authority is based on data from the accounting records of the Authority and the annual audit reports. These reports were prepared by the certified public accounting firms of Robt. E. Garnett & Company, Tulsa, Oklahoma, for the years 1938 through 1954, Paul C. Campbell & Company, Miami, Oklahoma, for the years 1955 and 1956, and Campbell & Adkison, Miami, Oklahoma for 1957. These annual audits are required by the following statute:

. . . The Board shall cause to be made and completed within ninety days after the end of each calendar year, an audit of the books of account and financial records of the District for such calendar year, such audit to be made by an independent certified public accountant or firm of certified public accountants.⁶⁸

The audits as an independent check "to ascertain the accuracy, integrity, and authenticity of those records and documents"⁶⁹

⁶⁸Oklahoma, Statutes (1951), Title 82, Section 866.

⁶⁹Holmes, Arthur W., Auditing Principles and Procedure (Homewood, Illinois: Richard D. Irwin, Inc., 1954), p. 1.

necessary in the recording of the operations as they are performed by the Authority.

This analysis is made on annual summaries taken from the sources described above, and considers the more important information pertaining to the kilowatt-hour generation, the expenses of such generation, the cost of power purchased, and other expenses involving transmission and administration expenditures. Generation data is presented in totality as well as being examined in detail by the two methods of power production used, which are steam and hydraulic generation.

The hydraulic, or hydroelectric, method of generation is used at the Pensacola Dam plant where the impounded waters are used to drive the turbine generators which produce the electrical energy. The steam generating plant near Choteau, Oklahoma, uses coal from the near-by coal fields as a fuel for the boilers which furnish steam to drive turbine generators.

The first power actually distributed by the Grand River Dam Authority was produced in the preliminary operations (see Table A-1) of the Pensacola Hydroelectric Generating Plant during the period of September, 1940 to November 20, 1941. As mentioned in Chapter II, the control and operation of the dam and hydroelectric plant passed into the hands of the Federal government on November 21, 1941. It was not until September 1, 1946, upon the signing and acceptance of the 'Turnback Agreement' by the Authority and the United States Department of Interior, that actual operational

production was assumed by the Grand River Dam Authority.

At this point it should be brought out that the expense figures used in Tables 9, 11, 12, 13, and 14 have been adjusted as a part of the research procedure to include charges for the depreciation of assets. These were retroactively charged against expenses, for the various years concerned, by a journal entry in the records of the Grand River Dam Authority on December 31, 1955 (see Tables A-14 and A-15). Many times this additional charge to expense more than doubled the specific expense account values that were originally published in statements of income, or deficit, for the given annual period. Depreciation charges also have had the effect of changing the net profit figures of seven annual periods, within the years 1947 to 1954 inclusive, to net deficits (see Tables A-2a through A-10a). However, as the income statements for the years 1955, 1956, and 1957, as well as all future statements, have or will contain such charges to expense for the depreciation of assets, it was considered necessary to adjust former statements of income by adding this charge, to make the data comparable throughout the entire period under consideration.

1946 Production

Gross production for the final four months of 1946 resulted in the production of 53,779,400 kilowatt-hours of electrical power (see Table 6). This power was all produced by the Pensacola Hydroelectric Generating Plant (see Table 7) where five 14,400 kilowatt units were the installed (see Table 8).

TABLE 6

ELECTRICAL ENERGY PRODUCED, BY METHOD OF GENERATION, AND ENERGY PURCHASED,
BY THE GRAND RIVER DAM AUTHORITY, ANNUALLY, 1946-1957

Year	Steam	Hydroelectric	Purchases	Total
1946 ^a		53,779,400		53,779,400
1947		248,804,100		248,804,100
1948	3,384,900	272,314,700		275,699,600
1949	46,734,300	389,402,000		436,136,300
1950	30,376,100	355,007,000		385,383,100
1951	51,681,200	401,252,900		452,934,100
1952	172,546,000	274,827,700	3,086,000	450,459,700
1953	290,900,700	90,488,500	75,303,500	456,692,700
1954	322,459,400	75,452,400	130,543,800	528,455,600
1955	291,811,600	200,098,500	111,075,000	602,985,100
1956	341,808,100	62,600,900	254,839,000	659,248,000
1957	202,043,800	282,356,700	201,024,400	685,424,900

^aFor period of September 1 to December 31, 1946.

Source: Operating Revenue Accounts Ledger, Grand River Dam Authority,
Vinita, Oklahoma.

TABLE 7

ELECTRICAL ENERGY SOURCES AS A PERCENT OF
TOTAL ENERGY AVAILABLE FOR DISTRIBUTION
GRAND RIVER DAM AUTHORITY
ANNUALLY, 1946 - 1957

Year	Steam	Hydraulic	Purchased
1946 ^a		100.00	
1947		100.00	
1948	1.23	98.77	
1949	10.72	89.28	
1950	7.88	92.12	
1951	11.41	88.59	
1952	38.30	61.01	.69
1953	63.70	19.81	16.49
1954	61.02	14.28	24.70
1955	48.39	33.18	18.43
1956	51.85	9.50	38.65
1957	29.48	40.19	29.33

^aFor period of September 1 to December 31, 1946.

Source: Table 6.

TABLE 8

DATE OF INSTALLATION, SIZE, & TYPE OF ELECTRICAL GENERATING
EQUIPMENT OPERATED BY THE GRAND RIVER DAM AUTHORITY
AS OF DECEMBER 31, 1956

Pensacola Hydroelectric Plant			
Year Installed	No. Units	Type	Size (in kilowatts)
1940	4	Turbine	14,400 each
1940	1 ^a	Turbine	500
1946	1	Turbine	14,400
1952	1	Turbine	14,400
Total	7 ^b		86,900 ^b
Choteau Steam Plant			
Year Installed	No. Units	Type	Size (in kilowatts)
1942	2	Condensing	5,000 each
1942	1	Non-condensing	5,000
1950	1	Condensing	10,000
1951	1	Condensing	15,000
Total	5		40,000

^aEmergency unit for plant use.

^bIncludes emergency unit of 500 kilowatt capacity.

Source: Annual Report to the Federal Power Commission; December 31, 1956. (Grand River Dam Authority, Vinita, Oklahoma), pp. 96-99.

Production expenses for this period amounted to \$108,695.02 (see Table 9) or an average production cost of 2.02 mills per kilowatt-hour (see Table 10). However, the addition of other expenses, which included transmission, customer accounting and collecting, and administrative and general expenses, resulted in total operating expenses of \$252,999.87 (see Table 11); an average total expense of 4.7 mills per kilowatt-hour produced.

1947 Production

With the availability of the five units above for the entire year of 1947, the gross production was increased to 248,804,100 kilowatt-hours. This was an approximate increase of 50 percent in production over 1946, if the final four months for 1946 were used as a basis for projection for the entire year to give an annual production of 161,328,200 kilowatt-hours. Production expenses failed to rise proportionally and only amounted to \$328,685.06; an average production cost of 1.32 mills per kilowatt-hour. Total operating expenses were also proportionally lower and the \$770,065.41 expenditure held the average total operating expense down to 3.09 mills per kilowatt-hour of gross production.

1948 Production

The Grand River Dam Authority formally took over the Choteau Steam Generating Plant, previously a part of the Oklahoma Ordnance Works, in April of 1948. However, due to

TABLE 9

COST OF ELECTRICAL ENERGY PRODUCED, BY METHOD OF GENERATION,
AND ENERGY PURCHASED BY THE GRAND RIVER DAM AUTHORITY,
ANNUALLY, 1946 - 1957

Year	Steam	Hydraulic	Purchased	Total
1946 ^a		\$108,695.02		\$ 108,695.02
1947		328,685.06		328,685.06
1948	\$ 17,922.56	329,920.65		347,843.21
1949	447,751.30	317,655.09		765,406.39
1950	438,422.80	317,171.40		755,594.20
1951	533,143.43	333,508.34		866,651.77
1952	922,290.35	363,835.54	\$ 13,307.00	1,299,432.89
1953	1,407,005.73	378,367.62	386,326.62	2,171,699.97
1954	1,586,423.84	323,584.96	776,014.89	2,686,023.69
1955	1,603,272.05	324,662.62	412,609.95	2,340,544.62
1956	1,750,508.90	329,056.89	1,059,760.26	3,139,326.05
1957	1,455,148.64	345,072.32	666,012.58	2,466,233.54

^aFor period of September 1 to December 31, 1946.

Source: Tables A-2a through A-10a and A-11 through A-13.

TABLE 10

AVERAGE COSTS, BY SOURCE, OF ELECTRICAL ENERGY PRODUCED AND PURCHASED
BY THE GRAND RIVER DAM AUTHORITY, ANNUALLY, 1946-1957
(in mills per kilowatt-hour)

Year	Generated Energy			Average Cost of Purchased Energy	Average Purchase and Production Cost	Average Total Operating Expense
	Average Production Expense					
	Steam	Hydro	Total			
1946 ^a		2.02	2.02		2.02	4.70
1947		1.32	1.32		1.32	3.09
1948	5.29	1.21	1.26		1.26	2.87
1949	9.58	.82	1.75		1.75	2.85
1950	14.43	.89	1.96		1.96	3.27
1951	10.32	.83	1.91		1.91	3.18
1952	5.35	1.32	2.02	4.39	2.90	4.28
1953	4.84	4.18	4.68	5.13	4.76	6.20
1954	4.92	4.44	4.80	5.94	5.08	6.34
1955	5.49	1.62	3.92	3.71	3.88	5.02
1956	5.12	5.25	5.14	4.16	4.76	5.89
1957	7.20	1.22	3.92	3.31	3.59	4.79

^aFor the period September 1 to December 31, 1946.

Source: Tables 6, 9, and 11 through 14.

TABLE 11
OPERATING EXPENSES OF THE GRAND RIVER DAM AUTHORITY,
BY TYPE OF EXPENSE, YEARS 1946, 1947, & 1948

	1946 ^a	1947	1948
Production - Steam Power			\$ 17,922.56
Production - Hydraulic Power	\$108,695.02	\$328,685.06	329,920.65
Purchased Power			
Transmission	86,402.11	267,762.50	260,074.81
Customer Accounting & Collecting ^b	1,799.69	5,256.35	6,239.20
Sales Promotion			
Administrative and General	<u>56,103.05</u>	<u>168,351.50</u>	<u>177,302.18</u>
Total	\$252,999.87	\$770,065.41	\$791,459.40

^aFor the period September 1 to December 31, 1946.

^bIncludes Distribution Expense of \$1,639.41 for 1946 and \$4,672.92 for 1947.

Source: Tables A-2a, A-3a, and A-4a.

the general condition of the plant and the necessity of extensive repairs, it was operated on a "testing" basis in 1948 and only produced 3,338,900 kilowatt-hours of electrical energy. This power was produced at a cost of \$17,922.56 which gave an average production cost of 5.29 mills per kilowatt-hour.

The Pensacola Hydroelectric Generating Plant generated a total of 272,314,700 kilowatt-hours in 1948 to produce 98.77 percent of the total production for the year. This production was an increase of approximately ten percent over the previous year. Production expenses were \$329,920.65, which was nearly constant with those of 1947 even though there was the above increase in gross generation, and resulted in an average production cost of 1.21 mills per kilowatt-hour. Total production costs for both the steam and hydroelectric power was \$347,843.21; an average of 1.26 mills per kilowatt-hour for the total production of 275,709,600 kilowatt-hours.

Total operating expenses for 1948 amounted to \$791,459.40 and were nearly 10 percent above those of the previous year. However, the increase in total operating cost was accompanied by an increase in production which brought the average total operating cost per kilowatt-hour generated down to 2.87 mills. The increase in total operating expenditures was due to the increases in generating costs of \$19,158.15, in administrative and general expenses of

\$7,940.68, and customer accounting and collection expenses of \$982.85. These increases were somewhat offset by a decrease in transmission costs of \$7,687.69.

1949 Production

Total gross production for 1949 increased approximately 63 percent over the previous year to a new high, for the Grand River Dam Authority, of 437,135,300 kilowatt-hours. This was, of course, the first complete year for the operation of the Choteau Plant where 46,734,300 kilowatt-hours were generated to provide 10.72 percent of total generation. Production at the Pensacola Hydroelectric Plant increased approximately 70 percent to a total of 389,402,000 kilowatt-hours. This hydroelectric production was 89.28 percent of total production.

Total production costs increased to \$765,406.39; an average cost of 1.75 mills per kilowatt-hour. This increase in average total production cost was entirely due to the expense of operation of the steam plant where the production cost was \$447,751.30, which was an average cost of 9.58 mills per kilowatt-hour. Actually, the average cost of producing hydraulic power fell to .82 mills per kilowatt-hour as total hydroelectric production costs were down \$12,265.56, to \$317,655.09, notwithstanding the increase in production of 117,087,300 kilowatt-hours.

Total operating expenses increased over 60 percent above those of the previous year for a new high of \$1,245,232.64 (see Table 12), but the greater percentage increase in gross

TABLE 12
OPERATING EXPENSES OF THE GRAND RIVER DAM AUTHORITY,
BY TYPE OF EXPENSE, YEARS 1949, 1950, & 1951

	1949	1950	1951
Production - Steam Power	\$ 447,751.30	\$ 438,422.80	\$ 533,143.43
Production - Hydraulic Power	317,655.09	317,171.40	333,508.34
Purchased Power			
Transmission	256,943.13	257,296.95	324,219.17
Customer Accounting & Collecting	8,763.42	8,714.11	6,770.74
Sales Promotion	4,569.61	13,402.13	7,075.21
Administrative and General	<u>209,550.09</u>	<u>223,682.03</u>	<u>235,949.66</u>
Total	\$1,245,232.64	\$1,258,689.42	\$1,440,666.55

Source: Tables A-5a, A-6a, A-7a.

kilowatt-hour production slightly lowered the average total expense in mills to 2.85 mills per kilowatt-hour produced. The increase in total operating expense was due to several factors. The major factor was the increase of production costs at the steam generating plant at Choteau above, but other items included increases of \$32,247.91 in administrative and general expense; the establishment of a sales promotion department, within the operational framework of the GRDA, whose expenses for the period were \$4,569.61; and a smaller increase of \$2,524.22 in providing customer accounting and collecting services. These increases were offset to some extent by a decrease of \$3,131.68 in transmission expenditures and the decrease in hydraulic production costs mentioned above.

1950 Production

Total gross production for 1950 of 385,383,100 kilowatt-hours was a decrease of almost 12 percent from that of the previous year. This decline was due, almost entirely, to a lessening of demand which resulted from the termination of a short-term contract with The Arkansas Power and Light Company, Pine Bluff, Arkansas. This company used 96,492,300 kilowatt-hours of energy in 1949. Total production expense was \$755,594.20. This was a decrease of approximately ten thousand dollars, but was more than offset by the decreased gross production and the average total production cost increased to 1.96 mills per kilowatt-hour.

Production at the Choteau steam plant for the year was 30,376,100 kilowatt-hours. This was a decrease of almost one-third from the previous period and comprised only 7.88 percent of total production for 1950. Although the generating expenses dropped to \$438,422.80, the decline was not proportional to the decrease in steam generation and the average production cost per kilowatt-hour increased to a new high of 14.43 mills.

Production at the Pensacola hydroelectric plant decreased 34,395,000 kilowatt-hours to a level of 355,007,000 kilowatt-hours, yet this amount was 92.12 percent of total production by the GRDA. Cost of production dropped by almost the same ratio and average cost only increased slightly to a level of .89 mills per kilowatt-hour.

Total operating expenses for 1950 amounted to \$1,258,689.42. This was actually a net increase of \$13,456.74 and increased the average total operating expense per kilowatt-hour produced to 3.27 mills. This net increase is explained by increases of \$14,131.94 in administrative and general expense and \$8,832.52 in sales promotion. These amounts were offset to some extent by a decrease of \$9,328.50 in steam power production costs. Hydroelectric production costs and transmission expenses remained approximately the same.

1951 Production

Steam production at the Choteau plant increased by

two-thirds to a new level of 51,681,200 kilowatt-hours after the installation of an additional steam, condensing type, unit of 10,000 kilowatt capacity. This raised production by the steam plant to 11.41 percent of the total generation by the GRDA for the year. Steam generation expense also increased, by approximately one-fifth, to a total of \$533,143.43 which gave an average production cost of 10.32 mills per kilowatt-hour generated.

Hydraulic production also increased in 1951 to 401,252,900 kilowatt-hours which was an expansion of about 13 percent and comprised 88.59 percent of total generation. Production costs only increased five percent, however, to a total of \$333,508.34 and allowed the average production cost per kilowatt-hour generated by the hydroelectric plant to fall to .83 mills.

Total production for the year was 452,934,100 kilowatt-hours which was an approximate increase of 18 percent. Total production expense increased to \$866,651.77. However, this was at a slightly lower rate of increase than expansion in production and consequently average total generating expenses were lowered a little to 1.91 mills per kilowatt-hour produced.

Total operating expense for 1951 was increased by \$181,977.13, but again this was not proportional to the generation increase so the average total operating expense per kilowatt-hour produced fell slightly to 3.18 mills.

All classes of expenses increased, except for sales promotion and customer accounting and collecting which together decreased a little over \$8,000.00, but no single item increased excessively when the step up in total production is considered.

1952 Production and Purchases

Total energy generated during 1952 was just about the same as for 1951. However, total production expense increased almost 50 percent as drouth conditions forced the curtailment of hydroelectric generating facilities and the expansion of the operation of the steam generating facilities. With a total production expense of \$1,286,125.89 the average total production cost per kilowatt-hour produced went up to 2.02 mills.

As mentioned above, a low water supply occasioned by severe drouth conditions in the upper Grand River watershed, brought about a decrease in hydraulic energy production of nearly one-third of that of the previous year. Total hydroelectric power produced was only 274,827,700 kilowatt-hours even though the installation of an additional turbine, with a rated capacity of 14,400 kilowatts, was completed in 1952 at the Pensacola Hydroelectric Generating Plant. This production was 61.01 percent of total power generated. Even though production was curtailed, production expense for the hydroelectric power generated increased about ten percent over 1951. The production cost of

\$363,835.54 gave an average cost of 1.32 mills per kilowatt-hour. However, nearly five percent of this production expense increase could be directly traced to depreciation charges on the expanded facilities.

Steam generation for 1952 was increased about 335 percent over 1951 generation. This new high was made possible by the installation of a new 15,000 kilowatt, condensing, steam unit at the Choteau Steam Generating Plant and as a result 172,546,000 kilowatt-hours were produced by this method to comprise 38.30 percent of the total generation by GRDA. Production costs increased almost 75 percent to \$922,290.35, but this increase was at a much lower rate than that of the kilowatt-hours produced so average cost of production, for the steam generated energy, fell nearly fifty percent to 5.35 mills per kilowatt-hour.

The drouth conditions, and the consequent low water level in Grand Lake, brought about a shortage of firm power at certain periods of operation and necessitated the purchase of 3,086,000 kilowatt-hours of power in 1952. These purchases cost \$13,307.00, and averaged 4.39 mills per kilowatt-hour purchased.

The increase in production costs for both the hydraulic and steam generated energy, along with the purchase of power from other sources above, were responsible for the major increases in total operating expense. Increases in

transmission maintenance costs of \$14,993.71 and administrative and general operation expenses of \$31,875.23 also contributed to the total operating expenses of \$1,926,785.34 (See Table 13) which averaged 4.28 mills per kilowatt-hour.

1953 Production and Purchases

The drouth conditions of 1952 continued into 1953 and grew more severe as the year progressed. These conditions brought about drastic changes in operations as indicated in a letter, dated February 17, 1954 by the General Counsel of the Grand River Dam Authority, to the certified public accountants who were auditing the Grand River Dam Authority records for the year ended December 31, 1953.

Since May, 1952 the water shed above the Pensacola Dam has experienced a record drought resulting in very unusual and abnormal water conditions and the Authority has been unable to operate its hydro plant in a normal manner and in order to meet its power commitments has had to operate its fuel burning, steam generating plant at full capacity and to purchase power from the Public Service Company during all of this drought period.⁷⁰

Hydroelectric power generation, being drastically curtailed for reasons above, only reached a level of 90,488,500 kilowatt-hours, or 19.81 percent of total power produced and purchased in 1953. This was only one-third the low production of 1952. Hydro production expenses continued to increase slightly to \$478,367.62 and the average production cost was 4.18 mills per kilowatt-hour.

⁷⁰Audit Report, 1953, p. 18.

TABLE 13
OPERATING EXPENSES OF THE GRAND RIVER DAM AUTHORITY,
BY TYPE OF EXPENSE, YEARS 1952, 1953, & 1954

	1952	1953	1954
Production - Steam Power	\$ 922,290.35	\$1,407,005.73	\$1,586,423.84
Production - Hydraulic Power	363,835.54	378,367.62	323,584.96
Purchased Power	13,307.00	386,326.62	776,014.89
Transmission	348,395.53	378,058.75	377,546.48
Customer Accounting & Collecting	4,503.18	3,116.20	4,188.73
Sales Promotion	5,548.88	11,106.87	3,597.61
Administrative and General	<u>268,904.86</u>	<u>269,295.70</u>	<u>271,823.94</u>
Total	\$1,926,785.34	\$2,833,277.49	\$3,343,180.45

Source: Tables A-8a, A-9a, and A-10a.

Steam power generated 290,900,700 kilowatt-hours of energy to make up 63.7 percent of the total power produced and purchased for resale by the Authority for the year 1953. Production costs increased to \$1,407,005.73. This gain however, was not in proportion to the increase in kilowatt-hours generated, and average cost of production fell to 4.84 mills per kilowatt-hour.

Purchased power from the Public Service Company of Oklahoma, Tulsa, Oklahoma, was increased to 75,303,500 kilowatt-hours in order to meet the contractual requirements of the Authority. This purchase amounted to 16.49 percent of the total power available to the Authority and cost \$386,326.62 or an average of 5.13 mills per kilowatt-hour.

Total energy produced and purchased amounted to 456,692,700 kilowatt-hours which was approximately the same as for the previous two years. The total production and purchase cost was \$2,171,699.97 which gave an average of 4.76 mills per kilowatt-hour.

At this point it should be noted that the years 1952, 1953, and 1956 seem to refute the last statement above as total expenses increased while production decreased.

In 1952 there was an increase in depreciation charges as a new generator was added to existing facilities in that year. In the years following, depreciation charges, for each given year, remained relatively constant.

In each of the years above maintenance costs increased as the decrease in production permitted the shut-down of given units and facilitated making repairs while other units carried the load.

In 1953 and 1956 operating costs decreased slightly as production fell. However, in 1952 operating costs rose considerably even though production decreased approximately 30 percent. This item can be partially explained by a statement; "It is our [the auditors] belief that some overhead could also have been properly allocated to property costs."⁷¹ Actually, however, this single exception to the general statement regarding the effect of a preponderance of fixed expense in hydraulic production, in relation to changes in the volume of production, can not be considered as sufficient to invalidate the general comment.

Total operating expense for 1953 increased about 40 percent to \$2,833,277.44; an average total operating expense of 6.20 mills per kilowatt-hour generated and purchased. This was almost entirely due to increased costs of production of both hydro and steam generated energy, the expenditure for purchased power, and an increase in transmission costs of about thirty thousand dollars as other items of operating expense remained nearly constant.

⁷¹Audit Report, 1952, p. 20.

1954 Production and Purchases

Total energy generated and purchased during 1954 increased nearly 16 percent, but with the continuation of the drouth the increase was mainly due to an increase of purchased power. The total cost of energy produced and purchased was \$2,686,023.69 for the production and purchase of 528,455,600 kilowatt-hours. This was an increase of nearly 25 percent over costs for the previous year and brought the average cost per kilowatt-hour produced and purchased to 5.08 mills.

Hydraulic generation of energy continued to drop to a level of 75,452,400 kilowatt-hours which was a decrease of nearly 17 percent below the low generation level of the previous year. This production was only 14.28 percent of the total purchased and produced power. Basic energy production costs for this type of generation fell to \$323,584.96. This was a lesser drop, percentage wise, than production itself and the average cost rose to 4.44 mills per kilowatt-hour produced. However, with a number of the 'costs of production' of hydroelectric power essentially of a 'fixed' type of expense, it should be expected that average costs would probably be greater as production was curtailed.

Steam generation increased to 322,459,400 kilowatt-hours. This was an increase of 31,588,700 kilowatt-hours, or more than ten percent over 1953 generation. Production costs rose to \$1,586,423.84, which was slightly more than

proportional to the increase in the production of energy, and the average production expense for steam generation increased slightly to 4.92 mills per kilowatt-hour. Steam production was 61.02 percent of total generated and purchased power.

Purchased power steadily increased in volume to 24.7 percent of the total power available for sale as the drouth conditions continued. The Authority paid \$776,014.89 for the 130,543,800 kilowatt-hours purchased in 1954. This was an increase of \$389,688.27 or a little above twice the dollar purchases for the previous year. The actual kilowatt-hours purchased were less than three-fourths the purchases of 1953, so the average cost per kilowatt-hour purchased continued to increase to 5.94 mills.

While the total energy produced and purchased increased about 16 percent this year, the total operating expenses increased 18 percent to a total of \$3,343,180.45. This slightly higher ratio of expenses to kilowatt-hours produced and purchased increased the average total operating cost to 6.34 mills per kilowatt-hour.

There was a decrease of over 15 million KWH in hydro production and an increase in steam plant production and power purchased of more than 86 million KWH. This was largely attributable to a low water supply occasioned by the continued drought in the upper Grand River watershed. This situation evidently contributed to the increase in operating expenses, as the Authority had to purchase a considerable amount of power and operate the steam plant at near capacity in order to meet the demands of its customers.⁷²

⁷²Audit Report, 1954, p. 18.

. . . The general increase in steam power production expenses is attributed to an increase of over \$186,000 in fuel purchased. There were other minor increases in steam production expenses; but there were enough decreases to make a net increase of approximately \$178,000 in the total of these expenses. The decrease in hydraulic production expenses was partly attributable to a labor lay-off in the early part of 1954. Maintenance of the hydro plant decreased approximately \$22,500 for the year. These two factors account for the decrease in hydro expenses. The increase of nearly \$390,000 in cost of purchased power may be largely attributable to the continued drought, which has already been discussed herein. The decrease of nearly \$11,000 in transmission expenses is due to a reduction in repairs and maintenance of transmission lines. Sales promotion expense decreased about \$7,500 during 1954 and was largely due to the decrease in demonstration, advertising and miscellaneous sales expenses. The increases in the remaining operating expense accounts are too small to warrant discussion in this report.⁷³

1955 Production and Purchases

"Grand Lake filled in 1955 for first time since 1952 permitting GRDA to make 123 million kilowatt-hours more hydroelectric power than in 1954."⁷⁴ This break in drouth conditions, and the subsequent use of the hydroelectric generating plant at somewhat nearer its capacity, increased hydro production to 200,098,500 kilowatt-hours while expenses in this production stayed nearly constant. In fact, the expenses only increased \$1,077.66 to \$324,662.62 for the year compared to \$323,584.96 for 1954 even though gross generation increased 124,646,100 kilowatt-hours. This nearly constant

⁷³Audit Report, 1954, p. 19.

⁷⁴The Daily Oklahoman (Oklahoma City, Okla.), April 3, 1956, p. 9, col. 2.

cost at an increased rate of production brought the average production cost of the hydraulic generation of energy down to 1.62 mills per kilowatt-hour. Hydro production increased to 33.18 percent of total power available for sale.

Steam generation continued on a high level to comprise 48.39 percent of total power purchased and produced for the year. Total production was 291,811,600 kilowatt-hours and was only approximately ten percent below that of 1954. Steam production expenses increased about \$14,000 to \$1,603,272.05 and averaged 5.49 mills per kilowatt-hour generated.

Purchased power decreased from a level of 130,543,800 to 111,075,000 kilowatt-hours to 18.43 percent of the total power produced and purchased for the year. Though purchases decreased 15 percent in terms of kilowatt-hours, the cost of purchases fell from \$776,014.89 to \$412,609.95, a decrease of approximately 47 percent and an average cost of only 3.71 mills. This average was actually lower than the average cost of steam generation at the Choteau plant.

Total power purchased and generated continued to increase, by almost 15 percent, to a total of 602,985,100 kilowatt-hours as demand continued to increase. However, total production and purchased power costs decreased considerably to \$2,340,544.62, an average of 3.88 mills per kilowatt-hour, as an increase in hydro generation became possible when the level of the reservoir rose above the power

pool elevation for the first time since 1952. The decrease in the cost of purchased power was also a major factor in the decrease in total power costs above.

Total operating expenses decreased almost ten percent to a total of \$3,031,836.01 (see Table 14), even though total power produced and purchased increased. The average total operating cost dropped to 5.02 mills per kilowatt-hour. The decrease in the cost of purchased power was the major factor as other increases and decreases were relatively minor and only served to offset each other when netted out.

1956 Production and Purchases

Once again, as in the three years just prior to 1955, an unfavorable water condition brought about by a resumption of the drouth was the primary factor in a substantial increase in the cost of power. Hydraulic generation fell to a new low of 62,600,900 kilowatt-hours and represented only 9.5 percent of the total power generated and purchased by the Authority. This was a decrease of almost 70 percent from 1955 production and was the lowest annual production of hydroelectric energy since the resumption of operations by the Grand River Dam Authority in November, 1946. As in previous years of low production, hydro generating expenses stayed at a high level as a large percentage of the costs involved are of a 'fixed' nature. Actual expenses for the year were \$329,056.89 which was an average cost of 5.25 mills

TABLE 14
OPERATING EXPENSES OF THE GRAND RIVER DAM AUTHORITY,
BY TYPE OF EXPENSE, YEARS 1955, 1956, & 1957

	1955	1956	1957
Production - Steam Power	\$1,603,272.05	\$1,750,508.90	\$1,455,148.64
Production - Hydraulic Power	324,662.62	329,056.89	345,072.32
Purchased Power	412,609.95	1,059,760.26	666,012.58
Transmission	398,226.25	465,919.88	601,973.95
Customer Accounting & Collecting	4,338.56	4,696.55	4,884.48
Sales Promotion	8,698.20	3,645.43	
Administrative and General	<u>280,028.38</u>	<u>269,080.51</u>	<u>247,221.54</u>
Total	\$3,031,836.01	\$3,882,668.42	\$3,320,313.51

Source: Tables A-11, A-12, and A-13.

per kilowatt-hour generated. This was also the first time for the Authority that average hydroelectric production expenses exceeded the average cost of steam production and purchased power costs.

Sales demands continued to mount and the steam generating plant at Choteau was again pushed to near capacity production. Total production was 341,808,100 kilowatt-hours which was an increase of nearly 50 million kilowatt-hours and 15 percent over 1955 production. Generating expenses increased to \$1,750,508.90, but this was only an increase of approximately eight percent and the average cost of production per kilowatt-hour fell to 5.12 mills.

Purchased power of 254,839,000 kilowatt-hours was an increase of about two and one-fourth times the power purchased in 1955. However, the cost of these purchases was \$1,059,760.26 and though this averaged slightly more than the low cost of purchased power in 1955 was actually the cheapest power available. The average cost per kilowatt-hour of purchased power was 4.16 mills while hydro and steam generation costs averaged 5.25 mills and 5.12 mills, respectfully.

The expense of generation and the cost of the purchased power, totaling \$3,139,326.05, averaged 4.76 mills per kilowatt-hour for the total of 659,248,000 kilowatt-hours available and was approximately one-third over that of 1955.

The increase in total cost of production and purchased power of \$798,781.43, discussed above, explains the major part

of the increase in total operating expense of \$850,852.41. Cost of transmission increased over \$67,000 as the Authority assumed the operation of transmission lines formerly controlled by the KAMO Electric Cooperative, Inc. of Vinita, Oklahoma, under a contract agreement. Administrative and general expenses decreased over \$10,000 and there were minor changes in the other expense classifications. Total operating expense of \$3,882,668.42 for the year was almost 30 percent over similar expenses in 1955 and averaged a cost of 5.89 mills per kilowatt-hour available for distribution.

1957 Production and Purchases

Favorable water conditions in 1957 enabled the hydro plant to produce a far greater amount of power than in 1956. This was credited by the management with being the primary factor in enabling the Authority to show a net profit of \$777,711.06, after provision for depreciation, for the year 1957 as compared with a net loss of \$53,228.89 for the previous year.

Hydraulic generation resulted in the production of 282,356,700 kilowatt-hours in 1957. This generation was an increase of slightly more than 450 percent over production in 1956. Production costs increased about seven percent in climbing to \$345,072.32 from \$329,056.89 in 1956. The average cost of production of hydraulic generated power was 1.22 mills per kilowatt-hour produced.

Steam generation decreased slightly more than 40 percent in 1957 to 202,043,800 kilowatt-hours. However, production expenses for this steam generated power only decreased approximately 18 percent and resulted in an increase in the average cost to 7.20 mills per kilowatt-hour produced compared to 5.12 mills for the previous year.

Purchased power costs declined nearly 40 percent with a reduction in actual kilowatt-hours purchased of approximately 20 percent. The 201,024,400 kilowatt-hours purchased in 1957 cost \$666,012.58 which was an average cost per kilowatt-hour purchased of 3.31 mills. This average cost was lower than the average production cost of 3.92 mills per kilowatt-hour for energy produced by the Authority.

The expense of generation and the cost of the purchased power, totaling \$2,466,233.54, averaged 3.59 mills per kilowatt-hour for the total of 685,424,900 kilowatt-hours available and was approximately one-fourth less than that of 1956.

Total operating expenses of the Authority in 1957 were down about 15 percent to \$3,320,313.51 while total production increased nearly five percent to 685,424,900 kilowatt-hours. This brought the average total operating expense down nearly 20 percent to an average of 4.79 mills per kilowatt-hour produced and purchased in 1957. Most of this decrease can be explained by the decrease in average cost of hydraulic power production and that of purchased

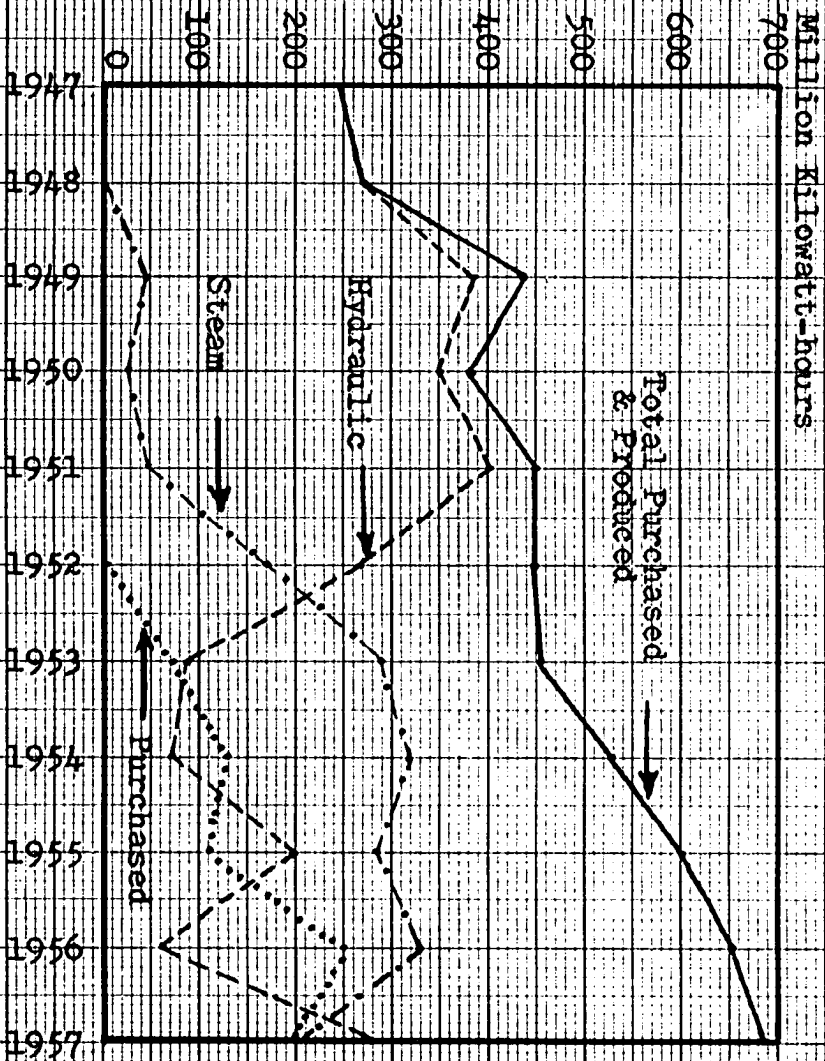
power along with a 10 percent decrease in administrative and general costs. As discussed above, average steam generation costs increased somewhat even though production was at a lower level. Transmission costs continued to climb, as has been the trend for a number of years with the expanding network of transmission lines and substations, and went up nearly one-third in 1957 to a high of \$601,973.95. Most of this increase in transmission costs was in the cost of operation as maintenance and depreciation costs increased only nominally.

Summary

The total kilowatt-hours of produced and purchased power have steadily increased in volume (see Illustration 1) over the eleven and one-third years of operations of the Grand River Dam Authority with the single exception of a decline of approximately 10 percent in 1950 when a short term contract for a rather significant amount of power, involving over 20 percent of the total kilowatt-hours produced in 1949, was terminated according to agreement. However, the sources supplying the increasing volume of electrical energy have varied considerably from year to year. This has been due partially to the installation of additional generating equipment at both the Pensacola Hydroelectric Plant and the Choteau Steam Generating Plant, but more basically has been due to the variation of the water level in the Lake O' the Cherokees behind the Pensacola Dam.

ILLUSTRATION 1

ELECTRICAL ENERGY PRODUCED, BY METHOD OF GENERATION,
AND POWER PURCHASED, ANNUALLY, 1947-1957,
BY THE GRAND RIVER DAM AUTHORITY
(in million kilowatt-hours)



Source: Table 6.

A severe period of drouth, extending from 1951 to 1955 and reoccurring again in 1956, forced a continuing curtailment of hydraulic production in the years 1952, 1953, 1954, and 1956. Hydraulic production dropped approximately 31 percent in 1952, another 60 percent in 1953, and a final 16 percent in 1954 to make a total drop from 401,252,900 kilowatt-hours in 1951 to 75,452,400 kilowatt-hours in 1954, and then fell to a new low level of 62,600,900 kilowatt-hours in 1956.

Steam generation of energy was steadily increased over this drouth period and production was increased approximately 330 percent in 1952, 70 percent in 1953, and an additional ten percent in 1954. Even though steam generation of energy increased from 51,681,200 kilowatt-hours in 1952 to 322,459,400 kilowatt-hours in 1954, total production was still unable to meet the growing demand for power facing the Authority.

The purchase of power from the Public Service Company of Oklahoma, Tulsa, Oklahoma, began in 1952 with the purchase of 3,086,000 kilowatt-hours of energy. Purchases increased to 75,303,500 kilowatt-hours in 1953, 130,543,800 kilowatt-hours in 1954, and 254,839,000 kilowatt-hours in 1956.

The year 1955 saw a break in the drouth and the Pensacola plant stepped up hydroelectric production by about 167 percent to 200,098,500 kilowatt-hours. However, demand continued to increase and though the Authority only cut steam generation back about 10 percent to 291,811,600

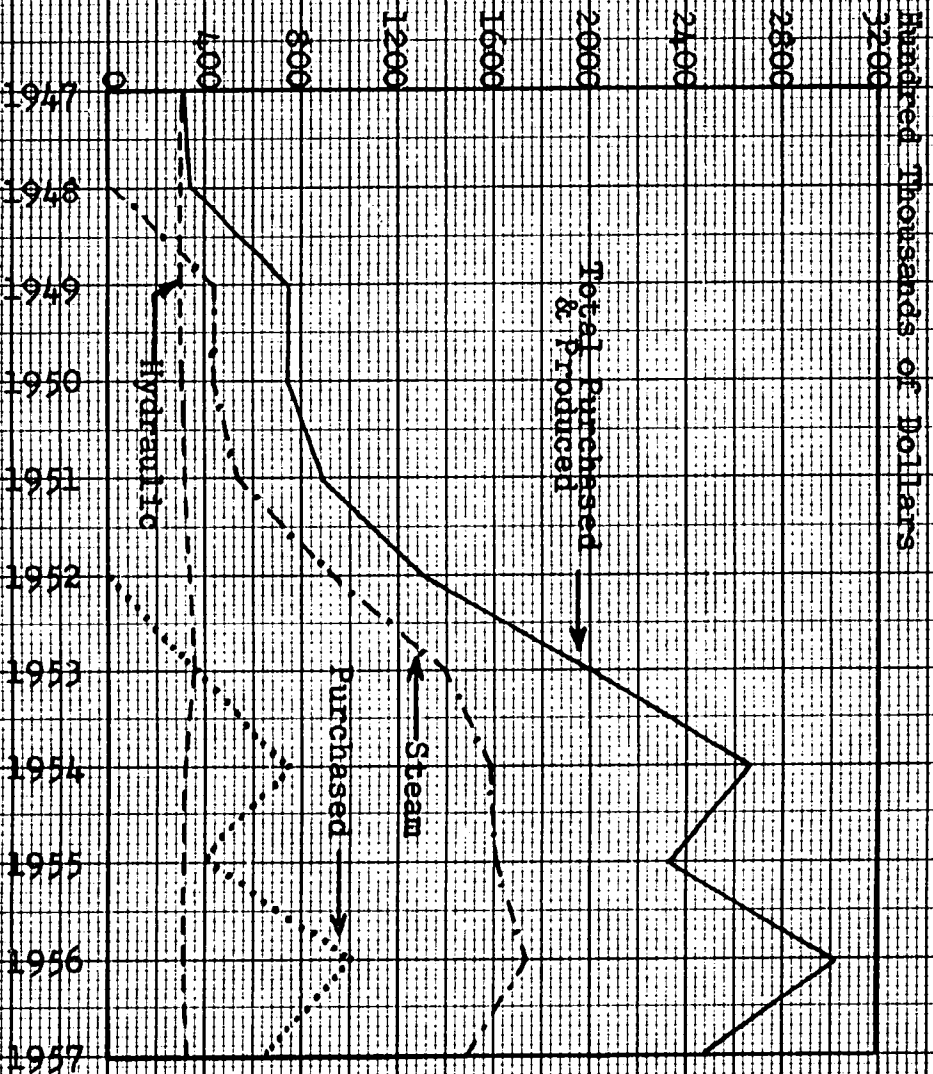
kilowatt-hours to curtail rising costs with steam generation operations at near capacity volume, it was still necessary to purchase a total of 111,075,000 kilowatt-hours in 1955 to supplement production.

Hydraulic costs per kilowatt-hour produced were usually low when the volume of energy generated was high but total hydraulic generation costs (see Illustration 2) fail to fall very much, even when there is an enormous drop in the volume of energy generated, as most of the costs of hydraulic production are of a fixed nature and continue to accrue on a steady basis within wide variations of productivity. Of course, there was some increase in hydraulic production expense as additional facilities installed in 1952 were added to depreciable assets. However, in the entire period under consideration, the extremes of variation in total production costs of hydraulic generation was from a \$317,171.40 low in 1950, when hydraulic energy production was at a high level of 355,007,000 kilowatt-hours, to a \$378,367.62 high in 1953 when production was at a low level of 90,488,500 kilowatt-hours. As a consequence of this somewhat steady level of production expense, average hydraulic production costs in mills per kilowatt-hour generated (see Illustration 3) varied inversely with production and were highest during the years 1953, 1954, and 1956 when hydraulic generation was lowest.

On the other hand, total steam generation costs have risen rather steadily. The greatest increases were in the drouth years of 1952 and 1953 when the steam generating

ILLUSTRATION 2

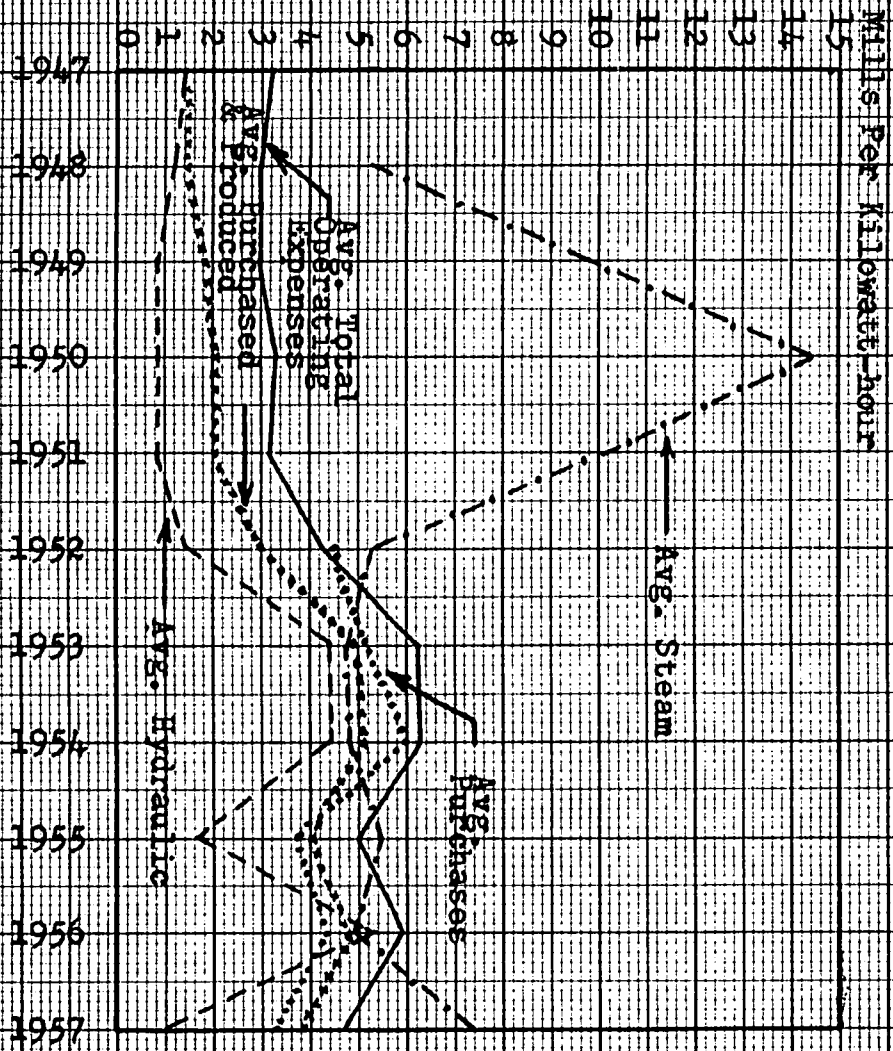
COST OF ELECTRICAL ENERGY PRODUCED BY METHOD OF
GENERATION, AND POWER PURCHASED,
GRAND RIVER DAM AUTHORITY,
ANNUALITY, 1947-1957
(in hundred thousands of dollars)



Source: Table 9.

ILLUSTRATION 3

AVERAGE COSTS, BY SOURCE, OF ELECTRICAL ENERGY PRODUCED
 AND PURCHASED, GRAND RIVER DAM AUTHORITY,
 ANNUALITY, 1947-1957
 (in Mills per kilowatt-hour)



Source: Table 10.

system was first pushed to near capacity operation. In general, however, this increase in total costs can be traced to the general trend of rising prices for fuel and supplies. Steam generation costs per kilowatt-hour of energy produced have decreased somewhat over the period as production has reached a higher level of operation. In the past five years the trend has been more nearly like that of hydraulic production in that the cost of production in mills per kilowatt-hour varies inversely with the volume of energy produced except that in the case of steam generation of energy the variation is not so pronounced as it is in hydraulic production. This similarity, of course, merely bears out the fact that while steam generation costs are also largely of a fixed type of expense they are more variable in nature than those of hydraulic production.

Purchased power did not become a sizeable consideration until 1953 when the purchase of over 75 million kilowatt-hours of energy amounted to 16.49 percent of the total power available for distribution. This purchase was made to offset the hydraulic production lost due to the low level of the Lake O' the Cherokees with the continuation of the drouth and the ever expanding demand for power. For the past five year period the Authority purchased approximately 25 percent of the total power sold. The purchase price per kilowatt-hour has varied somewhat but there appears to be a definite trend toward a slightly decreasing level of cost. The 3.71 mills

per kilowatt-hour paid in 1955 was considerable less than the 5.49 production cost of steam generated power at the Choteau plant. Also, the 4.16 mills paid in 1956 and the 3.31 mills paid in 1957 per kilowatt-hour purchased were under the production cost figures for both hydraulic and steam generated energy in those years.

CHAPTER IV

AN ANALYSIS OF THE DISTRIBUTION OF THE ELECTRICAL ENERGY SOLD BY THE GRAND RIVER DAM AUTHORITY

This analysis of sales of electrical energy by the Grand River Dam Authority is, as was the analysis in Chapter III of the purchase and production of energy, based upon the accounting records of the Authority and the annual audit reports prepared by the certified public accounting firms responsible for the given years audit.

The approach to this analysis is by an annual survey of sales to the major revenue account classifications of customers as follows: Industrial sales, sales to public authorities, and sales to electric utilities. These classes are then analyzed thoroughly by the different sub-groups of customers within each class. Industrial sales are only considered as a group, but sales to public authorities are sub-divided into sales to federal authorities and to municipal authorities. Sales to electric utilities are first considered in terms of sales to privately owned electric utilities and to publicly owned electric utilities. Then the sub-group, sales to public electric utilities, is

further sub-divided into sales to municipalities and to cooperatives.

There are some discrepancies in the data presented in the accompanying tables that must be explained at this point to avoid possible confusion as these differences occur both in the form of account titles and in numerical totals. First, the summary of 'Sales to Public Authorities' (see Table A-17) for the years 1948 through 1955 only covered sales to federal authorities but it should have also included sales to municipal authorities. These sales to municipal authorities were included under the summary of 'Industrial Sales' (see Table A-18) for the above years. This was an error in the classification of customer accounts which was corrected in 1956. Furthermore the totals in tables of 'Sales to Public Authorities' and 'Industrial Sales', which follow in the text for the years 1948 through 1955, are not in agreement with the summary totals of these same classes of sales as shown in Tables A-17 and A-18 as they have been corrected to correspond with the standard classification of customer accounts as recommended by the Federal Power Commission.

Second, another difference is due to an error in the classification title of what is actually, according to Grand River Dam Authority records and the Federal Power Commission standard form of customer classification, 'Other Sales to Public Authorities' but the auditors changed the

title in their audit report (see Table A-6) in 1950 to 'Lighting and Maintenance.' This error has been continued through the succeeding years. However, in 1956 the auditors did use the more proper title 'Governmental and Municipal' for this account in the text of the report⁷⁵ but they continued to use the improper title 'Lighting and Maintenance', in the Statement of Income for the year as presented in Exhibit "C" of the audit report.

Finally, differences in 1955 totals in Tables A-16 and A-18 can be explained as being due to a difference in the classification of a single \$10 account of the Benedict Construction Company which was classified as an industrial sale by the Authority and as an electric utility sale by the auditor. The Authority was correct in their classification as the customer, without question, was an industrial type firm.

According to the Federal Power Commission standard form for classification of electric utility customers the customers of the Grand River Dam Authority all fall within three types of revenue accounts: (1) Industrial Sales, Account Number 602; (2) Other Sales to Public Authorities, Account Number 604; and (3) Sales to Electric Utilities, Account Number 605. In Grand River Dam Authority reports to the Federal Power Commission these revenue accounts are

⁷⁵Audit Report, 1956, p. 17.

sub-divided into four applicable classes of rate schedules.⁷⁶

Though the Grand River Dam Authority is licensed to operate under the authority of the Federal Power Commission it is not subject to rate regulation in the sale of their generated energy as:

. . . the jurisdiction of the Federal Power Commission is now divided into three spheres, namely, power generated on public lands by licensees, power transmitted at wholesale in interstate commerce, and power generated by two federal projects [Bonneville and Fort Peck].⁷⁷

Consequently, rate schedules of the Grand River Dam Authority are not required to follow the pattern of those electric utilities subject to Federal Power Commission rate regulation and so have set their rates up on a slightly different basis.

⁷⁶Schedule A-1, sales to rural cooperatives and municipalities--for resale to customers (but no resale to any customer using more than 500 kw of demand without permission of the Authority); Schedule A-2, sales to private utilities and companies who contract to purchase secondary power and energy, in addition to firm power and energy; Schedule B-1, sales to new manufacturing and processing plants to be established in Oklahoma or manufacturing and processing plants already established in Oklahoma where power is consumed directly in manufacturing a finished product or processing or mining raw materials for sale or use in manufacturing or processing a finished product--(no resale of power or energy); Schedule B-2, sales to basic large lighting and power users for street lighting, pumping loads, construction work, and plants and industries not engaged in manufacturing or processing a finished product and all such power users to whom Schedule B-1 does not apply--(no resale of power or energy). (Federal Power Commission, Form 1, Annual Report.)

⁷⁷The Twentieth Century Fund, Electric Power and Government Policy (New York: The Twentieth Century Fund, 1948), p. 69.

Though they cover the four classes of rate schedules of the Federal Power Commission the Grand River Dam Authority revenue accounts are only sub-divided into three classes of rate schedules as detailed below:

(1) Industrial Sales: The energy rate (kilowatt-hours consumed) is 4 mills for the first 2 million kilowatt-hours and 3.5 mills for consumption above 2 million kilowatt-hours plus a \$0.50 demand charge (based on the maximum kilowatts used as determined from readings taken on 30 minute intervals or the contract demand whichever is the greater. This is, in turn, based on an 85 percent power factor, which refers to the constancy of demand, and the charge is increased if the power factor is lower or decreased if the power factor is higher).

(2) Municipal Sales: The energy rate is 4 mills for the first 100,000 kilowatt-hours, 3 mills for the next 200,000 kilowatt-hours, and 2.5 mills for consumption above 300,000 kilowatt-hours plus a \$0.90 demand charge.

(3) Rural Electric Administration Sales: Both the energy charges and the demand charges are the same as those for sales to municipalities.

These basic rate schedules are also subject to the following modifications depending on the various circumstances concerned:

(1) Each of the classes of customers are allowed a 10 percent discount on the demand charge if the customer owns

and maintains their own substation.

(2) The net billing of each individual account must exceed both of the following minimums; (a) energy used multiplied times 4.6 mills (this is reduced to 4.5 mills if the customer owns and maintains his own substation), and (b) total demand multiplied times \$1.50.

(3) Surcharges have been added to net bills (or minimum bills) and the approval and use of these surcharges were described as follows:

When the federal government was in control of the operation of the facilities [Pensacola Dam for the period November 21, 1940 to August 31, 1946] the government sold all power at a straight four mills per kilowatt-hour with no demand charge. When the facilities were returned to state control the Authority used the same basic rates as are presently used, ignoring the 15 percent surcharge included in the basic rate today.

In 1949 the Grand River Dam Authority added a 15 percent surcharge to the basic rate and in 1953 the 1949 rates were subjected to an additional flexible surcharge. This flexible surcharge, which can vary as much as from minus 5 percent to plus 20 percent, in multiples of 5 percent, is calculated quarterly and based on the following formula: Net Income - (provision for depreciation of assets + provision for debt service, including interest and amortization) + surcharge necessary = Net Revenues.⁷⁸

The flexible surcharge was authorized by the Authority as a temporary emergency measure. Its necessity and some possible effects were discussed as follows:

The decrease in income disclosed by the foregoing tabulation [Comparative Statements of Income for the Years Ended December 31, 1952 and 1953] may be very largely attributed to the severe drought prevailing throughout the year. In this connection we quote from

⁷⁸Interview with James I. Monroe, General Auditor of the Grand River Dam Authority, Vinita, Oklahoma, January 21, 1958.

the General Counsel's letters to us dated February 17 and February 4, 1954:

"Since May, 1952 the water shed above the Pensacola Dam has experienced a record drought resulting in very unusual and abnormal water condition and the Authority has been unable to operate its hydro plant in a normal manner and in order to meet its power commitments has had to operate its fuel burning, steam generating plant at full capacity and to purchase power from the Public Service Company during all of this drought period. As a result the Authority had to use all of its reserve funds to meet its debt requirements, however, on the 1st of December, 1953 the Authority placed in effect an increase of rates in the form of a 20% emergency drought surcharge. It is estimated that with the 20% surcharge the Authority will be able to meet its operating expenses and its debt requirements until there is sufficient inflow into the reservoir to permit normal operations at the hydro plant. The 20% surcharge will remain in effect until the drought emergency is over, or through the month of June, 1954."⁷⁹

With the continuation of the drouth through 1954 the temporary 20 percent surcharge was replaced with a more flexible method of assuring that the Authority would be able to meet its operating expenses and debt requirements through the current drouth and in any future periods of drouth by collecting sufficient, but not excessive, revenues in those periods creating funds emergencies.

We quote from the General Counsel's letter dated February 23, 1955, with respect to the continued drought and surcharge:

"The drought conditions referred to in our report to you last year continued through 1954, and the 20% surcharge was continued and is still in effect, however, during the year a study and report was made by Mr. W. V. Burnell, formerly Vice President of Stone and Webster Engineering Corporation, and W. R. Holway and Associates, from which the Authority adopted a formula for increasing and decreasing rates and incorporated said formula in its schedule of rates. Under this formula the rates are

⁷⁹Audit Report, 1953, p. 18.

adjusted quarterly with a view of providing net earnings equal to 1.5 times the debt service requirements, however, the rates cannot be increased more than 20%." ⁸⁰

Under the formula discussed above, the flexible surcharge has varied considerably over the years and a record of these charges is as follows:

20 percent December, 1953 through September, 1955.
 15 percent October, 1955 through December, 1955.
 10 percent January, 1956 through September, 1956.
 15 percent October, 1956 through December, 1956.
 20 percent January, 1957 through June, 1957.
 10 percent July, 1957 through September, 1957.
 5 percent October, 1957, through the present date. ⁸¹

A typical statement to an industrial sales account for the month of December, 1957 is presented as follows:

Kilowatt-hours consumed (up to 2 million kwh @ \$0.004)	xxx
(over 2 million kwh @ \$0.0035)	xxx
Demand x rate (90% Power Factor) kw @ \$0.36 ^a	xxx
Less: credit for own substation	<u>xx</u> <u>xxx</u>
Net Billing ^b	<u>xxx</u>
Plus: 15 percent surcharge	<u>xx</u>
Sub-total	<u>xxx</u>
Plus: 5 percent surcharge ^c	<u>xx</u>
Total charge for the period	<u>xxx</u>

^aNormal \$0.50 demand charge to industry based on 85 percent power factor.

^bSubject to minimums discussed above.

^cSurcharge determined by earnings ratio as discussed above.

⁸⁰Audit Report, 1954, p. 17.

⁸¹Monroe Interview, loc. cit.

Preliminary Operations

Preliminary operations in the period September, 1940 to November 20, 1941 resulted in the gross production of 101,890,090 kilowatt-hours of energy⁸² and the receipt of \$163,790.60 in sales revenues (see Table 15). These operations were interrupted on November 21, 1941, as discussed in Chapter II, when, by Executive Order of the President, control of the facilities was taken from the state authority and turned over to federal authority. It was not until September 1, 1946, when control was returned to the Grand River Dam Authority, that the complete operation of production and distribution of energy was initiated by the Authority.

1946 Sales⁸³

Total sales of electrical energy for the period resulted in the distribution of 50,408,319 kilowatt-hours of energy and the receipt of \$224,108.51 in revenues (see Table A-19), which was an average of 4.45 mills per kilowatt-hour sold (see Table 16).

Industrial Sales

Sales to commercial and industrial type of firms was the second largest class of customers and produced 22.2 percent (see Table A-20) of the total electric energy

⁸²Letter from James I. Monroe, General Auditor, Grand River Dam Authority, Vinita, Oklahoma, February 7, 1958.

⁸³For the period September 1 to December 31, 1946.

TABLE 15

GRAND RIVER DAM AUTHORITY
REVENUES FOR THE PERIOD
SEPTEMBER, 1940 to NOVEMBER 20, 1941

Customer Name	Date Started	Amount
Chelsea, Town of	May 10, 1941	\$ 2,772.96
Claremore, City of	Sept. 13, 1941	1,180.43
Collinsville, City of	May 16, 1941	2,453.08
Disney Lake, Light and Power Company	Oct. 26, 1940	1,338.00
Holway & Neuffer Construction Company	Sept., 1940	599.58
Northeast Oklahoma Electric Cooperative	May 1, 1941	298.15
Oklahoma Gas and Electric Company	April 27, 1941	145,470.05
U. S. Engineers, (Bomber Plant, Tulsa, Okla.)	June 18, 1941	961.87
Verdigris Valley Electric Cooperative	June 18, 1941	1,620.75
Cash Sales		<u>68.37</u>
Total revenues from the production of electric power		\$156,763.24
Other revenues (boat and dock permits, farm permits, water sales, and house rents)		<u>7,027.36</u>
Total Revenues		\$163,790.60

Source: Audit Report for 1941, Grand River Dam Authority, Vinita, Okla. (Robt. E. Garnett & Co., Certified Public Accountants, Tulsa, Oklahoma), p. 21.

TABLE 16

AVERAGE SALES PRICE, BY CLASS OF CUSTOMER, GRAND RIVER DAM AUTHORITY
(in mills per kilowatt-hour)

Class of Customer	1946 ^a	1947	1948	1949	1950	1951
<u>Industrial</u>	4.37	4.85	4.56	5.18	5.37	5.48
<u>Electric Utilities</u>						
Municipalities	4.86	4.90	4.98	5.29	5.74	5.80
Cooperatives	6.01	5.76	5.80	5.84	5.64	5.66
Total Public Utilities	5.21	5.07	5.14	5.47	5.69	5.72
Private Utilities	4.29	3.10	3.22	3.82	3.78	3.54
Total Electric Utilities	4.44	3.41	3.64	4.08	4.27	4.19
<u>Public Authorities</u>						
Federal Authorities	5.76	5.33	5.40	5.68	5.97	6.12
Municipal Authorities			5.35	5.37	5.79	5.98
Total Public Authorities	5.76	5.33	5.40	5.59	5.92	6.05
<u>Total Sales</u>	4.45	3.69	3.84	4.22	4.45	4.42

TABLE 16 Continued

Class of Customer	1952	1953	1954	1955	1956	1957
<u>Industrial</u>	5.35	5.42	6.47	6.34	5.79	5.98
<u>Electric Utilities</u>						
Municipalities	5.66	5.60	6.67	6.75	6.21	6.35
Cooperatives	5.87	5.89	6.55	6.40	5.98	6.03
Total Public Utilities	5.77	5.83	6.60	6.55	6.07	6.15
Private Utilities	4.67	6.43	7.48	6.00	96.85	5.99
Total Electric Utilities	5.14	6.10	6.89	6.44	6.58	6.14
<u>Public Authorities</u>						
Federal Authorities	8.04	7.99	9.23	8.06	8.03	7.90
Municipal Authorities	6.01	6.22	7.26	7.39	7.11	7.61
Total Public Authorities	6.30	6.48	7.54	7.51	7.26	7.67
<u>Total Sales</u>	5.21	5.86	6.72	6.39	6.06	6.06

^aFor the period September 1 to December 31, 1946.

Source: Tables 17 through 52.

sales revenue for the period. Sales revenues of \$49,842.34 from industrial purchases of 11,413,600 kilowatt-hours of energy (see Table 17) were made at an average rate of 4.37 mills per kilowatt-hour purchased.

TABLE 17
INDUSTRIAL POWER SALES,
PERIOD OF SEPTEMBER 1 TO DECEMBER 31, 1946

Customers	KWH	Amount
B. F. Goodrich Company	11,404,000	\$49,742.34
Ark-La Electric Cooperative	9,600	100.00 ^a
Total for period	11,413,600	\$49,842.34

^aA minimum billing.

Source: Operating Revenue Accounts Ledger, Grand River Dam Authority.

Sales to Public Authorities

Sales to public authorities in the period consisted only of sales to federal authorities of 757,360 kilowatt-hours of energy and resulted in revenues of \$4,362.60 (see Table 18) which was an average of 5.76 mills per kilowatt-hour sold.

Sales to Electric Utilities

Total sales of electrical energy to electric utilities in the last four months of 1946 resulted in the distribution of 38,237,359 kilowatt-hours of energy and the receipt of \$169,903.57 in revenues (see Table 19) at an average rate of

TABLE 18

SALES TO PUBLIC AUTHORITIES
PERIOD OF SEPTEMBER 1 TO DECEMBER 31, 1946

Customers	KWH	Amount
<u>Federal</u>		
Camp Gruber, Oklahoma	273,600	\$1,319.80
Oklahoma Ordnance Works	429,760	2,784.80
Cardox Plant (W.A.A.)	54,000	258.00
Total for period	757,360	\$4,362.60

Source: Operating Revenue Accounts Ledger, Grand River Dam Authority.

TABLE 19

SALES TO ELECTRIC UTILITIES
PERIOD OF SEPTEMBER 1 TO DECEMBER 31, 1946

Customers	KWH	Amount
<u>Municipalities</u>		
City of Chelsea	406,080	\$ 2,606.72
City of Claremore	3,292,800	14,434.86
City of Collinsville	647,520	4,122.27
Total to Municipalities	4,346,400	\$21,163.85
<u>Cooperatives</u>		
Consumers Electric Coop. Inc.	461,650	\$ 2,549.89
Northeast Okla. Coop. Inc.	855,443	5,363.29
Verdigris Valley Elect. Coop. Inc.	620,666	3,739.84
Total to Cooperatives	1,937,759	\$11,653.02
<u>Private Utilities</u>		
Public Service Co. of Okla. and Oklahoma Gas & Electric Co.	31,953,200	\$137,086.70

TABLE 19 Continued

Customers	KWH	Amount
<u>Summary</u>		
Municipalities	4,346,400	\$ 21,163.85
Cooperatives	1,937,759	11,653.02
Total to Public Utilities	6,284,159	\$ 32,816.87
Private Utilities	31,953,200	137,086.70
Total to Electric Utilities	38,237,359	\$169,903.57

Source: Operating Revenue Accounts Ledger, Grand River Dam Authority.

4.44 mills per kilowatt-hour sold.

Sales to Municipalities. Sales to municipalities of 4,346,400 kilowatt-hours of energy brought in revenues totaling \$21,163.85 based on an average rate of 4.86 mills per kilowatt-hour sold.

Sales to Cooperatives. Sales to cooperatives resulted in the distribution of 1,937,759 kilowatt-hours of energy and revenues totaling \$11,653.02. These revenues were based on an average of 6.01 mills per kilowatt-hour distributed.

Sales to Publicly Owned Utilities. Total sales to all publicly owned electric utilities, which included both municipally owned and rural electric cooperative utilities resulted in the sale of 6,284,159 kilowatt-hours of energy and revenues of \$32,816.87. These sales were made at an average rate of 5.21 mills per kilowatt-hour sold.

Sales to Privately Owned Utilities. Only one sale was made to

a private electric utility in the period but this was under a contract to a combination of the Public Service Company of Oklahoma and the Oklahoma Gas & Electric Company who divided the energy received in a separate private agreement between the two firms. This sale was for 31,953,200 kilowatt-hours of energy and included almost a million kilowatt-hours of dump power (see Table A-19). The revenue from this sale was \$137,086.70 and though it was all sold under one contract it was the largest sale made in this period to a single classification of customers. The average rate per kilowatt-hour sold was 4.29 mills.

1947 Sales

Total power sales for the year resulted in the distribution of 254,113,486 kilowatt-hours of energy and the receipt of \$937,772.09 in revenues. These sales were made at an average of 3.69 mills per kilowatt-hour which was three-quarters of a mill less per kilowatt-hour than the average sales price for the four months period of operation in 1946.

It was evident that this was going to be a good year from a report made by the Authority in September on the anniversary of the first complete year of operations.

Power Sales At Grand Dam Rise Steadily.--The Grand River Dam Authority reported Thursday steadily mounting revenues and a \$400,000 payment on its bonded debt from \$871,339 in hydroelectric power revenues during the first year of

the projects return to state control.

General Manager France Paris announced monthly sales mounted from \$50,074 in September 1946, to a peak of \$98,534 during last May's heavy rains. Revenue dropped back to \$79,444 last month.

The GRDA reported nine new customers connected to its transmission lines since the state-owned project was turned back to the state last September after being operated by the federal government during the war.

The new customers were the municipalities of Tahlequah, Wagoner and Miami, waterworks installations at Muskogee and Pryor, the army air force at Tulsa, The General Power factory at Quapaw and Johnson-Winston Kiewitt and M. O. Weaver Company, both contractors on the Fort Gibson dam project near Muskogee.⁸⁴

Industrial Sales

Sales to industry was again the second largest sub-group of customer sale by the Authority. These sales produced \$184,458.53 in revenues (see Table 20), which was 19.7 percent of the total revenues for the year on the sale of 38,019,846 kilowatt-hours of energy. The average sales price of this energy sold to industry was 4.85 mills per kilowatt-hour.

Sales to Public Authorities

Sales to public authorities for the year consisted only of sales to federal authorities who purchased 8,249,200 kilowatt-hours of energy and paid \$45,953.40 (see Table 21) to the Authority. These revenues resulted in 4.7 percent of the total revenues of the Authority and were based on an average sales price of 5.33 mills per kilowatt-hour.

⁸⁴The Oklahoma City Times, September 18, 1947, p. 12.

TABLE 20
INDUSTRIAL POWER SALES
Year 1947

Customers	KWH	Amount
General Power	126,046	\$ 1,012.89
B. F. Goodrich Company	35,861,000	168,942.67
Ark-La Electric Cooperative	43,200	450.00 ^a
Johnson-Winston Kiewit	1,267,800	9,325.00
M. O. Weaver	721,800	4,727.97
Total for year	38,019,846	\$184,458.53

^aA minimum billing.

Source: Operating Revenue Accounts Ledger, Grand River Dam Authority.

TABLE 21
SALES TO PUBLIC AUTHORITIES
Year 1947

Customers	KWH	Amount
Camp Gruber, Oklahoma	446,400	\$ 3,917.00
Oklahoma Ordnance Works	1,336,800	7,706.40
Cardox Plant (W.A.A.)	151,000	755.00
Government Aircraft Plant No. 3	6,315,000	31,575.00
Total for year	8,249,200	\$43,953.40

Source: Operating Revenue Accounts Ledger, Grand River Dam Authority.

Sales to Electric Utilities

Total sales of electric energy to electric utilities in 1947 resulted in the distribution of 207,844,400 kilowatt-hours

of energy and the receipt of \$709,360.16 (see Table 22). These sales comprised 75.6 percent of total sales of the Authority and were made at an average of 3.41 mills per kilowatt-hour sold.

Sales to Municipalities. Sales to municipalities comprised 13.6 percent of the total sales for the year and resulted in the disposal of 26,149,280 kilowatt-hours of energy and the receipt of \$128,041.77 in revenues. This revenue was based on an average sales price of 4.90 mills per kilowatt-hour sold.

Sales to Cooperatives. Sales of 6,686,860 kilowatt-hours of energy to cooperative electrical utilities resulted in revenues of \$38,509.04, which was 4.1 percent of the total revenues of the Authority for the year. The average sales price of this energy was 5.76 mills per kilowatt-hour.

Sales to Publicly Owned Utilities. Total sales to publicly owned utilities comprised 17.7 percent of all sales of the year and produced \$166,550.81 in revenues from the sale of 32,836,140 kilowatt-hours of energy at an average sales price of 5.07 mills per kilowatt-hour sold.

Sales to Privately Owned Utilities. This was a sale to a single customer and was a combined purchase of the Public Service Company of Oklahoma and the Oklahoma Gas & Electric Company under a single contract. The consumption of 175,008,300 kilowatt-hours of energy, which included 22,789,700 kilowatt-hours of secondary power and 72,134,500

TABLE 22
SALES TO ELECTRIC UTILITIES
Year 1947

Customers	KWH	Amount
<u>Municipalities</u>		
City of Chelsea	1,411,680	\$ 8,753.11
City of Claremore	11,916,800	49,836.41
City of Collingsville	1,994,400	12,791.74
City of Miami	6,850,800	34,854.74
City of Tahlequah	2,574,000	13,463.90
City of Wagoner	1,401,600	8,342.43
Total to Municipalities	26,149,280	\$128,041.77
<u>Cooperatives</u>		
Consumers Electric Coop. Inc.	1,304,450	\$ 7,263.51
Northeast Okla. Coop. Inc.	3,140,427	18,749.76
Verdigris Valley Elect. Coop. Inc.	2,241,983	12,495.77
Total to Cooperatives	6,686,860	\$ 38,509.04
<u>Private Utilities</u>		
Public Service Co. of Okla. and Oklahoma Gas & Electric Co.	175,008,300	\$542,809.35
<u>Summary</u>		
Municipalities	26,149,280	\$128,041.77
Cooperatives	6,686,860	38,509.04
Total to Public Utilities	32,836,140	\$166,550.81
Private Utilities	175,008,300	542,809.35
Total to Electric Utilities	207,844,440	\$709,360.16

Source: Operating Revenue Accounts Ledger, Grand River Dam Authority.

kilowatt-hours of dump power, was the largest sale of energy to a single sub-group of customer made by the Authority in the year and comprised 57.9 percent of total sales. Revenues from this source were \$542,809.35 and averaged 3.10 mills per

kilowatt-hour sold.

1948 Sales

Total sales of electrical energy for the period resulted in the distribution of 263,416,972 kilowatt-hours of power and provided revenues of \$1,012,770.84 at an average sales price of 3.84 mills per kilowatt-hour delivered. These sales represented an increase of a little less than 5 percent over the total sales of 1947.

Industrial Sales

Industrial sales in 1948 increased more than 15 percent over the previous year to a high of \$202,196.30 (see Table 23). This revenue was produced at an average price of 4.56 mills per kilowatt-hour for the 44,309,670 kilowatt-hours delivered to this class of customers. Industrial sales made up approximately 20 percent of the total sales for the year.

Sales to Public Authorities

Energy sales to public authorities were down nearly 5 percent in 1948 as 7,869,418 kilowatt-hours of energy were delivered (see Table 24), but the decrease in revenue was only down about 3 percent as revenues of \$42,462.59 were received from this class of customers as the sales price increased to 5.40 mills per kilowatt-hour sold. Total sales to this class of customers provided 4.2 percent of the

TABLE 23

INDUSTRIAL POWER SALES
Year 1948

Customers	KWH	Amount
General Power	147,410	\$ 1,198.96
B. F. Goodrich Company	38,202,000	167,128.94
Arklahoma Corporation ^a	43,200	450.00 ^b
Johnson-Winston Kiewit	4,059,000	21,429.60
Pryor Water Works ^c	371,260	1,907.68
M. O. Weaver	1,486,800	10,081.12
Total for year	44,309,670	\$202,196.30

^aFormerly the Ark-La Electric Cooperative.

^bA minimum billing.

^cMisclassified in original records. However, sales only made to 1952 and sales amounts considered immaterial.

Source: Operating Revenue Accounts Ledger, Grand River Dam Authority.

TABLE 24

SALES TO PUBLIC AUTHORITIES
Year 1948

Customers	KWH	Amount
<u>Federal</u>		
Camp Gruber, Oklahoma	267,840	\$ 3,750.00
Oklahoma Ordnance Works	600,338	3,542.35
Cardox Plant (W.A.A.)	102,000	510.00
Government Aircraft Plant No. 3	6,432,000	32,160.00
Total Federal Authorities	7,402,178	\$39,962.35
<u>Municipal</u>		
Muskogee Water Works	327,600	\$ 1,645.00
Quapaw Water Works	139,640	855.24
Total Municipal Authorities	467,240	\$ 2,500.24

TABLE 24 Continued

Customers	KWH	Amount
<u>Summary</u>		
Federal Authorities	7,402,178	\$39,962.35
Municipal Authorities	467,240	2,500.24
Total to Public Authorities	7,869,418	\$42,462.59

Source: Operating Revenue Accounts Ledger, Grand River Dam Authority.

total revenue received by the Authority this year.

Sales to Federal Authorities. Sales to federal authorities provided \$39,962.35 in revenues for the 7,402,178 kilowatt-hours delivered and made up about 95 percent of the sales to public authorities and 4.0 percent of total sales.

Sales to Municipal Authorities. Sales to municipal authorities became a sub-group of the sales to public authorities for the first time in 1948 with the beginning of purchases by the Muskogee Water Works and the Quapaw Water Works. Sales to this sub-group of customers resulted in the receipt of \$2,500.24 in revenues from the sale of 467,240 kilowatt-hours of energy. However, from a percentage viewpoint these sales were insignificant as they provided but 5 percent of the revenue furnished by all public authority sales and 0.25 percent of the total revenues of the Authority in 1948.

Sales to Electric Utilities

Total sales of electrical energy to electric utilities of all types continued to provide over 75 percent of the revenues of the Authority as the sale of 211,237,884 kilowatt-hours of energy, at an average rate of 3.64 mills per kilowatt-hour sold, provided \$768,111.95 in revenues in 1948 (see Table 25).

Sales to Municipalities. Sales to municipalities of 37,063,160 kilowatt-hours of energy resulted in an increase of nearly 50 percent in revenues from this sub-group of customers with the receipt of \$184,543.43. These revenues were produced from an average sales price of 4.98 mills per kilowatt-hour sold and amounted to 18.2 percent of total sales for the year.

Sales to Cooperatives. Sales to cooperatives of 9,043,124 kilowatt-hours of energy resulted in revenues of \$52,464.42 at an average rate of 5.8 mills per kilowatt-hour sold. These revenues were about 40 percent over those from this sub-group in 1947 and provided 5.2 percent of the total revenues for the year.

Sales to Publicly Owned Utilities. Total sales to publicly owned utilities, which include the two sub-groups of public utilities above, increased approximately 45 percent over the previous year and provided \$237,017.85 in revenues from the sale of 46,106,284 kilowatt-hours of energy at an average

TABLE 25
SALES TO ELECTRIC UTILITIES
Year 1948

Customers	KWH	Amount
<u>Municipalities</u>		
City of Chelsea	1,489,440	\$ 9,121.83
City of Claremore	14,438,200	63,459.48
City of Collinsville	2,277,120	14,241.26
City of Miami	11,705,600	58,816.00
City of Tahlequah	4,407,600	22,643.22
City of Wagoner	2,745,200	16,271.64
Total to Municipalities	37,063,160	\$184,543.43
<u>Cooperatives</u>		
Consumers Electric Coop. Inc.	2,133,600	\$ 10,997.49
KAMO Electric Coop. Inc.	187,200	2,777.42
Northeast Oklahoma Coop. Inc.	4,183,354	23,884.05
Verdigris Valley Elect. Coop. Inc.	2,538,970	14,805.46
Total to Cooperatives	9,043,124	\$ 52,464.42
<u>Private Utilities</u>		
Public Service Company of Okla. and Oklahoma Gas & Electric Co.	165,131,600	\$531,094.10
<u>Summary</u>		
Municipalities	37,063,160	\$184,543.43
Cooperatives	9,043,124	52,464.42
Total to Public Utilities	46,106,284	\$237,017.85
Private Utilities	165,131,600	531,094.10
Total to Electric Utilities	211,237,884	\$768,111.95

Source: Operating Revenue Accounts Ledger, Grand River Dam Authority.

price of 5.14 mills per kilowatt-hour sold. Sales to this group of customers provided nearly one-fourth of the total income received by the Authority in 1948.

Sales to Privately Owned Utilities. Sales under the single contract to this sub-group of customers decreased about 7 percent as 165,131,600 kilowatt-hours of energy were delivered. This sale included nearly 28 million kilowatt-hours of secondary power and almost 52 million kilowatt-hours of dump power. Revenues amounted to \$531,094.10, a decrease of only 2 percent over the previous year, and provided 52.4 percent of the total revenues of the Authority. The average sales price was 3.22 mills per kilowatt-hour delivered.

1949 Sales

Total power sales for the year resulted in the distribution of 411,249,967 kilowatt-hours of energy and the receipt of \$1,734,845.26 in revenues. These sales were made at an average of 4.22 mills per kilowatt-hour sold which was about 10 percent over the 1948 sales price.

This increase in revenues in 1949 was mainly due to:

. . . the sale of 96,492,300 KWH to Arkansas Power and Light Company [Pine Bluff, Arkansas] under a short term contract, now terminated, and to an increase in sales to other private utilities.⁸⁵

Industrial Sales

Sales to industry was the only class of sales to decrease over corresponding sales in 1948. These sales were off nearly 20 percent and resulted in a distribution of only 37,255,900 kilowatt-hours of energy and the receipt of

⁸⁵Audit Report, 1949, p. 19.

\$192,917.95 in revenues (see Table 26). Industrial sales only produced 11.1 percent of the total revenues even though the average sales price increased over 10 percent to 5.18 mills per kilowatt-hour sold.

TABLE 26
INDUSTRIAL POWER SALES
Year 1949

Customers	KWH	Amount
General Power	149,900	\$ 1,272.19
B. F. Goodrich Company	32,395,000	157,163.17
Muskogee Materials Company	615,100	6,034.00
Arklahoma Corporation	18,000	187.50 ^a
Johnson-Winston Kiewit	2,804,400	19,513.20
Pryor Water Works	416,700	2,273.30
M. O. Weaver	856,800	6,474.59
Total for year	37,255,900	\$192,917.95

^aA minimum billing.

Source: Operating Revenue Accounts Ledger, Grand River Dam Authority.

Sales to Public Authorities

Sales to all public authorities for the year resulted in an increase of more than 50 percent over the previous year as 11,454,860 kilowatt-hours of energy were delivered for receipts totaling \$64,066.87 (see Table 27). However, the percentage of total revenues accounted for by this class of customers fell almost 10 percent to provide only 3.7 percent of total sales. The average sales price for these sales was 5.59 mills per kilowatt-hour sold. The major factors in the

TABLE 27
SALES TO PUBLIC AUTHORITIES
Year 1949

Customers	KWH	Amount
<u>Federal</u>		
Camp Gruber, Oklahoma	184,680	\$ 3,281.25
Oklahoma Ordnance Works	541,130	3,214.76
Government Aircraft Plant No. 3	7,483,000	40,126.46
Total to Federal Authorities	8,208,810	\$ 46,622.47
<u>Municipal</u>		
Muskogee Water Works	3,147,000	\$ 16,489.37
Quapaw Water Works	99,050	955.03
Total Municipal Authorities	3,246,050	\$ 17,444.40
<u>Summary</u>		
Federal Authorities	8,208,810	\$ 46,622.47
Municipal Authorities	3,246,050	17,444.40
Total to Public Authorities	11,454,860	\$ 64,066.87

Source: Operating Revenue Accounts Ledger, Grand River Dam Authority.

net increase in sales to public authorities was due to a 15 percent increase in power purchased by Government Aircraft Plant Number 3 and the fact that this was the first full year for sales to the Muskogee Water Works whose purchases increased approximately 300 percent over 1948.

Sales to Federal Authorities. Sales to federal authorities increased almost 20 percent as revenues of \$46,622.47 were received from the delivery of 8,208,810 kilowatt-hours of energy. The average sales price also increased some to

average 5.68 mills per kilowatt-hour sold.

Sales to Municipal Authorities. With the additional purchases by the Muskogee Water Works, described above, municipal authority purchases increased to a new high of 3,246,050 kilowatt-hours of energy. This was an increase of about 700 percent over the purchases by this sub-group of customers in the previous year. Revenues amounted to \$17,444.40, to provide 1 percent of total revenues, and the average sales price was 5.37 mills per kilowatt-hour purchased by the municipal authorities.

Sales to Electric Utilities

Total sales of electrical energy to electric utilities in 1949 resulted in the distribution of 362,539,207 kilowatt-hours of energy and the receipt of \$1,477,860.44 in revenues (see Table 28). These sales comprised 85.2 percent of the total sales of the Authority and were made at an average of 4.08 mills per kilowatt-hour sold. Electric utility sales were almost double those of 1948 and while gains were made in each sub-group of purchasers in this classification of customers, the most pronounced gain was in private utility purchases described below.

Sales to Municipalities. Sales to municipalities increased about 5 percent over the previous year and resulted in revenues of \$205,199.40 from the sale of 38,798,940 kilowatt-hours of energy. Though this was a net increase in sales over

TABLE 28
SALES TO ELECTRIC UTILITIES
Year 1949

Customers	KWH	Amount
<u>Municipalities</u>		
City of Chelsea	1,732,340	\$ 11,145.24
City of Claremore	14,246,000	68,002.44
City of Collinsville	2,526,600	16,605.27
City of Miami	12,353,600	64,964.44
City of Tahlequah	4,992,000	26,559.28
City of Wagoner	2,948,400	17,922.73
Total to Municipalities	38,798,940	\$205,199.40
<u>Cooperatives</u>		
Consumer Electric Coop. Inc.	2,996,500	\$ 15,654.04
KAMO Electric Coop. Inc.	5,886,300	35,601.04
Northeast Oklahoma Coop. Inc.	5,787,367	33,662.88
Verdigris Valley Elect. Coop. Inc.	3,550,000	21,485.32
Total to Cooperatives	18,220,167	\$106,403.28
<u>Private Utilities</u>		
Public Service Co. of Okla. and Oklahoma Gas & Electric Co.	209,027,800	\$627,987.71
Arkansas Power & Light Co.	96,492,300	538,270.05
Total to Private Utilities	305,520,100	\$1,166,257.76
<u>Summary</u>		
Municipalities	38,798,940	\$204,199.40
Cooperatives	18,220,167	106,403.28
Total to Public Utilities	57,019,107	\$311,602.68
Private Utilities	305,520,100	1,166,257.76
Total to Electric Utilities	362,539,207	\$1,477,860.44

Source: Operating Revenue Accounts Ledger, Grand River Dam Authority.

those of 1948 the gains made by other sub-groups of customers lowered the percent of total sales that these sales made up

to 11.8 percent compared to the 18.2 percent provided the previous year. The average sales price was 5.29 mills per kilowatt-hour sold.

Sales to Cooperatives. Sales of 18,220,167 kilowatt-hours of energy doubled the purchases of cooperative electrical utilities over the purchases of 1948. Revenues were also up approximately 100 percent to \$106,403.28 and comprised 6.2 percent of the Authority's total sales. The average sales price of the energy purchased by the cooperatives was 5.84 mills per kilowatt-hour which was relatively constant with the 5.80 mill rate of the previous year.

Sales to Publicly Owned Utilities. Total sales to publicly owned utilities comprised 18.0 percent of all sales of the year and produced \$311,602.68 in revenue from the sale of 57,019,107 kilowatt-hours of energy at an average sales price of 5.47 mills per kilowatt-hour.

Sales to Privately Owned Utilities. The sales to this subgroup of customers made the greatest gain of all groups as 305,520,100 kilowatt-hours of energy were distributed in 1949 compared to 165,131,600 kilowatt-hours in 1948.

Revenues also showed a comparable increase in reaching the sum of \$1,166,257.76, compared to last years \$531,094.10, and comprised 67.2 percent of the total sales of the Authority. Most of this increase was, as previously described, due to a short term contract with the Arkansas Power and Light Company, but the combined Public Service Company of

Oklahoma—Oklahoma Gas & Electric Company contract brought in \$627,987.71 which was nearly \$100,000 over previously high purchases. Sales of secondary power of 38,741,000 kilowatt-hours and dump power sales of 95,810,100 kilowatt-hours were included in the sales above. The average sales price was 3.82 mills per kilowatt-hour sold and reflects the lower rates charged for the secondary and dump power included in the total sales to privately owned electric utilities.

1950 Sales

Total sales of 365,495,075 kilowatt-hours of electrical energy in 1950 was approximately 10 percent under those of the previous year and revenues of \$1,627,536.56 were about 7 percent lower. However the entire decrease could be traced to one account:

The decrease in sales for the year is attributable largely to the sale in 1949 of 96,492,300 KWH to Arkansas Power and Light Company under a short term contract. This was partially offset by increases in sales to other customers, particularly to the K.A.M.O. Electric Cooperative.⁸⁶

The average sales price for all sales was 4.45 mills per kilowatt-hour delivered.

Industrial Sales

Industrial sales in 1950 increased more than 20 percent over the previous year to a high of 45,561,88

⁸⁶Audit Report, 1950, p. 19.

kilowatt-hours of power distributed (see Table 29).

Revenues were up, even a little more percentage wise than energy sales, to \$244,473.79 and were produced from sales which averaged 5.37 mills per kilowatt-hour. Industrial sales made up approximately 15 percent of the total sales for the year.

TABLE 29
INDUSTRIAL POWER SALES
Year 1950

Customers	KWH	Amount
General Power	177,400	\$ 1,380.00
B. F. Goodrich Company	43,326,000	224,433.43
Muskogee Materials Company	614,400	8,330.26
W. R. Grimshaw Company	405,000	3,018.75
Johnson-Winston Kiewit	412,200	2,679.30
Pryor Water Works	437,800	2,579.55
M. O. Weaver	189,000	2,052.50
Total for year	45,561,800	\$244,473.79

Source: Operating Revenue Accounts Ledger, Grand River Dam Authority.

Sales to Public Authorities

Total sales to public authorities were almost the same as in 1949 and produced \$64,316.16 in revenue from the 10,868,125 kilowatt-hours of energy (see Table 30) which was sold at an average sales price of 5.92 mills per kilowatt-hour. This class of customer provided approximately 4.0 percent of the total sales of the Authority for the year.

Sales to Federal Authorities. Sales to federal authorities

TABLE 30
SALES TO PUBLIC AUTHORITIES
Year 1950

Customers	KWH	Amount
<u>Federal</u>		
Camp Gruber, Oklahoma	159,480	\$ 1,116.36
Oklahoma Ordnance Works	422,175	3,533.07
Government Aircraft Plant No. 3	7,160,000	41,572.05
Total Federal Authorities	<u>7,741,655</u>	<u>\$46,221.48</u>
<u>Municipal</u>		
Muskogee Water Works	3,014,000	\$17,059.68
Quapaw Water Works	112,470	1,035.00
Total Municipal Authorities	<u>3,126,470</u>	<u>\$18,094.68</u>
<u>Summary</u>		
Federal Authorities	7,741,655	\$46,221.48
Municipal Authorities	3,126,470	18,094.68
Total to Public Authorities	<u>10,868,125</u>	<u>\$64,316.16</u>

Source: Operating Revenue Accounts Ledger, Grand River Dam Authority.

of 7,741,655 kilowatt-hours of energy accounted for revenues of \$46,221.48 based on an average sales price of 5.97 mills per kilowatt-hour sold. This sub-group of customers produced 2.9 percent of the Authority's total sales in 1950.

Sales to Municipal Authorities. Sales to municipal authorities increased slightly as 3,126,470 kilowatt-hours of energy were delivered to produce \$18,094.68 in revenue. These sales were based on an average sales price of 5.79

mills per kilowatt-hour sold and accounted for 1.1 percent of the total sales for the year.

Sales to Electric Utilities

Total energy sales to electric utilities dropped nearly 20 percent over the previous year with the previously discussed termination of the short term contract the Authority had with the Arkansas Power and Light Company. However, the sale of 309,065,150 kilowatt-hours of energy resulted in the receipt of \$1,318,746.61 in revenues (see Table 31) which was only an approximate 12 percent decrease. The average sales price was 4.27 mills per kilowatt-hour sold. Sales to electric utilities produced 81 percent of the total revenue received by the Authority in 1950.

Sales to Municipalities. Sales to municipalities continued to climb slowly in 1950 and produced \$236,165.57 in revenue from the sale of 41,143,962 kilowatt-hours of energy at an average rate of 5.74 mills. These sales produced 14.5 percent of the total sales for the year.

Sales to Cooperatives. Sales to cooperatives of 37,819,688 kilowatt-hours of energy resulted in revenues of \$213,442.04 at an average sales price of 5.64 mills per kilowatt-hour delivered. These revenues were over 50 percent above those of this sub-group in 1949 and provided 13.1 percent of the total revenues of the year.

TABLE 31
SALES TO ELECTRIC UTILITIES
Year 1950

Customers	KWH	Amount
<u>Municipalities</u>		
City of Chelsea	1,863,300	\$ 13,117.74
City of Claremore	15,488,000	80,150.43
City of Collinsville	2,611,062	18,490.95
City of Miami	12,472,000	70,618.74
City of Stillwell	254,400	2,731.35
City of Tahlequah	5,460,000	30,969.49
City of Wagoner	2,995,200	20,086.87
Total to Municipalities	41,143,962	\$236,165.57
<u>Cooperatives</u>		
Consumers Electric Coop. Inc.	3,758,500	\$ 20,707.35
KAMO Electric Coop. Inc.	23,503,670	126,533.45
Northeast Oklahoma Coop. Inc.	7,125,410	43,425.15
Verdigris Valley Elect. Coop. Inc.	3,432,108	22,776.09
Total to Cooperatives	37,819,688	\$213,442.04
<u>Private Utilities</u>		
Public Service Co. of Oklahoma	230,101,500	\$869,139.00
<u>Summary</u>		
Municipalities	41,143,962	\$236,165.57
Cooperatives	37,819,688	213,442.04
Total to Public Utilities	78,963,650	\$449,607.61
Private Utilities	230,101,500	869,139.00
Total to Electric Utilities	309,065,150	\$1,318,746.61

Source: Operating Revenue Accounts Ledger, Grand River Dam Authority.

Sales to Publicly Owned Utilities. Total sales to publicly owned utilities, which are the totals of the two sub-groups above, increased approximately 40 percent over the previous year and provided \$449,607.61 from the sale of 78,963,650

kilowatt-hours of energy at an average price of 5.69 mills per kilowatt-hour sold. Sales to this group of customers provided 27.6 percent of the total income received by the Authority in 1950.

Sales to Privately Owned Utilities. The decrease of approximately 20 percent in sales to privately owned electric utilities in 1950 was the largest single contribution to the decrease in total sales. However, the expected expiration of a short term contract was partially offset by increased purchases of the Public Service Company of Oklahoma under a new contract:

As of December 1, 1949, the company [Public Service Company of Oklahoma] entered into a 20 year contract with the Grand River Dam Authority, an agency of the State of Oklahoma, for the purchase of 50,000 kilowatts of primary energy per month, together with such secondary and dump electric energy as is offered by the Authority and accepted by the company. . . . This contract replaces the contract originally entered into as of January 1, 1947 by the company and the Oklahoma Gas and Electric Company with the Grand River Dam Authority.⁸⁷

Total sales to privately owned electric utilities consisted entirely of the sales to the Public Service Company of Oklahoma in the year 1950. These sales of 230,101,500 kilowatt-hours of energy included a small amount of secondary power and 110,076,500 kilowatt-hours of dump power. The average sales price of 3.78 mills per kilowatt-hour sold produced \$869,139.00 in revenues which comprised 53.4 percent of the total receipts of the Authority in 1950.

⁸⁷Moody's Investor Service, Moody's Public Utility Manual, 1950 (New York: Moody's Investors Service, 1951), p. 375.

1951 Sales

Total sales of 429,802,100 kilowatt-hours of energy at an average sales price of 4.42 mills provided \$1,898,141.99 in revenues in 1951. This was an increase of approximately 20 percent in energy delivered and about 15 percent in gross revenues.

While there was a slight general increase in sales to most customers, the major increases appear to be attributable to sales to the recently opened Douglas Aircraft assembly Plant near Tulsa and to the increased deliveries to the K.A.M.O. Electric Cooperative.⁸⁸

Industrial Sales

Sales to commercial and industrial firms increased nearly 50 percent over the previous year both in terms of energy delivered and revenues received. As discussed above, sales to the Douglas Aircraft Plant provided the greatest part of this increase. The 66,145,576 kilowatt-hours of energy delivered was sold at an average rate of 5.48 mills per kilowatt-hour and produced \$362,740.77 in revenues (see Table 32). Industrial sales provided 19.1 percent of the total sales of the Authority for the year.

Sales to Public Authorities

Total sales to public authorities dropped almost 50 percent in 1951 as the Government Aircraft Plant Number 3 at Tulsa, Oklahoma ceased operations. Total revenues of \$34,848.49 were received from the sale of 5,764,200

⁸⁸Audit Report, 1951, p. 18.

TABLE 32
INDUSTRIAL POWER SALES
Year 1951

Customers	KWH	Amount
Coronado Manufacturing Company	29,256	\$ 942.56
Douglas Aircraft	19,257,000	110,727.75
General Power	177,800	1,372.33
B. F. Goodrich Company	44,552,000	231,329.12
Muskogee Materials Company	594,900	7,774.00
National Gypsum Company	154,820	2,186.29
W. R. Grimshaw Company	839,400	5,285.41
Pryor Water Works	540,400	3,123.31
Total for year	66,145,576	\$362,740.77

Source: Operating Revenue Accounts Ledger, Grand River Dam Authority.

kilowatt-hours of energy (see Table 33) at an average sales price of 6.05 mills per kilowatt-hour. Total sales to public authorities only provided 1.8 percent of the total sales of the Authority in 1951.

Sales to Federal Authorities. Sales to federal authorities were only one-third the sales of 1950 as the Government Aircraft Plant purchased less than 2 million kilowatt-hours of energy instead of a normal 6 or 7 million kilowatt-hours. Total sales to federal authorities of 2,573,590 kilowatt-hours of energy at an average rate of 6.12 mills per kilowatt-hour provided \$15,759.74 in revenues.

Sales to Municipal Authorities. Sales of 3,190,610 kilowatt-hours of energy to municipal authorities were almost the same as sales for the previous year but revenues of \$19,088.75

TABLE 33
SALES TO PUBLIC AUTHORITIES
Year 1951

Customers	KWH	Amount
<u>Federal</u>		
Camp Gruber, Oklahoma	154,800	\$ 1,083.60
Oklahoma Ordnance Works	571,790	4,055.89
Government Aircraft Plant No. 3	1,847,000	10,620.25
Total Federal Authorities	2,573,590	\$15,759.74
<u>Municipal</u>		
Muskogee Water Works	3,082,000	\$18,059.50
Quapaw Water Works	108,610	1,029.25
Total Municipal Authorities	3,190,610	\$19,088.75
<u>Summary</u>		
Federal Authorities	2,573,590	\$15,759.74
Municipal Authorities	3,190,610	19,088.75
Total to Public Authorities	5,764,200	\$34,848.49

Source: Operating Revenue Accounts Ledger, Grand River Dam Authority.

were up a little over 5 percent. This slight increase can be almost entirely accounted for by an increase in the average sales price from 5.79 mills to 5.98 mills per kilowatt-hour.

Sales to Electric Utilities

Total sales to electric utilities increased about 15 percent over 1950 sales. The largest net sub-group gain was private electric utilities who purchased about 20 million additional kilowatt-hours of energy but the largest gain

from a percentage viewpoint was in cooperative electric utilities purchases which increased about 55 percent over the previous year. The distribution of 357,892,324 kilowatt-hours of energy to electric utilities at an average sales price of 4.19 mills resulted in revenues of \$1,500,522.73 (see Table 34) which comprised 79.1 percent of the total sales of the Authority in 1951.

Sales to Municipalities. Sales of 48,567,050 kilowatt-hours of energy, at an average sales price of 5.80 mills per kilowatt-hour, provided \$281,821.22 in revenues and 14.9 percent of the total sales for the year. These sales were an increase of more than 20 percent over those of the previous year. The greatest part of this increase was due to the addition of the City of Pryor to this sub-group of customers with the remaining increase being accounted for by some increases in purchases by all but one of the other customers.

Sales to Cooperatives. The 55 percent increase in cooperative purchases was almost entirely due to an increase in purchases by the KAMO Electric Cooperative, Incorporated from 23.5 million kilowatt-hours in 1950 to 35.7 million kilowatt-hours in 1951. Sales to cooperative electric utilities provided \$328,466.01 in revenues, from the distribution of 58,059,774 kilowatt-hours of energy at an average rate of 5.66 mills per kilowatt-hour, and made up 17.3 percent of the Authority's total sales.

TABLE 34

SALES TO ELECTRIC UTILITIES
Year 1951

Customers	KWH	Amount
<u>Municipalities</u>		
City of Chelsea	1,790,650	\$ 13,644.26
City of Claremore	14,749,000	76,623.18
City of Collinsville	2,949,000	19,089.78
City of Miami	13,116,000	74,482.23
City of Pryor	4,905,600	26,957.60
City of Stillwell	1,872,000	16,403.35
City of Tahlequah	5,707,200	32,755.13
City of Wagoner	3,477,600	21,865.69
Total to Municipalities	48,567,050	\$ 281,821.22
<u>Cooperatives</u>		
Consumer Electric Coop. Inc.	7,502,729	\$ 41,028.76
KAMO Electric Coop. Inc.	35,714,265	198,938.55
Northeast Oklahoma Coop. Inc.	11,190,480	64,852.68
Verdigris Valley Elect. Coop. Inc.	3,652,300	23,646.02
Total to Cooperatives	58,059,774	\$ 328,466.01
<u>Private Utilities</u>		
Public Service Company of Okla.	251,265,500	\$ 890,265.50
<u>Summary</u>		
Municipalities	48,567,050	\$ 281,821.22
Cooperatives	58,059,774	328,466.01
Total to Public Utilities	106,626,824	\$ 610,287.23
Private Utilities	251,265,500	890,265.50
Total to Electric Utilities	357,892,324	\$1,500,552.73

Source: Operating Revenue Accounts Ledger, Grand River Dam Authority.

Sales to Publicly Owned Utilities. Total sales to publicly owned electric utilities of 106,626,824 kilowatt-hours of energy at an average sales price of 5.72 mills resulted in

revenues of \$610,287.23 and provided 32.2 percent of the total sales for the year.

Sales to Privately Owned Utilities. The sale of 251,265,500 kilowatt-hours of energy to the Public Service Company of Oklahoma was an increase of nearly 10 percent in their annual purchases. However, this increase was almost entirely due to an increase in dump power available and the sale for the year included 131,265,500 kilowatt-hours of dump power. This sale provided revenues of \$890,265.50 which was 46.9 percent of the total sales of the Authority for the year. The average sales price was 3.54 mills per kilowatt-hour sold.

1952 Sales

Total power sales for the year resulted in the distribution of 417,785,249 kilowatt-hours of energy and the receipt of \$2,175,315.89 in revenues. The auditors reported the increase in revenue of \$277,173.90 over 1951 sales which provided revenue of \$1,898,141.99 as follows:

There was an increase in sales. The major increases appear to be attributable to increased deliveries to the Douglas Aircraft Assembly Plant near Tulsa, the National Gypsum and Coronado plants at Chouteau, and to the K.A.M.O. Electric Cooperative.⁸⁹

However, these sales were made at an average of 4.22 mills per kilowatt-hour sold which was about 17 percent over the 1951 sales price. If this increase in sales price is taken

⁸⁹Audit Report, 1952, p. 18.

into consideration there was actually a decrease over 1951 sales as the \$335,228.20 revenue gained from the increased sales would lower gross sales, at the 1951 price level, to \$1,840,087.60 in 1952 which was actually \$58,054.30 less in revenues received than the \$1,898,141.99 revenues received in 1951. Energy sales were also less in 1952 as only 417,785,249 kilowatt-hours were delivered that year compared to the 429,802,100 kilowatt-hours delivered in 1951. This is a decrease in energy sales of 12,016,851 kilowatt-hours.

Industrial Power Sales

Energy sales of 113,318,666 kilowatt-hours (see Table 35) were almost 67 percent higher than the corresponding energy sales in 1951, however, a .13 mill decrease in the average price per kilowatt-hour sold, to 5.35 mills, lowered the percentage gain in revenues to approximately 65 percent. Industrial sales revenue of \$606,546.17 in 1952 provided 27.9 percent of the total revenue for the year.

Sales to Public Authorities

Sales to public authorities continued to decrease for the third straight year as 3,804,100 kilowatt-hours of energy were delivered, at an average sales price of 6.30 mills per kilowatt-hour, to produce revenues of \$23,956.96 (see Table 36) which only amounted to 1.1 percent of total revenues for the year.

Sales to Federal Authorities. Sales to federal authorities

TABLE 35
INDUSTRIAL POWER SALES
Year 1952

Customers	KWH	Amount
Coronado Manufacturing Company	3,305,596	\$ 20,225.18
Douglas Aircraft	54,222,000	282,574.56
General Power	175,200	1,380.00
B. F. Goodrich Company	40,056,000	210,919.63
Muskogee Materials Company	837,000	8,313.12
National Gypsum Company	13,186,170	73,395.10
Yahala Sand & Gravel Company	669,600	4,483.87
W. R. Grimshaw Company	764,400	4,536.53
Pryor Water Works	66,700	718.18
Total for year	113,318,666	\$606,546.17

Source: Operating Revenue Accounts Ledger, Grand River Dam Authority.

TABLE 36
SALES TO PUBLIC AUTHORITIES
Year 1952

Customers	KWH	Amount
<u>Federal</u>		
Camp Gruber, Oklahoma	89,280	\$ 624.96
Oklahoma Ordnance Works	445,800	3,674.84
Total Federal Authorities	535,080	\$ 4,299.80
<u>Municipal</u>		
Muskogee Water Works	3,146,000	\$ 18,615.42
Quapaw Water Works	123,020	1,041.74
Total Municipal Authorities	3,269,020	\$ 19,657.16

TABLE 36 Continued

Customers	KWH	Amount
<u>Summary</u>		
Federal Authorities	535,080	\$ 4,299.80
Municipal Authorities	3,269,020	19,657.16
Total to Public Authorities	<u>3,804,100</u>	<u>\$ 23,956.96</u>

Source: Operating Revenue Accounts Ledger, Grand River Dam Authority.

of 535,080 kilowatt-hours of energy, at an average price of 8.04 mills per kilowatt-hour, resulted in revenues of \$4,299.80 for the year.

Sales to Municipal Authorities. Sales to municipal authorities increased slightly with the receipt of \$32,690.20 in revenues from the sale of 3,269,020 kilowatt-hours of energy at an average sales price of 6.01 mills per kilowatt-hour delivered.

Sales to Electric Utilities

Electrical energy sales to electric utilities decreased approximately 14 percent to 300,662,483 kilowatt-hours (see Table 37). However, part of this decrease was in dump power, previously available with a plentiful water supply, which could not be economically produced with a lower lake level in 1952. Consequently, the fact that no sales of dump power were made this year the average sales price increased nearly one mill to 5.14 mills per kilowatt-hour sold to this class of customers. Additional sales of firm power to

TABLE 37
SALES TO ELECTRIC UTILITIES
Year 1952

Customers	KWH	Amount
<u>Municipalities</u>		
City of Chelsea	1,792,000	\$ 13,913.58
City of Claremore	15,492,000	80,171.16
City of Collinsville	3,022,000	19,592.34
City of Miami	14,716,000	79,413.02
City of Pryor	6,458,400	34,791.67
City of Sallisaw	2,009,000	12,480.39
City of Stillwell	2,236,800	16,685.49
City of Tahlequah	6,134,400	34,400.49
City of Wagoner	3,793,200	23,342.35
Total to Municipalities	55,653,800	\$ 314,789.49
<u>Cooperatives</u>		
Consumers Electric Coop. Inc.	11,414,875	\$ 60,384.70
KAMO Electric Coop. Inc.	43,214,724	261,301.33
Northeast Oklahoma Coop. Inc.	12,196,484	68,674.05
Verdigris Valley Elect. Coop. Inc.	4,255,200	26,734.80
Total to Cooperatives	71,081,283	\$ 417,094.88
<u>Private Utilities</u>		
Public Service Company of Okla.	173,927,400	\$ 812,927.39
<u>Summary</u>		
Municipalities	55,653,800	\$ 314,789.49
Cooperatives	71,081,283	417,094.88
Total to Public Utilities	126,735,083	\$ 731,884.37
Private Utilities	173,927,400	812,927.39
Total to Electric Utilities	300,662,483	\$1,544,811.76

Source: Operating Revenue Accounts Ledger, Grand River Dam Authority.

municipalities and cooperatives more than offset the loss of dump power sales and revenues increased slightly, over those

of 1951, to \$1,544,812.76 and provided 71.0 percent of the total sales revenue for the year.

Sales to Municipalities. Sales of electrical energy to municipalities increased nearly 20 percent but sales revenues were only up a little over 10 percent for the year. This difference in percentages is attributable to a decrease in the average sales price of .14 mills to an average sales price for the year for municipalities of 5.66 mills per kilowatt-hour sold. Energy sales of 55,653,800 kilowatt-hours resulted in revenues of \$314,789.49 that comprised 14.4 percent of the total revenue of the Authority in 1952.

Sales to Cooperatives. Sales to cooperative electric utilities increased somewhat in 1952 and revenues were up a little over one-fourth those of 1951 for this sub-group of customers. The delivery of 71,081,283 kilowatt-hours of energy, at an average sales price of 5.87 mills per kilowatt-hour sold, resulted in sales revenues of \$417,094.88 which accounted for 19.2 percent of the total sales revenue for the year.

Sales to Publicly Owned Utilities. Total sales to publicly owned electric utilities comprised 33.6 percent of all sales of the year and produced \$731,884.37 in revenue from the sale of 126,735,083 kilowatt-hours of energy at an average sales price of 5.77 mills per kilowatt-hour.

Sales to Privately Owned Utilities. The only sale to a privately owned electric utility was to the Public Service

Company of Oklahoma of 173,927,400 kilowatt-hours of energy, at an average sales price of 4.67 mills per kilowatt-hour, for \$812,927.39 to provide 37.4 percent of the Authority's total revenue in 1952. Drouth conditions and a low lake level prevented the sale of dump power for the first time since the Authority regained possession of the facilities in 1946.

1953 Sales

Total sales of 415,710,542 kilowatt-hours of electrical energy in 1953 was approximately the same as sales in 1952 but revenues of \$2,437,401.08 were up over 10 percent as the average sales price increased to 5.86 mills per kilowatt-hour.

During the year under review the Authority added as new power customers the City of Cushing, the City of Pawnee and Deere and Company. It also added a new delivery point at Jay, Oklahoma, for the Northeast Oklahoma Electric Cooperative, and the four new delivery points on the K.A.M.O. system mentioned above. Checotah, Stigler, Stillwater and Webbers Falls, Oklahoma.⁹⁰

There was an increase in total dollar sales, and in all customer classifications except private utilities. The major increases appear to be attributable to increased deliveries to the Douglas Aircraft Assembly Plant near Tulsa, the National Gypsum and Coronado plants at Chouteau, the B. F. Goodrich plant at Miami, and to the K.A.M.O. Electric Cooperative.⁹¹

Industrial Sales

Industrial sales increased more than 30 percent over those of the previous year to a new high of 147,069,000

⁹⁰Audit Report, 1953, p. 3.

⁹¹Audit Report, 1953, p. 19.

kilowatt-hours of power distributed (see Table 38).

Revenues were up, even a little more percentage wise than energy sales, to \$797,658.44 and were produced from an average sales price of 5.42 mills per kilowatt-hour delivered. Industrial sales provided approximately one-third of the total revenue for the year.

TABLE 38
INDUSTRIAL POWER SALES
Year 1953

Customers	KWH	Amount
Coronado Manufacturing Company	12,837,600	\$ 72,059.60
Deere and Company	110,400	1,474.67
Douglas Aircraft	70,336,000	370,055.28
General Power	168,000	1,403.00
B. F. Goodrich Company	45,404,000	241,042.41
Muskogee Materials Company	625,200	8,418.00
National Gypsum Company	16,209,600	90,328.77
Yahala Sand & Gravel Company	1,182,600	11,405.22
W. R. Grimshaw Company	195,600	1,471.49
Total for year	147,069,000	\$797,658.44

Source: Operating Revenue Accounts Ledger, Grand River Dam Authority.

Sales to Public Authorities

Total electrical energy sales to public authorities of 3,885,680 kilowatt-hours (see Table 39) were just slightly over those of 1952 but revenues of \$25,160.97 were up approximately 10 percent. These revenues, however, provided less than one percent of the total revenues of the year. The average sales price to this class of customers was 6.48 mills

TABLE 39
SALES TO PUBLIC AUTHORITIES
Year 1953

Customers	KWH	Amount
<u>Federal</u>		
Camp Gruber, Oklahoma	102,420	\$ 738.61
Oklahoma Ordnance Works	456,700	3,727.53
Total Federal Authorities	559,120	\$ 4,466.14
<u>Municipal</u>		
Muskogee Water Works	3,210,000	\$19,637.19
Quapaw Water Works	116,560	1,057.64
Total Municipal Authorities	3,326,560	\$20,694.83
<u>Summary</u>		
Federal Authorities	559,120	\$ 4,466.14
Municipal Authorities	3,326,560	20,694.83
Total to Public Authorities	3,885,680	\$25,160.97

Source: Operating Revenue Accounts Ledger, Grand River Dam Authority.

per kilowatt-hour delivered.

Sales to Federal Authorities. Sales to federal authorities of 559,120 kilowatt-hours of energy accounted for revenues of \$4,466.14 based on an average sales price of 7.99 mills per kilowatt-hour sold.

Sales to Municipal Authorities. Sales to municipal authorities increased slightly as 3,326,560 kilowatt-hours of energy were delivered to produce \$20,694.83 in revenue. These sales were based on an average sales price of 6.22 mills per kilowatt-hour sold.

Sales to Electric Utilities

Total energy sales to electric utilities of 264,755,862 kilowatt-hours (see Table 40) were an increase of nearly 15 percent over the previous years sales of energy while revenues of \$1,614,581.67 only showed an increase of approximately five percent. These revenues comprised 65.8 percent of the total revenues for 1953. The average sales price was 6.10 mills per kilowatt-hour.

Sales to Municipalities. Sales to municipalities increased about 15 percent over the previous year and resulted in revenues of \$356,903.31 from the sale of 63,765,500 kilowatt-hours of energy. Though this was a net increase in sales over those of 1952 the gains in sales by other sub-groups of customers held the percentage of total sales accounted for by the sales to municipalities to 14.6 percent, which was nearly the same as in 1952. The average sales price was 5.60 mills per kilowatt-hour sold.

Sales to Cooperatives. Sales to cooperative electrical utilities of 84,316,362 kilowatt-hours of electrical energy and the receipt of sales revenues of \$496,965.31 represented an increase of nearly 20 percent over those same figures for 1952. The revenues received accounted for 20.4 percent of the Authority's total revenue for the year and were produced from an average sales price of 5.89 mills per kilowatt-hour sold.

TABLE 40
SALES TO ELECTRIC UTILITIES
Year 1953

Customers	KWH	Amount
<u>Municipalities</u>		
City of Chelsea	2,052,500	\$ 14,695.22
City of Claremore	15,633,000	82,323.49
City of Collinsville	3,308,000	21,213.28
City of Cushing	2,275,200	15,000.96
City of Miami	16,032,000	86,734.38
City of Pawnee	48,000	392.22
City of Pryor	7,574,400	42,378.38
City of Sallisaw	3,850,800	24,508.02
City of Stillwell	2,718,400	18,528.76
City of Tahlequah	6,009,600	35,140.82
City of Wagoner	4,263,600	26,087.78
Total to Municipalities	63,765,500	\$ 356,903.31
<u>Cooperatives</u>		
Consumer Electric Coop. Inc.	13,297,400	\$ 71,542.18
KAMO Electric Coop. Inc.	52,420,320	316,905.41
Northeast Oklahoma Coop. Inc.	13,622,292	77,346.09
Verdigris Valley Elect. Coop. Inc.	4,976,350	31,171.63
Total to Cooperatives	84,316,362	\$ 496,965.31
<u>Private Utilities</u>		
Public Service Co. of Oklahoma	116,674,000	\$ 750,613.05
<u>Summary</u>		
Municipalities	63,765,500	\$ 356,903.31
Cooperatives	84,316,362	496,965.31
Total to Public Utilities	148,081,862	\$ 853,868.62
Private Utilities	116,674,000	750,613.05
Total to Electric Utilities	264,755,862	\$1,614,581.67

Source: Operating Revenue Accounts Ledger, Grand River Dam Authority.

Sales to Publicly Owned Utilities. This was the first annual period in the history of operations by the Grand River Dam Authority that sales to publicly owned electric utilities exceeded sales to privately owned electrical utilities. Total sales to publicly owned utilities comprised 35.0 percent of all sales of the year and produced \$853,868.62 in revenues from the sale of 148,081,826 kilowatt-hours of energy at an average sales price of 5.83 mills per kilowatt-hour.

Sales to Privately Owned Utilities. Sales to privately owned electrical utilities fell to a new low of 116,674,000 kilowatt-hours of energy and only produced \$750,613.05 in revenues. Though this was a drop of about 30 percent in energy sales it was only a decrease of 8 percent in revenue receipts. Private utility sales revenue comprised only 30.8 percent of the total sales and were produced by an average sales price of 6.43 mills per kilowatt-hour. The continuation of drouth conditions prevented the sale of any secondary or dump power in this period.

1954 Sales

Total sales of 483,440,373 kilowatt-hours of energy in 1954 were a little more than 15 percent over those of the previous year and revenues of \$2,437,401.08 were about 12 percent higher.

There was an increase in total dollar sales, and in all customer classifications except privately owned utilities. The quantity of power sales to each customer

increased except in two cases. Twelve customers who have been taking power from the Authority for more than one year increased their purchases by more than two million KWH each for 1954 over 1953, however, in some cases they were not customers for the full year 1953.⁹²

The average sales price of all sales was 6.72 mills per kilowatt-hour delivered.

Industrial Sales

Industrial sales in 1954 increased nearly 50 percent over the previous year to a high of 209,235,700 kilowatt-hours of power distributed (see Table 41). Revenues were approximately 70 percent higher at \$1,354,687.70 and were produced from sales of energy at an average sales price of 6.47 mills per kilowatt-hour. Industrial sales made up 41.7 percent of the total sales for the year.

Sales to Public Authorities

Total energy sales to public authorities were up approximately 12 percent and revenues were almost one-third more than those of 1953. The sale of 4,383,940 kilowatt-hours of energy produced \$33,065.79 in revenues (see Table 42) which were less than one percent of total revenues. The average sales price to public authorities was 7.54 mills per kilowatt-hour delivered.

Sales to Federal Authorities. Sales to federal authorities of 628,220 kilowatt-hours of energy accounted for revenues of \$5,796.82 based on an average sales price of 9.23 mills

⁹²Audit Report, 1954, p. 18.

TABLE 41

INDUSTRIAL POWER SALES
Year 1954

Customers	KWH	Amount
Coronado Manufacturing Company	16,639,200	\$ 109,572.23
Deere and Company	20,795,600	137,479.10
Douglas Aircraft	76,026,000	472,121.46
General Power	162,900	1,656.00
B. F. Goodrich Company	49,328,000	307,422.61
Midwest Carbide Company	25,382,400	176,467.94
Muskogee Materials Company	457,200	9,936.00
National Gypsum Company	18,794,400	122,049.86
Yahala Sand and Gravel Company	1,611,600	15,912.50
Universal Concrete Company	38,400	2,070.00
Total for year	209,235,700	\$1,354,687.70

Source: Operating Revenue Accounts Ledger, Grand River Dam Authority.

mills per kilowatt-hour sold.

Sales to Municipal Authorities. Sales to municipal authorities of 3,755,720 kilowatt-hours of energy, at an average sales price of 7.26 mills per kilowatt-hour, produced revenues of \$27,268.97. This was an increase of approximately 12 percent in energy sales and 32 percent in revenue receipts over those of 1953.

Sales to Electric Utilities

Total energy sales to electric utilities were nearly constant with those of 1953. However, the increase in the average sales price, to 6.89 mills per kilowatt-hour delivered, was a major factor in the increase of sales revenues of nearly

TABLE 42
SALES TO PUBLIC AUTHORITIES
Year 1954

Customers	KWH	Amount
<u>Federal</u>		
Camp Gruber, Oklahoma	128,520	\$ 1,079.55
Oklahoma Ordnance Works	499,700	4,717.27
Total Federal Authorities	628,220	\$ 5,796.82
<u>Municipal</u>		
Muskogee Water Works	3,633,000	\$26,001.30
Quapaw Water Works	122,720	1,267.67
Total Municipal Authorities	3,755,720	\$27,268.97
<u>Summary</u>		
Federal Authorities	628,220	\$ 5,796.82
Municipal Authorities	3,755,720	27,268.97
Total to Public Authorities	4,383,940	\$33,065.79

Source: Operating Revenue Accounts Ledger, Grand River Dam Authority.

15 percent. The delivery of 269,823,433 kilowatt-hours of electric energy resulted in revenues of \$1,859,139.73 (see Table 43). These revenues comprised 57.3 percent of the total revenues of the Authority in 1954.

Sales to Municipalities. Municipal electric utility sales of 81,849,690 kilowatt-hours of energy were up nearly one-fourth and the average sales price of 6.67 mills per kilowatt-hour resulted in a more than 50 percent increase in revenues which amounted to \$546,165.48. These revenues provided 16.8 percent of the total revenues for the year.

TABLE 43

SALES TO ELECTRIC UTILITIES
Year 1954

Customers	KWH	Amount
<u>Municipalities</u>		
City of Chelsea	2,279,750	\$ 18,790.62
City of Claremore	16,866,800	106,995.57
City of Collinsville	3,836,000	28,828.51
City of Cushing	8,285,300	51,744.83
City of Miami	18,608,640	118,401.42
City of Pawnee	3,583,200	24,846.02
City of Pryor	9,197,400	60,268.82
City of Sallisaw	4,161,600	30,005.17
City of Stillwell	2,798,400	22,908.28
City of Tahlequah	7,052,800	47,659.56
City of Wagoner	5,188,800	35,716.68
Total to Municipalities	81,849,690	\$ 568,731.86
<u>Cooperatives</u>		
Consumer Electric Coop. Inc.	16,558,300	\$ 105,112.07
KAMO Electric Coop. Inc.	60,956,849	396,398.31
Northeast Oklahoma Coop. Inc.	15,775,544	104,235.71
Ozark Rural Electric Cooperative	1,397,200	10,802.77
Verdigris Valley Elect. Coop. Inc.	5,676,850	40,775.89
Total to Cooperatives	100,373,743	\$ 657,324.75
<u>Private Utilities</u>		
Public Service Co. of Oklahoma	87,600,000	\$ 655,649.50
<u>Summary</u>		
Municipalities	81,849,690	\$ 568,731.86
Cooperatives	100,373,743	657,324.75
Total to Public Utilities	182,223,433	\$1,203,490.23
Private Utilities	87,600,000	655,649.50
Total to Electric Utilities	269,823,433	\$1,859,139.73

Source: Operating Revenue Accounts Ledger, Grand River Dam Authority.

Sales to Cooperatives. Cooperative electric utility sales of 100,373,743 kilowatt-hours of energy and revenues of \$657,324.75 were both an increase of approximately one-third over the previous year. These revenues were produced from an average sales price of 6.55 mills per kilowatt-hour and comprised 20.3 percent of the total revenues.

Sales to Publicly Owned Utilities. Total sales of energy to publicly owned electric utilities were up about 23 percent over those of the previous year as 182,223,433 kilowatt-hours were delivered. Revenues of \$1,203,490.23 showed an increase of 40 percent. These were nearly double the revenues from sales to privately owned electric utilities and provided 37.1 percent of the Authority's total revenue. The average sales price was 6.6 mills per kilowatt-hour sold.

Sales to Privately Owned Utilities. Sales to privately owned electric utilities continued to fall and the delivery of 87,600,000 kilowatt-hours of energy, at an average sales price of 7.48 mills per kilowatt-hour, only produced \$655,649.50 in revenues. These revenues comprised 20.2 percent of the total revenue of the Authority for 1954.

1955 Sales

Total sales of 557,188,235 kilowatt-hours of energy at an average sales price of 6.39 mills provided \$3,562,110.70 in revenues in 1955. This was an increase of nearly ten percent in both energy sales and gross revenues.

. . . electrical energy sales to all classes of customers showed an increase over 1954 figures, with the exception of sales to privately owned utilities.⁹³

Industrial Sales

Sales of energy to commercial and industrial firms increased nearly 50 percent over 1954 sales but a decrease in the average sales price from 6.47 to 6.34 mills per kilowatt-hour lowered the increase in sales revenues to about 43 percent. The 306,937,700 kilowatt-hours of energy delivered produced \$1,946,296.43 in revenues (see Table 44) which provided 54.6 percent of the total revenue of the Authority for the year.

Sales to Public Authorities

Total energy sales and revenue receipts from this class of customer dropped slightly in 1955 as 4,242,950 kilowatt-hours of energy were delivered (see Table 45), at an average sales price of 7.51 mills per kilowatt-hour, to produce \$31,876.11 in revenues. These sales were less than one percent of the total sales for the year.

Sales to Federal Authorities. Sales of 778,400 kilowatt-hours of energy to federal authorities in 1954 resulted in revenues of \$6,227.18. These sales averaged 8.06 mills per kilowatt-hour delivered.

Sales to Municipal Authorities. Sales to municipal authorities of 3,464,550 kilowatt-hours of electrical energy, at an average

⁹³Audit Report, 1955, p. 18.

TABLE 44
INDUSTRIAL POWER SALES
Year 1955

Customers	KWH	Amount
H. J. Benedict Construction Co.		\$ 10.00 ^a
Coronado Manufacturing Company	22,125,600	142,640.36
Deere and Company	51,604,000	342,623.99
Douglas Aircraft	87,864,000	539,878.77
General Power	171,400	1,638.75
B. F. Goodrich Company	56,744,000	350,119.57
Midwest Carbide Company	67,180,800	421,567.94
Muskogee Materials Company	492,000	8,299.48
National Gypsum Company	18,553,600	117,893.57
Yahala Sand and Gravel Company	2,078,700	18,374.93
Universal Concrete Company	123,600	3,249.07
	306,937,700	\$1,946,296.43

^aA minimum billing.

Source: Operating Revenue Accounts Ledger, Grand River Dam Authority.

sales price of 7.39 mills per kilowatt-hour, produced sales revenues of \$25,598.93.

TABLE 45
SALES TO PUBLIC AUTHORITIES
Year 1955

Customers	KWH	Amount
<u>Federal</u>		
Camp Gruber, Oklahoma	132,300	\$ 1,098.14
Oklahoma Ordnance Works	646,100	5,179.04
Total Federal Authorities	778,400	\$ 6,277.18

TABLE 45 Continued

Customers	KWH	Amount
<u>Municipal</u>		
Muskogee Water Works	3,334,000	\$24,357.74
Quapaw Water Works	130,550	1,241.19
Total Municipal Authorities	3,464,550	\$25,598.93
<u>Summary</u>		
Federal Authorities	778,400	\$ 6,277.18
Municipal Authorities	3,464,550	25,598.93
Total to Public Authorities	4,242,950	\$31,876.11

Source: Operating Revenue Accounts Ledger, Grand River Dam Authority.

Sales to Electric Utilities

Total energy sales and revenue receipts dropped somewhat as sales to privately owned electric utilities continued to decrease in 1955 at a greater rate than sales to municipalities and cooperatives increased. The distribution of 246,007,585 kilowatt-hours of energy to electrical utilities (see Table 46), at an average sales price of 6.44 mills per kilowatt-hour, resulted in revenues of \$1,583,938.16 which comprised 44.5 percent of the total sales revenues of the Authority in 1955.

Sales to Municipalities. Sales of 84,213,306 kilowatt-hours of energy, at an average sales price of 6.75 mills per kilowatt-hour, provided \$568,731.86 in revenues and 16.0 percent of the total sales for the year. These sales were an increase of about 10 percent over those of the previous year.

TABLE 46

SALES TO ELECTRIC UTILITIES
Year 1955

Customers	KWH	Amount
<u>Municipalities</u>		
City of Chelsea	2,433,750	\$ 19,632.52
City of Claremore	12,819,600	86,311.32
City of Collinsville	4,185,466	32,503.32
City of Cushing	10,536,400	69,886.73
City of Miami	20,205,690	126,624.82
City of Pawnee	3,777,600	25,734.36
City of Pryor	9,867,600	63,198.29
City of Sallisaw	4,814,400	32,706.04
City of Stillwell	3,164,800	24,674.23
City of Tahlequah	7,387,200	51,138.08
City of Wagoner	5,023,200	36,322.15
Total to Municipalities	84,215,306	\$ 568,731.86
<u>Cooperatives</u>		
Consumer Electric Coop. Inc.	24,000,650	\$ 150,496.76
KAMO Electric Coop. Inc.	59,356,087	374,613.50
Northeast Oklahoma Coop. Inc.	17,715,292	114,174.13
Ozark Rural Electric Coop.	3,554,600	25,876.67
Verdigris Valley Elect. Coop. Inc.	6,055,450	43,335.44
Total to Cooperatives	110,682,079	\$ 708,496.50
<u>Private Utilities</u>		
Public Service Co. of Oklahoma	51,109,800	\$ 306,709.80
<u>Summary</u>		
Municipalities	84,215,306	\$ 568,731.86
Cooperatives	110,682,079	708,496.50
Total to Public Utilities	194,897,385	\$1,277,228.36
Private Utilities	51,109,800	306,709.80
Total to Electric Utilities	246,007,585	\$1,583,938.64

Source: Operating Revenue Accounts Ledger, Grand River Dam Authority.

Sales to Cooperatives. Sales to cooperative electric utilities provided \$708,496.50 in revenues, from the distribution of 110,682,079 kilowatt-hours of energy at an average rate of 5.98 mills per kilowatt-hour, and made up 19.9 percent of the Authority's total sales. This was an increase of approximately 10 percent over 1954.

Sales to Publicly Owned Utilities. Total sales to publicly owned electric utilities of 194,897,385 kilowatt-hours of energy at an average sales price of 6.55 mills resulted in revenues of \$1,277,228.36 and provided 35.9 percent of the total sales for the year.

Sales to Privately Owned Utilities. The sale of 51,109,800 kilowatt-hours of energy to the Public Service Company of Oklahoma was a decrease of over one-third from the 87,600,000 kilowatt-hours delivered in 1954. This energy sale was made at an average price of 6 mills per kilowatt-hour delivered and provided revenues of \$306,709.80 which comprised only 8.6 percent of the total sales for the year. It is expected that sales to privately owned electric utilities will be further decreased as:

. . . The Public Service Company of Oklahoma served notice upon the Authority to cancel its purchase of 20,000 KWH of power and 4 million KWH of energy per month. With this cancellation, the revenues of the Authority will be reduced approximately \$25,000.00 per month.⁹⁴

⁹⁴Audit Report, 1956, p. 17.

1956 Sales

Total power sales for the year resulted in the distribution of 610,393,029 kilowatt-hours of energy and the receipt of \$3,720,591.57 in revenues. This was an increase of nearly 10 percent in energy sales and almost 5 percent in revenues over 1955. The five percent disparity between the increases in energy sales and revenues was due to a decrease in the average sales price of over five percent to 6.06 mills per kilowatt-hour delivered.

As was the case in the previous year, electrical energy sales to all classes of customers (other electric utility class excepted) showed an increase over the year preceeding.⁹⁵

Industrial Sales

Industrial electrical energy sales increased a little more than 25 percent as 377,501,900 kilowatt-hours (see Table 47) were delivered in 1956. The average sales price of 5.79 mills per kilowatt-hour was almost 10 percent lower and its effect was reflected in an increase of only 12 percent in the revenues received of \$2,184,799.23. These revenues comprised 58.7 percent of the total revenues received by the Authority in 1956.

Sales to Public Authorities

Sales to public authorities continued to decrease slightly as \$28,834.00 in revenues were received from the

⁹⁵Ibid., 1956, p. 17.

TABLE 47
INDUSTRIAL POWER SALES
Year 1956

Customers	KWH	Amount
H. J. Benedict Construction Co.		\$ 30.00 ^a
Coronado Manufacturing Company ^b	20,736,000	126,193.92
Deere and Company	86,976,000	477,417.69
Douglas Aircraft	94,848,000	545,986.31
General Power	162,600	1,535.25
B. F. Goodrich Company	49,590,000	288,380.33
Midwest Carbide Company	104,928,000	617,751.82
Muskogee Materials Company	204,600	2,590.10
National Gypsum Company	17,753,600	106,283.07
Yahala Sand and Gravel Company	2,303,100	18,660.44
Total for year	377,501,900	\$2,184,799.23

^aA minimum billing.

^bName was changed to Bestwall Gypsum Company (Certain-teed Products Company) on July 1, 1956.

Source: Operating Revenue Accounts Ledger, Grand River Dam Authority.

sale of 3,973,840 kilowatt-hours of energy (see Table 48) at an average rate of 7.67 mills per kilowatt-hour. These revenues provided less than one percent of the total revenues of the year.

Sales to Federal Authorities. Sales to federal authorities of 637,980 kilowatt-hours of energy, at an average price of 8.03 mills per kilowatt-hour, resulted in revenues of \$5,120.91 for the year.

Sales to Municipal Authorities. Sales to municipal authorities decreased slightly with the receipt of \$23,713.09 in revenues

TABLE 48
SALES TO PUBLIC AUTHORITIES
Year 1956

Customers	KWH	Amount
<u>Federal</u>		
Camp Gruber, Oklahoma	107,280	\$ 835.50
Oklahoma Ordnance Works	530,700	4,285.41
Total Federal Authorities	637,980	\$ 5,120.91
<u>Municipal</u>		
Muskogee Water Works	3,192,000	\$22,529.97
Quapaw Water Works	143,760	1,183.12
Total Municipal Authorities	3,335,760	\$23,713.09
<u>Summary</u>		
Federal Authorities	637,980	\$ 5,120.91
Municipal Authorities	3,335,760	23,713.09
Total to Public Authorities	3,973,740	\$28,834.00

Source: Operating Revenue Accounts Ledger, Grand River Dam Authority.

from the sale of 3,335,760 kilowatt-hours of energy at an average sales price of 7.11 mills per kilowatt-hour delivered.

Sales to Electric Utilities

Electrical energy sales to electric utilities decreased approximately 7 percent to 228,917,389 kilowatt-hours (see Table 49). However, revenues only decreased about five percent to \$1,506,928.64, as the average sales price increased .14 mills to 6.58 mills per kilowatt-hour sold. The entire loss in revenue from the decrease in energy sales can be traced to sales to the private utility sub-group of customers.

TABLE 49
SALES TO ELECTRIC UTILITIES
Year 1956

Customers	KWH	Amount
<u>Municipalities</u>		
City of Chelsea	2,607,500	\$ 19,335.06
City of Claremore	13,806,917	86,720.65
City of Collinsville	5,030,000	35,140.92
City of Cushing	8,475,600	50,037.84
City of Miami	23,618,678	137,637.69
City of Pawnee	4,072,800	26,437.91
City of Pryor	10,973,800	67,215.57
City of Sallisaw	5,728,800	35,287.77
City of Stillwell	3,281,600	23,134.52
City of Tahlequah	8,433,600	52,695.64
City of Wagoner	6,009,600	37,705.51
Total to Municipalities	92,037,895	\$ 560,728.29
<u>Cooperatives</u>		
Consumer Electric Coop. Inc.	30,107,550	\$ 178,883.94
KAMO Electric Coop. Inc.	73,777,582	437,346.56
Northeast Oklahoma Coop. Inc.	20,395,012	122,539.55
Ozark Rural Electric Coop.	4,256,700	27,827.09
Verdigris Valley Elect. Coop. Inc.	7,051,650	44,048.99
Total to Cooperatives	135,588,494	\$ 810,646.13
<u>Private Utilities</u>		
Public Service Co. of Oklahoma	1,290,000	\$ 124,933.43
<u>Summary</u>		
Municipalities	92,037,895	\$ 560,728.29
Cooperatives	135,588,494	810,646.13
Total to Public Utilities	227,626,389	\$1,381,995.21
Private Utilities	1,290,000	124,933.43
Total to Electric Utilities	228,917,389	\$1,506,928.64

Source: Operating Revenue Accounts Ledger, Grand River Dam Authority.

Cancellation of a contract with the Public Service Company of Oklahoma, eliminated revenues of \$25,000.00 per month. However, upon such cancellation, another agreement was arrived at, whereby the Public Service Company of Oklahoma contracted to purchase up to 10,000 kilowatts of power for a fixed sum of \$10,000.00 per month.⁹⁶

Sales revenues from electric utilities comprised 40.5 percent of the Authority's total revenues for the year.

Sales to Municipalities. Energy sales to municipalities increased about 10 percent to 92,037,895 kilowatt-hours, but a decrease in the average sales price of .54 mills, to 6.21 mills per kilowatt-hour sold, held the revenue from these sales to a minor gain. These revenues of \$571,349.08 provided 15.4 percent of the total revenue received.

Sales to Cooperatives. Sales to cooperatives continued to climb with 135,588,494 kilowatt-hours being purchased for an increase in sales of 20 percent. These sales were made at an average rate of 5.98 mills per kilowatt-hour and resulted in \$810,646.13 in revenues which comprised 21.8 percent of the total sales revenue for the year.

Sales to Publicly Owned Utilities. Sales to this group of customers reached an all time high as they made up 37.2 percent of the total sales. Revenues of \$1,381,995.21 were produced from the sale of 227,626,389 kilowatt-hours of energy at an average price of 6.15 mills per kilowatt-hour sold.

Sales to Privately Owned Utilities. Sales to privately owned electric utilities dropped to an all time low of 1,290,000 kilowatt-hours and only produced \$124,933.43 in revenues at

⁹⁶Audit Report, 1956, p. 16.

an average rate of 9.69 cents per kilowatt-hour sold. These revenues only provided 3.3 percent of the total income of the Authority in 1956.

1957 Sales

Total sales of 635,143,854 kilowatt-hours of energy and revenues of \$3,847,063.04 were an increase of approximately four percent over those of the previous year. The average sales price of all sales was 6.06 mills per kilowatt-hour delivered and was the same as in 1956.

Industrial Sales

Industrial sales of electric energy were down slightly while revenues from these sales were slightly more than those of the past year as the average sales price increased about four percent to 5.98 mills per kilowatt-hour sold. The delivery of 368,854,700 kilowatt-hours of energy produced \$2,207,103.38 in revenues (see Table 50) which comprised 57.4 percent of the total sales above.

Sales to Public Authorities

Sales of energy to public authorities continued to decline and were almost 10 percent under those of 1956. However, the decline in revenues were less than five percent as the average sales price to municipal authorities, which was the largest sub-group of sales under this classification, increased one-half mill per kilowatt-hour sold. The average

TABLE 50
INDUSTRIAL POWER SALES
Year 1957

Customers	KWH	Amount
Bestwall Gypsum Company	20,764,800	\$ 129,799.32
Deere and Company	88,480,000	520,704.36
Douglas Aircraft	88,597,000	522,242.28
General Power	154,300	1,569.75
B. F. Goodrich Company	55,952,000	332,466.08
Midwest Carbide Company	96,172,800	580,748.93
National Gypsum Company	17,088,000	105,707.68
Yahala Sand and Gravel Company	1,645,800	13,864.98
Total for year	368,854,700	\$2,207,103.38

Source: Operating Revenue Accounts Ledger, Grand River Dam Authority.

sales price for all public authority sales of 7.67 mills per kilowatt-hour produced revenues of \$27,744.28 from the delivery of 3,618,470 kilowatt-hours of energy (see Table 51). These revenues provided only .72 percent of the total sales of the Authority for the year.

Sales to Federal Authorities. Sales to federal authorities of 671,620 kilowatt-hours of energy accounted for revenues of \$5,305.07 based on an average sales price of 7.9 mills per kilowatt-hour sold.

Sales to Municipal Authorities. Sales to municipal authorities of 2,946,850 kilowatt-hours of energy, at an average sales price of 7.61 mills per kilowatt-hour, produced revenues of \$22,439.21.

TABLE 51
SALES TO PUBLIC AUTHORITIES
Year 1957

Customers	KWH	Amount
<u>Federal</u>		
Camp Gruber, Oklahoma	106,920	\$ 853.02
Oklahoma Ordnance Works	564,700	4,452.05
Total Federal Authorities	<u>671,620</u>	<u>\$ 5,305.07</u>
<u>Municipal</u>		
Muskogee Water Works	2,809,000	\$21,241.36
Quapaw Water Works	137,850	1,197.85
Total Municipal Authorities	<u>2,946,850</u>	<u>\$22,439.21</u>
<u>Summary</u>		
Federal Authorities	671,620	\$ 5,305.07
Municipal Authorities	2,946,850	22,439.21
Total to Public Authorities	<u>3,618,470</u>	<u>\$27,744.28</u>

Source: Operating Revenue Accounts Ledger, Grand River Dam Authority.

Sales to Electric Utilities

Sales of energy to electric utilities increased nearly 15 percent over the sales of the past year but revenues only increased about 7 percent as the average sales price was .44 mills lower than that of 1956. The distribution of 262,670,684 kilowatt-hours of energy, at an average sales price of 6.14 mills per kilowatt-hour, resulted in revenues of \$1,612,215.38 (see Table 52). These revenues comprised 41.9 percent of the total revenues for the year.

Sales to Municipalities. Sales to municipalities, both in

TABLE 52
SALES TO ELECTRIC UTILITIES
Year 1957

Customers	KWH	Amount
<u>Municipalities</u>		
City of Chelsea	2,745,250	\$ 20,636.26
City of Claremore	14,252,800	89,241.05
City of Collinsville	5,201,600	36,240.61
City of Miami	25,572,185	152,974.86
City of Pawnee	4,185,600	27,327.83
City of Pryor	11,065,600	71,428.45
City of Sallisaw	6,276,000	39,193.08
City of Stillwell	3,691,200	27,089.73
City of Tahlequah	9,178,000	57,088.59
City of Wagoner	6,134,400	39,507.83
Total to Municipalities	88,302,635	\$ 560,728.29
<u>Cooperatives</u>		
Consumer Electric Coop. Inc.	34,260,550	\$ 205,971.33
KAMO Electric Coop. Inc.	86,866,843	520,282.78
Northeast Oklahoma Coop. Inc.	21,460,056	133,272.08
Ozark Rural Electric Coop.	4,596,900	29,356.70
Verdigris Valley Elect. Coop. Inc.	9,400,800	56,030.98
Total to Cooperatives	156,585,149	\$ 944,913.87
<u>Private Utilities</u>		
Public Service Co. of Oklahoma	17,782,900	\$ 106,573.22
<u>Summary</u>		
Municipalities	88,302,635	\$ 560,728.29
Cooperatives	156,585,149	944,913.87
Total to Public Utilities	244,887,784	\$1,505,642.16
Private Utilities	17,782,900	106,573.22
Total to Electric Utilities	262,670,684	\$1,612,215.38

Source: Operating Revenue Accounts Ledger, Grand River Dam Authority.

terms of energy sales and revenue receipts, decreased slightly in 1956. Revenues of \$560,728.29 were produced from the sale of 88,302,635 kilowatt-hours of energy at an average sales price of 6.35 mills per kilowatt-hour and comprised 14.6 percent of the total revenues for the year.

Sales to Cooperatives. Sales to cooperatives increased about 15 percent over those of the previous year. The 156,585,149 kilowatt-hours of energy sold resulted in revenues of \$944,913.87. These revenues were produced from an average sales price of 6.03 mills per kilowatt-hour and provided 24.5 percent of the Authority's total revenues.

Sales to Publicly Owned Utilities. Total sales to publicly owned electric utilities of 244,887,784 kilowatt-hours of energy at an average sales price of 6.15 mills resulted in revenues of \$1,505,642.16 and provided 39.1 percent of the total sales revenue for the year.

Sales to Privately Owned Utilities. The only sale to this sub-group of customers consisted of a sale of 17,782,900 kilowatt-hours of dump power to the Public Service Company of Oklahoma which resulted in revenues of \$106,573.22 from an average sales price of 5.99 mills per kilowatt-hour sold. This sale provided less than three percent of the total revenues of the Authority for 1957.

Summary

Total energy sales and the revenue from these sales have steadily increased over the eleven years and four months

of operations by the Grand River Dam Authority (see Illustrations 4 and 5). The only annual period that shows a marked decrease in the amount of annual sales, when compared to the previous period, is in the year 1950. This decrease was due to the previously discussed termination of a short term contract with the Arkansas Power and Light Company and, even so, additional sales to other customers almost made up for the annual sales decrease due to this contract expiration.

Total energy sales have increased from 254,113,486 kilowatt-hours delivered for \$937,772.09 in sales revenues in 1947 to 635,143,854 kilowatt-hours that produced \$3,347,063.04 in sales revenues in 1957. This was an increase of nearly 250 percent in energy sales and over 350 percent in sales revenue receipts.

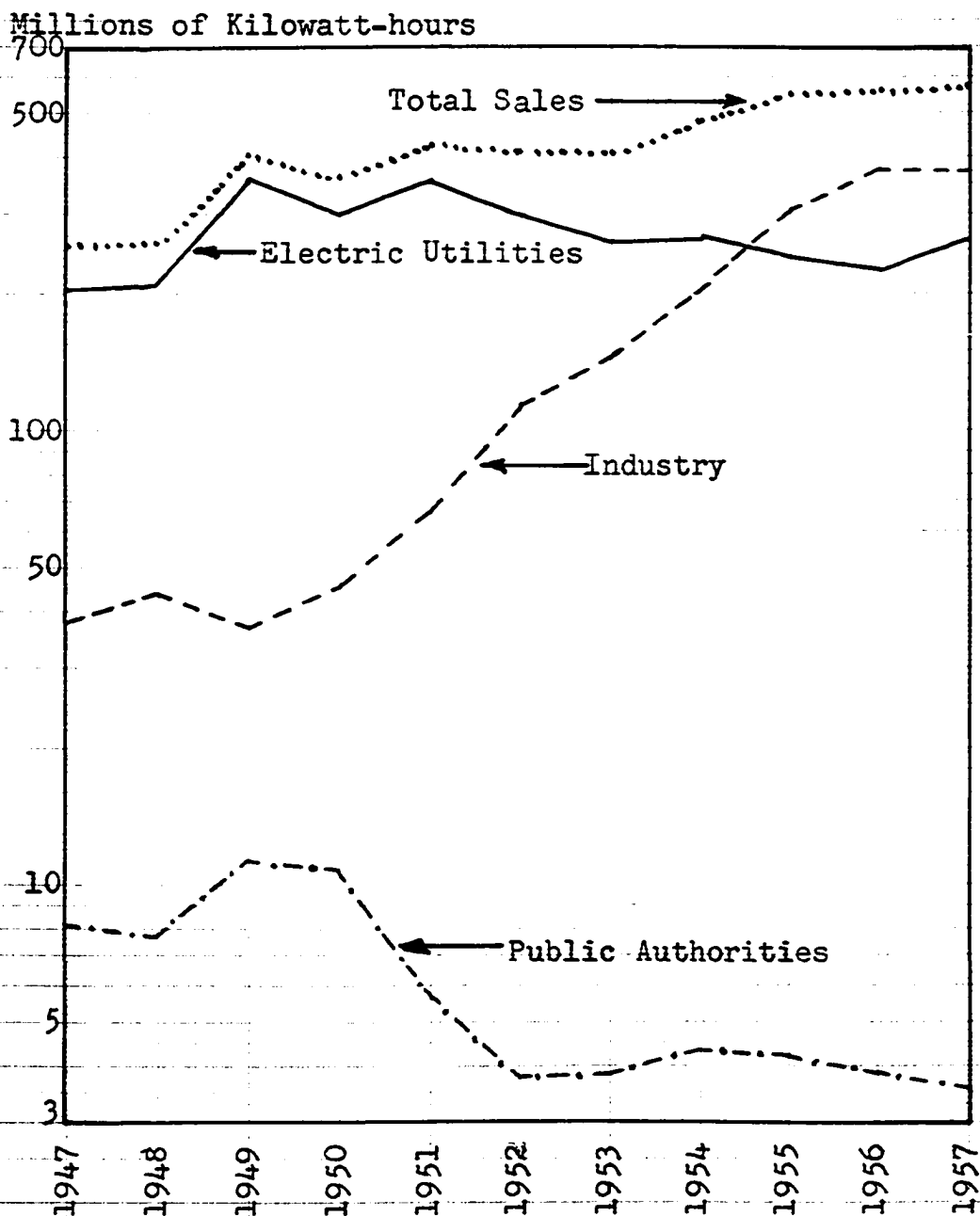
The number of total customers has increased from 12 in 1946 to a high of 32 in 1955 with 28 of these still active at the end of 1957. The average number of customers served was slightly over 25 per period over the eleven annual periods.

Sales to industrial firms have made the second highest gain of the various customer classifications. After the end of World War II sales revenue from industrial sales fell, from 22.2 percent of total sales in 1946, to 11.1 percent in 1949 (see Table A-20), but since then they have increased steadily over the years. Over the period 1947 to 1957 inclusive, total energy sales to industry have increased

ILLUSTRATION 4

GRAND RIVER DAM AUTHORITY KILOWATT-HOUR SALES,
BY MAJOR TYPE OF CUSTOMER, ANNUALLY, 1947-1957
(Millions of Kilowatt-hours)

Source: Tables 17, 20, 23, 26, 29, 32, 35, 38,
41, 44, 47, and 50.

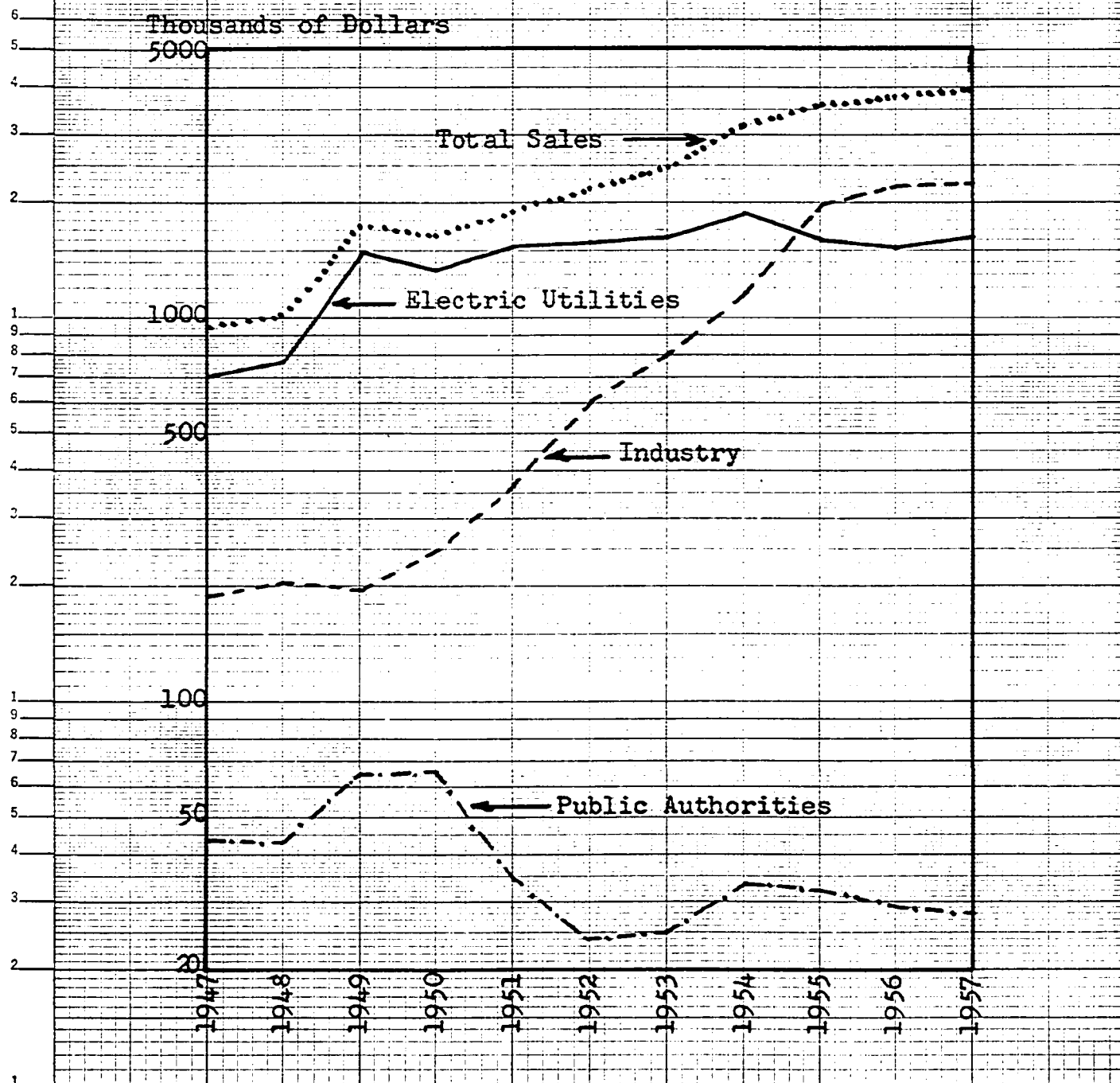


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ILLUSTRATION 5

GRAND RIVER DAM AUTHORITY SALES REVENUES, BY
MAJOR TYPE OF CUSTOMER, ANNUALLY, 1947-1957
(Thousands of Dollars)

Source: Tables 17, 20, 23, 26, 29, 32, 35, 38,
41, 44, 47, and 50.



nearly tenfold as deliveries were expanded from 38,019,846 to 368,854,700 kilowatt-hours and sales revenues received have increased even more in rising from \$184,458.53 to \$2,207,103.38. The number of industrial customers has increased from five in 1947 to a high of eleven in 1955 with eight of these still active in 1957. However, the eight customers in 1957 purchased slightly over 10 percent more than the eleven firms in 1955 so that the decrease in the number of customers did not necessarily mean a loss in sales revenue.

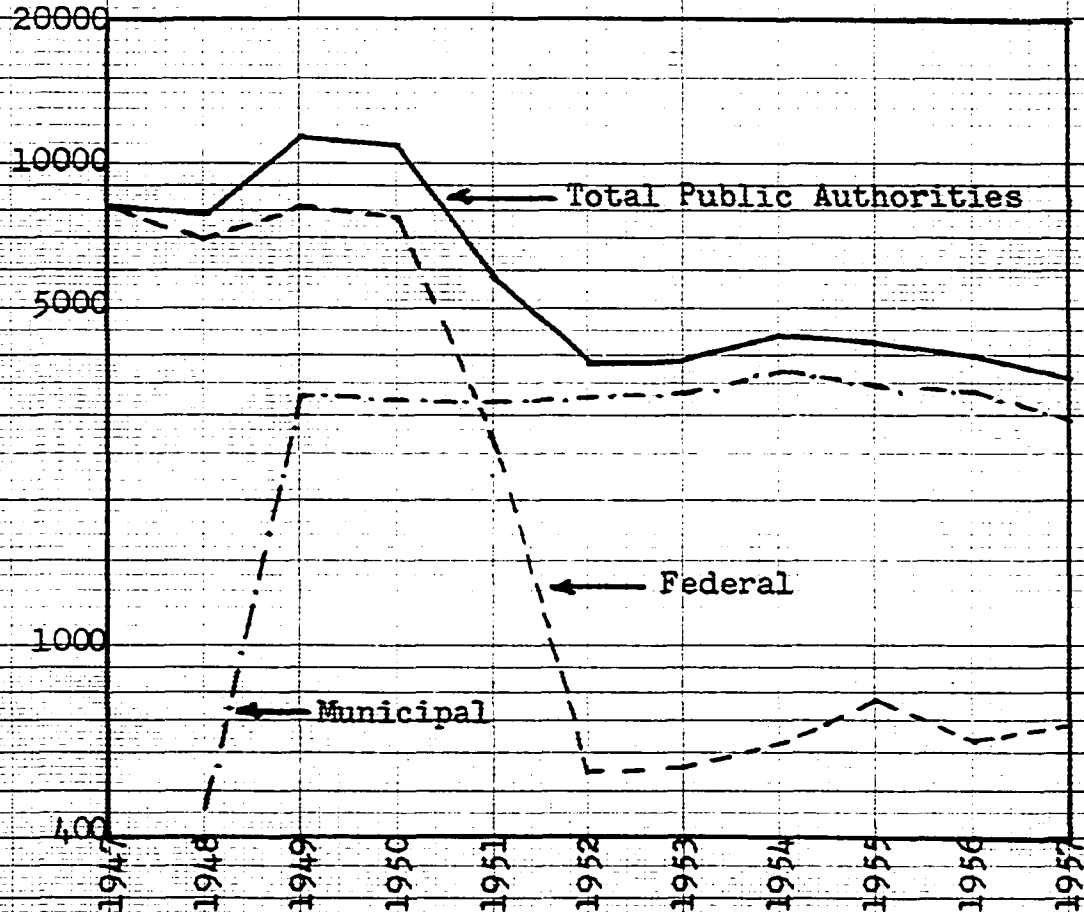
Sales to public authorities were at their highest peak in the years following the war, but with the closing of Government Aircraft Plant Number 3, near Tulsa, Oklahoma in 1951 they fell to a much lower level. Since 1951 this new level has been maintained fairly well with only minor variations in annual purchases. Energy sales (see Illustration 6) increased from 8,249,200 kilowatt-hours in 1947 to 11,454,860 kilowatt-hours in 1949, but by 1952 had dropped back again to approximately 4 million kilowatt-hours where they have been reasonably constant. The decrease in sales from the 1947 figure is slightly more than 50 percent but from the high of 1949 the drop is about 65 percent. Sales revenues (see Illustration 7) have followed a similar pattern to energy sales above, but the decline has been a little less severe, as the average sales price has increased steadily over the years from 5.33 to 7.67 mills per kilowatt-hour sold.

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ILLUSTRATION 6

GRAND RIVER DAM AUTHORITY KILOWATT-HOUR SALES, BY
 PUBLIC AUTHORITY CLASSIFICATION, ANNUALLY, 1947-1957
 (Thousands of Kilowatt-hours)

Thousands of Kilowatt-hours



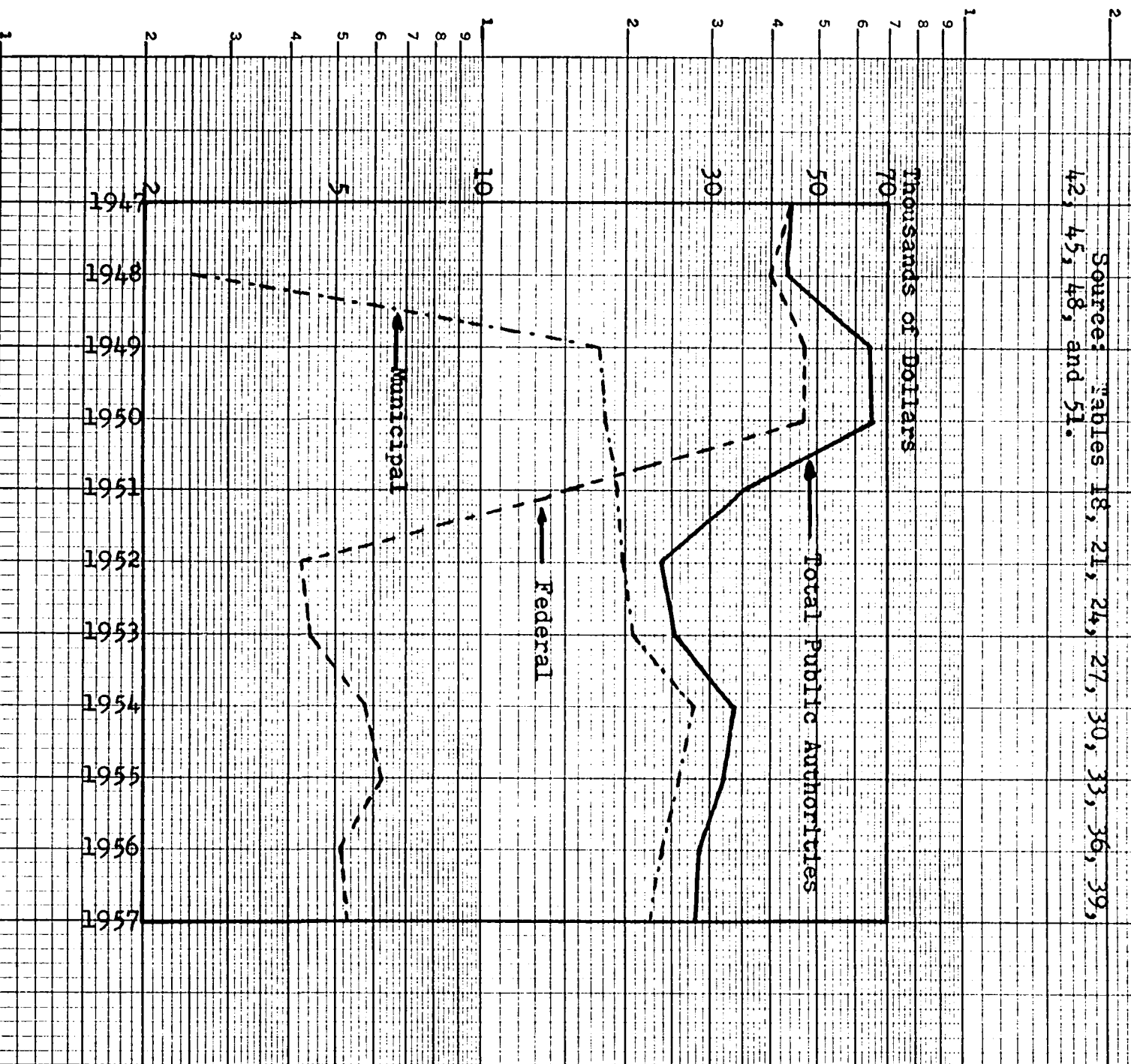
Source: Tables 18, 21, 24, 27, 30, 33, 36, 39,
 42, 45, 48, and 51.

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ILLUSTRATION 7

GRAND RIVER DAM AUTHORITY SALES REVENUES, BY PUBLIC
AUTHORITY CLASSIFICATION, ANNUALLY, 1947-1957
(Thousands of Dollars)

Source: Tables 18, 21, 24, 27, 30, 33, 36, 39,
42, 45, 48, and 51.



Most of the decline in public authority sales described above has been in sales to federal authorities. Energy sales to this sub-group of customers decreased rather sharply in 1951 and 1952 from a normal level of approximately eight million kilowatt-hours per year to a new normal level that has varied between 535 and 778 thousand kilowatt-hours since that time. Sales revenues have followed a similar pattern, but the decline has been moderated by the increase in the average sales price.

Energy sales to municipal authorities failed to reach a normal level until 1949, when the Muskogee Water Works purchased power for a full year for the first time, but since that year energy sales have been fairly constant at a level slightly over 3 million kilowatt-hours per year. Sales revenues from municipal authorities have increased about 30 percent, over the period 1949 to 1957 inclusive, but this increase has been due to the increase in the average sales price.

Total energy sales to customers classified as electric utilities have decreased somewhat over the years (see Illustration 8). However, they have been relatively constant if sales of dump power and sales made under short time contracts are considered. Sales revenues have more than doubled (see Illustration 9) as dump power sales have decreased and the average sales price has increased from 3.41 mills per kilowatt-hour in 1947 to 6.14 mills in 1957. The

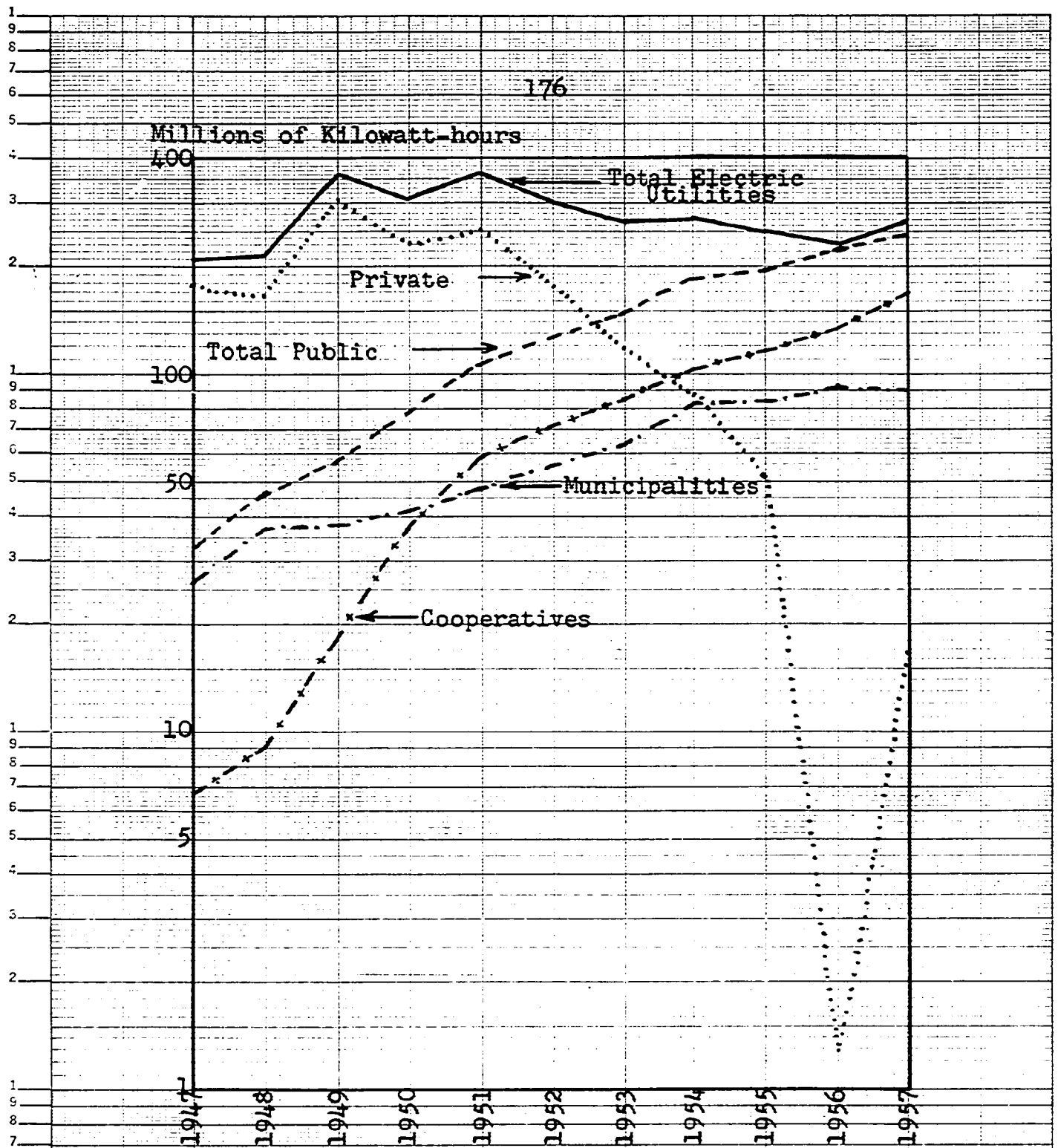


ILLUSTRATION 8
 GRAND RIVER DAM AUTHORITY KILOWATT-HOUR SALES, BY
 ELECTRIC UTILITY CLASSIFICATION, ANNUALLY, 1947-1957
 (Millions of Kilowatt-hours)

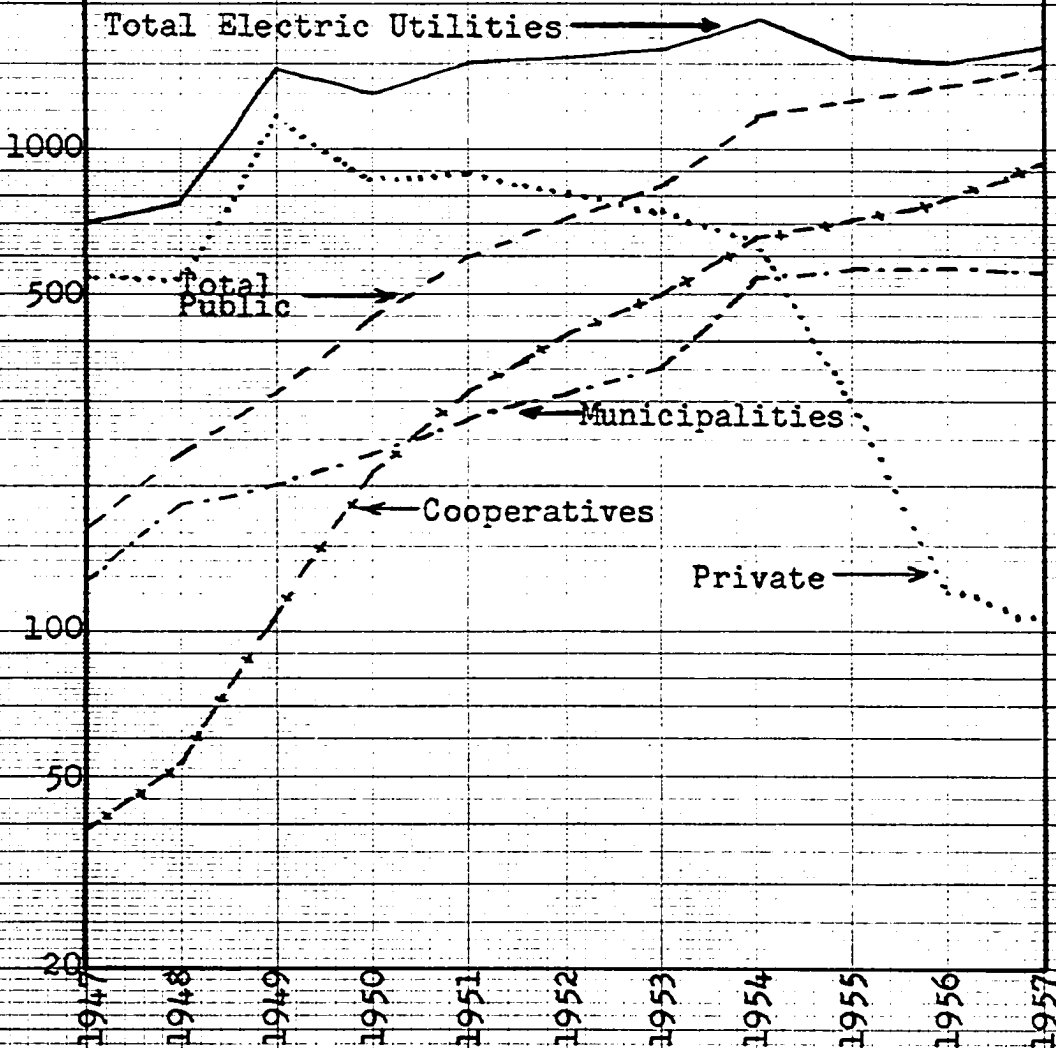
Source: Tables 19, 22, 25, 28, 31, 34, 37, 40,
 43, 46, 49, and 52.

ILLUSTRATION 9

GRAND RIVER DAM AUTHORITY SALES REVENUES BY
ELECTRICAL UTILITY CLASSIFICATION,
ANNUALLY, 1947-1957
(Thousands of Dollars)

Source: Tables 19, 22, 25, 28, 31, 34, 37, 40,
43, 46, 49, and 52.

Thousands of Dollars
5000



number of customers has increased from 11 in 1947 to a high of 17 in 1954, 1955, and 1956 with 16 of those still active in 1957.

Sales to municipalities of electrical energy have increased steadily over the years from 26,149,280 kilowatt-hours in 1947 to 92,037,895 kilowatt-hours in 1956. The loss in sales due to the termination of a contract with the City of Cushing in 1956, when they completed the installation of additional municipal generation capacity, was partially offset by sales to other customers, but still lowered the total delivery of energy to municipalities to 88,302,635 kilowatt-hours in 1957. Sales revenues received from municipalities followed the same pattern as sales of energy but the trend of increase was a little more pronounced as the average sales price per kilowatt-hour steadily increased over the years to 1955. Since then there has been a small decrease in price. The number of municipality customers increased from six in 1947 to a high of 11 in 1953 with 10 of these still active in 1957.

Electrical energy sales to and sales revenues from cooperatives have made the largest gain of any of the classes or sub-groups of customers served by the Grand River Dam Authority. Energy sales have increased steadily over the years from 6.7 million kilowatt-hours in 1947 to 156.6 million kilowatt-hours in 1957. Revenues from these sales increased from \$38,509.04 in 1947 to \$944,913.87 in 1957.

This was an increase of well over 2000 percent in both energy sales and sales revenues from this sub-group of customers. The percentage of total sales revenues that sales to cooperative electric utilities supplied rose from 4.1 percent in 1947 to 24.5 percent in 1957.

The number of customers in the cooperative utility group has been rather small over the years and has increased from 3 in 1947 to 4 in 1948 and finally to 5 in 1954. The only variance in the individual companies being served has been in the addition of new customers, all of whom are still active at the close of 1957.

The increase in both energy sales and sales revenues from all publicly owned electric utilities has, of course, been mainly due to the increase described above in the discussion of sales to cooperatives. However, the lesser increase attributable to sales to municipalities only lowered the percentage increase in sales to all publicly owned electric utilities to a 700 percent increase in energy sales and a 800 percent increase in revenues from this group of customers over the eleven year period. The percentage of total sales revenues that this group supplied increased from 17.8 percent in 1947 to 37.1 percent in 1957.

Energy sales to privately owned electric utilities have fluctuated widely over the years as dump power sales were made when water conditions were favorable (see Table A-19), but revenues from sales to this sub-group of customer

have consistently fallen since 1949, when a short term contract was in operation with the Arkansas Power and Light Company. The percentage of total annual sales revenues attributable to privately owned electric utilities has, excepting the year 1949, decreased from 57.9 percent in 1947 to 2.8 percent in 1957.

With the exception of the year 1949 there has only been one customer under contract for delivery of power under this classification. However, in the periods 1946 through 1949 power sold to the Public Service Company was actually divided, by an agreement between themselves, between the Public Service Company of Oklahoma and the Oklahoma Gas and Electric Company.

CHAPTER V

SUMMARY AND CONCLUSIONS

The Grand River Dam Authority balance sheet as of December 31, 1957,⁹⁷ is summarized as follows:

Assets:		
Plant Investment		\$35,630,203.48
Less: Depreciation		<u>6,754,324.65</u>
Net Plant Investment after Depreciation		\$28,875,878.83
Investment and Fund Accounts		1,843,212.71
Current Assets		1,252,655.79
Deferred Charges and Other Assets		<u>391,081.26</u>
Total Assets		<u>\$32,362,828.59</u>
Liabilities:		
Long Term Debt	\$21,132,000.00	
Current Liabilities	<u>857,595.03</u>	\$21,989,595.03
Deferred Credits		38,390.55
Contributions in Aid of Construction:		
Federal Grant	\$11,113,636.00	
Other Items	<u>222,633.81</u>	11,336,269.81
Deficit		<u>(1,001,426.80)</u>
		<u>\$32,362,828.59</u>

The Authority now controls depreciated physical assets valued at \$28,875,878.83 and other assets of \$3,486,949.76 for a total asset valuation of \$32,362,828.59. The total liabilities and deferred credits are \$22,027,985.58, which leaves a net

⁹⁷Audit Report, 1957, p. 2, Exhibit A.

unencumbered balance of \$10,334,843.01. However, it must also be pointed out that Federal grants and other contributions in aid of construction were made in the amount of \$11,336,269.91.

Since the Grand River Dam Authority is financed by revenue bonds, the financial success of the project can be measured in part by the ability of the Authority to service its debt obligations. Table 53 shows the record of the earning ability of the Authority for the period 1946 through 1957. Total operating revenues for the 12 periods of \$29,349,000⁹⁸ less the total operating revenue deductions of \$18,233,000 leaves a net electrical operating income of \$11,113,000. Other income of \$245,000 added to the net electrical income provided a gross income before provision for depreciation of \$11,354,000. A deduction of \$6,309,000 for interest expense and \$200,000 for the amortization of bond discount and expense leaves a net income before provision for depreciation of assets of \$4,854,000. A deduction of \$5,822,000 to provide for the depreciation of fixed assets leaves a net deficit of \$871,000⁹⁹ for the twelve periods of operation of the facilities under the Grand River Dam Authority.

The net deficit (after provision for depreciation) shown in Table 53 is actually just a book loss since the

⁹⁸ All figures are rounded to the nearest thousands of dollars.

⁹⁹ Surplus adjustments not considered in this analysis prevent this deficit figure from agreeing with the deficit figure shown in the preceding balance sheet.

TABLE 53

SUMMARY, GRAND RIVER DAM AUTHORITY INCOME STATEMENTS, ANNUALLY, 1946-1957
(in thousands of dollars)

Year	Total Operating Revenue	Total Operating Revenue Deductions	Net Electrical Operating Income ^a	Other Income	Gross Income ^a
1946 ^b	\$ 224	\$ 153	\$ 71	\$ 2	\$ 72
1947	938	431	506	6	512
1948	999	436	563	5	568
1949	1,732	792	940	26	966
1950	1,629	748	880	36	917
1951	1,901	904	997	24	1,020
1952	2,302	1,353	948	27	974
1953	2,649	2,247	402	22	425
1954	3,689	2,745	944	15	958
1955	4,207	2,430	1,777	3	1,779
1956	4,448	3,280	1,168	21	1,188
1957	4,631	2,714	1,917	58	1,975
Total	\$29,349	\$18,233	\$11,113	\$245	\$11,354

TABLE 53 Continued

Year	Interest Expense	Amortization of Bond Discount & Expense	Net Income ^a (Loss)	Provision for Depreciation of Assets	Net Income ^c (Loss)
1946 ^b	\$ 117		\$ (45)	\$ 99	\$ (144)
1947	350		162	338	(176)
1948	347		221	355	(134)
1949	536	\$ 15	415	453	38
1950	606	24	287	511	(224)
1951	612	24	384	536	(152)
1952	620	24	330	573	(243)
1953	639	24	(238)	587	(825)
1954	632	23	303	598	(295)
1955	626	23	1,130	601	529
1956	617	22	549	602	53
1957	607	21	1,347	569	778
Total	\$6,309	\$200	\$4,845	\$5,822	\$(871)

^aBefore provision for depreciation of assets.

^bFor the period September 1 to December 31, 1946.

^cAfter provision for depreciation of assets.

Source: Tables A-2 through A-13 including A-2a through A-10a.

provision for depreciation is not an expense, but is merely an allocation of income.¹⁰⁰ The true ability of the Authority to meet its debt obligations is presented in Table 54. In this table \$1,275,000 in principal paid on maturity is deducted from net income (before provision for depreciation) to leave a total net gain from operations by the Authority of \$3,042,000. Furthermore, the Authority has also been able to redeem \$548,000 of its bonds over and above the mandatory retirement of maturing principal. Net losses have occurred in only two periods, the three months period of 1946 and the year 1953.

Since the incorporation of the provision for the depreciation of assets into the rate determining formula, as described on page 100 of Chapter IV, it is apparent that at least up to the limit of the funds supplied by a maximum surcharge of 20 percent above normal basic rates, the Authority will be able to provide for asset depreciation in addition to meeting annual expenses and its debt service requirements.

In this same period the Authority has produced 2,706,384,800 kilowatt-hours of energy at the Pensacola Dam plant and 1,753,746,100 kilowatt-hours at the Choteau Steam

¹⁰⁰This provision for depreciation is an annual allocation of income for that portion of the historical cost of an asset, less any salvage value anticipated, that is normally computed for each year of the life span of that asset.

TABLE 54

SUMMARY, GRAND RIVER DAM AUTHORITY NET INCOME,^a
 PRINCIPAL PAYMENTS, AND NET GAIN
 OR LOSS,^a ANNUALLY, 1946-1957
 (in thousands of dollars)

Year	Net Income ^a	Principal Retired ^b	Principal Redeemed ^c	Net Gain (Loss) ^a
1946 ^d	\$ (45)			\$ (45)
1947	162			162
1948	221	\$ 100	\$100	21
1949	415			415
1950	287			287
1951	384			384
1952	330	145	73	112
1953	(238)	165	65	(468)
1954	303	185	70	48
1955	1,130	205	75	850
1956	549	230	80	259
1957	1,347	245	85	1,017
Total	\$4,845	\$1,275	\$548	\$3,042

^aBefore provision for depreciation of assets.

^bPrincipal retired upon maturity.

^cPrincipal redeemed before maturity.

^dFor the period September 1 to December 31, 1946.

Source: Tables 4 and 53. Text page 53.

plant for a total gross production of 4,460,130,900 kilowatt-hours of electrical energy. Along with the distribution of its own production the Authority has also been instrumental in the distribution of 775,871,700 kilowatt-hours of electrical energy produced by others (see Table 6).

The total production and purchase of electrical energy

for distribution by the Grand River Dam Authority grew steadily from 248,804,100 kilowatt-hours in 1947 to 685,424,900 kilowatt-hours in 1957. However, the purchase of 3,086,000 kilowatt-hours in 1952, 75,303,500 in 1953, 130,543,800 in 1954, 111,075,000 in 1955, 254,839,000 in 1956, and 201,024,400 kilowatt-hours in 1957 were mainly responsible for this growth after 1952.

The total production of energy by the facilities of the Grand River Dam Authority increased during the years 1947 and 1948. Over the nine year period since 1949 production could be classified as fairly constant as the maximum variance has been less than 62 million kilowatt-hours per year, except for the years 1955 and 1957. In these years production was increased to a point where the variance increased to a maximum of approximately 25 percent from the low production of 381,389,200 kilowatt-hours in 1953. The average variance over this nine year period has been less than 15 percent per year.

Periodic drouth conditions have been very important in the production of the hydroelectrically generated energy. Hydraulic production fell from its high of 401,252,900 kilowatt-hours in 1951 to a low of 62,600,900 kilowatt-hours in 1956. The only break in this drop in production was in 1955 when production was increased to 200 million kilowatt-hours after a short break in the drouth. The rains of 1956 helped improve the water level of the lake somewhat and

282,356,700 kilowatt-hours of electrical energy were produced hydraulically in 1957.

The production of steam-generated electric energy has fluctuated around two major levels which were determined by the generating capacity available in each period. In 1949, 1950, and 1951 this level was under the 50 million kilowatt-hour level. In 1952, 172,546,000 kilowatt-hours were produced and since then the level has varied around 300 million kilowatt-hours per year with the exception of 1957. In this last year of the period studied the increased production of hydroelectric energy, along with continued high purchases of energy, allowed steam production to fall to 202,043,800 kilowatt-hours.

Hydraulic energy average costs are normally low when the volume of energy generated is high and high when the output is low. Most of the costs of hydraulic production are of a fixed nature and continue to accrue on a steady basis within a wide range of productivity. Though the average cost of hydraulic production has varied rather widely as the volume of production changed, the total cost of production has not varied more than 15 percent over the entire eleven years of full production.

On the other hand, except for the 1949 to 1951 period when steam generation costs were abnormally high due to an attempt to maximize production with the then limited facilities, average steam generation costs have been fairly constant at about five mills per kilowatt-hour produced. A

single exception to this was in 1957 when the drop in production brought the average cost to above seven mills. Total production costs of steam generated electrical energy have risen steadily over the years. The increase has been due to the expansion of facilities and the rising cost of fuel and supplies. Production increases over the years have been responsible for the fairly constant level of average cost in spite of the rising total cost figures. A proper allocation of steam plant costs to provide for expense charges against steam, water, and air sales revenues, as discussed below, will provide a better analysis of the cost of producing steam generated electrical energy.

In general, the average cost of hydraulic production has been consistently lower than the average cost of steam produced energy. The single exception was in the year 1956 when the low level of hydraulic production increased its average cost of electrical energy to slightly more than the average cost of steam produced energy. The average cost of purchased energy was above the average total cost of the energy produced by the Authority in the years 1952 through 1955. In 1956 and 1957 the average cost of purchased energy was less than the average total cost of produced energy. However, the average cost of hydraulic energy has been consistently lower than the average cost of purchased energy. With a more proper allocation of costs to the various types of production at the steam plant, as will be discussed later

in this chapter, there is some question if the average cost of purchased energy in 1956 and 1957 was lower than the average cost of energy produced by the Authority. Also, in all instances it must be remembered that average costs of production of the Authority include a provision for depreciation which is made each year regardless of the volume of production in that year.

Provision for depreciation of the fixed assets of the Authority was first started by the Southwestern Power Administration but the practice was not continued by the State Authority. It was not until the Journal Entry of December 31, 1955 (see Table A-14) was made in the records of the Authority that depreciation was retroactively provided for the years prior to that date. An annual charge for depreciation expense is now a normal accounting procedure.

Since 1951 sales of steam, water, and air have become an important form of revenue for the Authority (see Table 55). However, the expenses incurred in providing these items for sales have never been separately allocated. Instead these costs have been regularly included in the cost of steam generated electrical energy production. This practice has, of course, distorted the total and average production costs of electrical energy (see Tables 9 through 14).

In 1958, the auditors, Campbell & Adkison of Miami, Oklahoma, instigated a break down of the expenses incurred in the steam plant for the years 1956 and 1957. These expenses

TABLE 55
OTHER OPERATING REVENUES,^a
GRAND RIVER DAM AUTHORITY,
ANNUALLY, 1947-1957

Year	Amount
1947	\$ 360.00
1948	480.00
1949	1,455.02
1950	1,154.89
1951	3,252.40
1952	126,195.00
1953	211,562.63
1954	441,690.18
1955	645,177.69
1956	727,465.60
1957	783,729.83 ^b

^aIncludes steam, water, and air sales, equipment rentals, water permits, and other revenues.

^bCorrected by a deduction of water operation and maintenance expense to correspond with net figures for prior years.

Source: Tables A-2 through A-13.

have been distributed so that costs are allocated to power generation, steam, and water and air production costs (see Table 56). In addition to this allocation of production costs, ten percent of the general and administrative costs are allocated to steam, water, and air sales with a result that the total and average operating cost of electrical energy is reduced still further.¹⁰¹

¹⁰¹Audit Report, 1957, p. 30.

TABLE 56

ALLOCATION OF GRAND RIVER DAM AUTHORITY STEAM PLANT COSTS
TO THE PRODUCTION OF ELECTRICAL ENERGY, STEAM, AND
WATER AND AIR, YEARS 1956 and 1957

Type of Cost	Year 1957		Year 1956	
	Total Cost	Steam Cost	Total Cost	Steam Cost
Fuel	\$ 962,854.89	\$485,856.57	\$1,310,940.92	\$431,299.56
Other Operating Costs	190,361.36	61,887.74	172,380.71	42,537.62
Maintenance Costs	82,600.65	23,457.08	86,132.39	22,803.69
Depreciation	181,438.75	35,339.21	181,050.88	32,845.19
Water Operation and Maintenance	37,892.99		34,843.21	
Totals	<u>\$1,455,148.64</u>	<u>\$606,640.60</u>	<u>\$1,785,352.11</u>	<u>\$529,486.06</u>
Steam Allocation	606,640.60		529,486.06	
Water and Air Allocation ^a	79,766.45		76,889.51	
Balance, Electrical Energy	<u>\$ 768,741.59</u>		<u>\$1,178,976.54</u>	

^aWater and air allocation based on revenues received as water sales contain little, if any profit and air production costs are small and considered incidental to power and steam production.

Source: Audit Report for the Year Ended December 31, 1957; Grand River Dam Authority, Vinita, Oklahoma. (Campbell & Adkison, Certified Public Accountants, Miami, Oklahoma) p. 30.

To point out the importance of this cost allocation procedure, production costs of steam generated electrical energy for 1956 are lowered from \$1,750,508.90 to \$1,178,976.54, which caused average production costs to drop from 5.12 to 3.45 mills per kilowatt-hour produced. Similar costs for 1957 are lowered from \$1,455,148.64 to \$768,741.59 which decreased the average production cost from 7.20 to 3.81 mills per kilowatt-hour produced. Total operating expense and average total operating expense, of the Authority, in the production and distribution of electrical energy will be further reduced with the ten percent reduction in general and administrative expense of electrical energy sales. This decrease will be \$26,908.05 in 1956 and \$24,722.15 in 1957 and results in net total operating costs per kilowatt-hour of 5.38 mills in 1956 and 4.11 mills in 1957.

Throughout the slightly more than eleven years of Grand River Dam Authority operations both total energy sales and the revenue received from these sales have steadily increased. Total energy sales, at the end of the period 1947 to 1957, were about two and one-half times and sales receipts were three times more than similar figures for the first of the period.

The total number of customers of the Authority has also increased over the years with most classes of customers sharing in this gain.

Electrical energy sales to and sales revenues from cooperative owned electrical utilities have made the largest relative gain of any of the classes or groups of customers served by the Grand River Dam Authority even though the number of customers only increased from three to five. Energy sales increased from 6,686,860 in 1947 to 156,585,149 kilowatt-hours in 1957. Revenues increased from \$38,509.04 in 1947 to \$944,913.87 in 1957. Dollar sales to this group comprised only 5.2 percent of the total revenues in 1947 but by 1957 this figure had increased to 20.4 percent.

Even though there was a drop in energy sales and revenues from industrial sales after the war, this group of customers increased from five in 1947 to eleven in 1955. Eight of these were still active in 1957 and constituted the source of the largest sales to a single class of customers the Authority had at the end of the period. Revenues from industrial sales fell from 22.2 percent of the total receipts of the Authority in 1947 to only 11.1 percent in 1949, but by 1957 this group was providing 57.4 percent of the Authority's revenues with energy sales increasing accordingly. In actual figures annual energy sales increased from 38,019,846 to 368,854,700 kilowatt-hours per year and revenues increased from \$184,458.53 to \$2,207,103.38 over the eleven year period.

Municipally owned electric utility customers increased from six in 1947 to ten in 1957 and their percentage of total revenues rose from 9.4 to 14.6 percent.

Annual energy sales rose from 26,149,280 kilowatt-hours in 1947 to 88,302,635 kilowatt-hours in 1957. Revenues have increased over this period from \$128,041.77 to \$560,728.29.

Sales to public authorities are relatively immaterial in terms of total sales. They have never provided more than 4.7 percent of the total revenue of the Authority and in recent years the trend has been downward to below one percent. Federal authorities, a sub-group of this class of customers, have steadily lost ground and by 1957 were only accounting for 0.1 percent of the total sales. Municipal authorities, which comprise the other sub-group of this classification, have nearly held their own over the years, but revenues from these sales have never amounted to much more than one percent of total sales.

Sales to private electrical utilities have been almost entirely to the single purchaser, the Public Service Company of Oklahoma. This firm's purchases comprised nearly 60 percent of the annual revenues of the Authority in the early years of the eleven year period but have fallen consistently over the years. In 1957, private electric utility purchases provided only 2.8 percent of the total revenue. The sale of dump power at off-peak load periods have comprised a considerable portion of the total sales to this firm, especially in the period 1947 to 1952. In 1957 dump power was the only purchase. Actual energy sales to this firm rose from 175,008,300 kilowatt-hours in the early

part of the period to 251,265,500 kilowatt-hours in 1951, but fell to only 17,782,900 kilowatt-hours in 1957. Dollar sales followed a similar pattern as energy sales except that in 1956 and 1957 a standby contract purchase agreement held receipts up somewhat even though deliveries were well below the demand contract. The sale to the Arkansas Power and Light Company in 1949, which was the only other purchase from the Authority by a private electric utility, was under a temporary one year contract and is ignored in the above discussion summary of annual sales to this class of customer.

With sales to cooperatives and municipalities on the increase there can be little doubt as to gains by the publicly owned class of electric utility as these two groups make up this entire classification.

The decline in sales to privately owned utilities has not been sufficient to offset public utility gains over the entire eleven year period but have been such that total sales to all electric utilities has fallen since the peak purchase years of this class in 1949 through 1952. The result of this is, that while revenues from this class of customer increased from 75.6 percent in 1947 to 85.2 percent of total revenues in 1949, they have declined rather continuously since that year to provide only 41.9 percent of the Authority's total sales revenues in 1957.

The demand for electrical energy has grown steadily over the years and has almost continuously absorbed the generating capacity of the Authority. As indicated earlier, the Authority has been severely handicapped in periods of drouth by the low level of the Pensacola Dam reservoir and has had to operate steam generating facilities at near maximum production levels. This maximum production operation of the steam plant has, of course, increased operating expenses in those periods, while serving the purpose of accomodating contract customers. The demands for increased production in the past few years, brought about by the expanding needs of even the existing customers, has resulted in the purchase of nearly one-fourth or more of the total energy sold.

These purchases have been mainly from the Public Service Company of Oklahoma, but some energy has been delivered by the Southwestern Power Administration, and are part of an interchange agreement between these firms and the Grand River Dam Authority. Such an interchange is made possible by an expanded grid-type network of transmission lines which have become so essential to the economic operation and best utilization of the electrical generating facilities of not only this section of the State of Oklahoma, but of all the facilities in a given region or section of the United States. This modern type of distribution system allows delivery of off-peak and dump power produced,

especially that produced by hydroelectric generating units when local demand is low, to be made over the grid to other areas where there is a demand. Such a demand can be due either to usage above the normal generating capacity of local units or as a supplement to, or replacement of, generating units that may have a higher rate of production cost.

Rates charged by the Authority for the electrical energy distributed have evolved over the years in the operation of the Authority and are explained in detail in Chapter IV. The basic rates used after the facilities were returned to the Authority by the Federal government were increased by a 15 percent surcharge in 1949. This surcharge was added to the basic rates and in 1953 an additional flexible surcharge was adopted. This flexible surcharge can vary as much as minus 5 percent to plus 20 percent, in multiples of 5 percent, and is calculated quarterly as the percentage increase necessary to expand net income to a point where it will provide an equalization between net revenues and the total of net income (including a deduction for the depreciation of fixed assets) plus provision for debt service (including interest and amortization).

In general, it appears that the average charge for energy delivered by the Grand River Dam Authority to its various classes of customers is comparable, if not slightly lower than that charged by others in this area. However, no attempt will be made to compare these average wholesale

prices paid by these customers and others as such a comparison certainly could not be considered as being very meaningful unless each case was adjusted to a given preselected standard. Such an adjustment would necessitate knowing, in each case, the details as to demand and energy charges as well as their rates, bases, and exclusions where such exist. Other details required would include the power factor or constancy of use of the contracted demand base that was used and the charges applied for any variance from this power factor base. Individual demand contracts vary considerably, the power factor of the individual is also important in calculating the demand rate to be applied, and in addition there may be a difference with the supplier in the power factor base that is used for such computation. Energy rates are sometimes based on a fixed rate while a sliding scale is used in other instances. Under either type of energy rate, above, there may, or may not, be an exclusion of a given number of kilowatt-hours before the rate is applicable.

It has been gratifying to note that the auditors have altered the Audit Report for 1957 to correct the error existing since 1950 in the use of the account title "Lighting and Maintenance" for the proper title "Governmental and Municipal".¹⁰² This title follows the standard classification recommended by the Federal Power Commission, which has

¹⁰²Audit Report, 1957, p. 25.

been used by the Authority for many years.

In general, the accounting procedures followed by the accounting department of the Authority appear to be quite adequate and satisfactory as to techniques used and methods applied. The records appeared to be efficiently prepared, and the information normally required for effective management seemed to be readily available for use.

In connection with the records of the Authority the writer would like to suggest that proper steps be taken, by those responsible for material in the Oklahoma Library Commission in the State Capitol Building, to secure a complete file of the Audit Reports of the records of the operations of the Grand River Dam Authority. Such a file should be available for public inspection and use at all times, but even more important is the need for the ready availability of this information to the members of the Oklahoma legislature, legislative and judiciary committees, as well as to the executive and other legal bodies of our government in the analysis of the operation and functioning of the Grand River Dam Authority as such an analysis relates to present and future legislation.

Though, of course, it was beyond the scope of this study, there can be no question but what the availability of the electrical energy produced and distributed by the Grand River Dam Authority has been instrumental in the establishment in the area of a number of industrial firms and other

facilities that probably otherwise would have been located elsewhere.

Recreational facilities of many forms have been provided by the Lake O' the Cherokees and have resulted in millions of people visiting the area to enjoy these facilities.

While no details are included in this study of the value of the flood control features of the Pensacola Dam, there is little doubt that floods on the Grand River and streams below have been lessened in their severity since the construction of the dam. The flood control features of the proposed Markham's Ferry Dam will no doubt lessen this severity even more when that dam is eventually constructed.

It is hoped that this pilot study of the Grand River Dam Authority will lead to a more active interest in, and broader understanding of its functions, facilities, and operations. It is seriously proposed that future research studies be made to include many of the areas and facets of economic life that have been affected by the creation of the Grand River Dam Authority and in the construction and operation of the facilities that are controlled by the Authority.

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APPENDIX

TABLE A-1

PRELIMINARY OPERATIONS, GRAND RIVER DAM AUTHORITY
SEPTEMBER, 1940 TO NOVEMBER 20, 1941

<u>Operating Revenues:</u>		
Sales of Electric Energy		\$156,763.24
Other Operating Income		<u>7,027.36</u>
Total Operating Revenues		\$163,790.60
<u>Expenses:</u> ^a		
Power House ^b	\$28,115.79	
Transmission ^b	15,643.25	
Reservoir Maintenance	10,319.33	
Legal Fees and Expenses	1,502.24	
Administrative and Overhead	6,287.35	
Publicity	2,248.16	
Supervision of Power Sales and Engineering ^b	9,991.33	
Hydraulic Engineering ^b	3,981.64	
Damages	<u>15,000.00</u>	
Total Expenses		<u>93,089.09</u>
Net Revenue		<u>\$ 70,701.51</u>
Gross Kilowatt-hours Generated Prior to November 20, 1941		101,890,090

^aNo provision made for depreciation.

^bExpenses directly applicable to cost of production.

Source: Revenue and expense data from Audit Report for 1941, Grand River Dam Authority, Vinita, Oklahoma. (Robt. E. Garnett & Co., Certified Public Accountants, Tulsa, Oklahoma) Exhibit F.

TABLE A-2

GRAND RIVER DAM AUTHORITY, VINITA, OKLAHOMA
Statement of Income, before Provision
for Depreciation, for the Period
September 1 to December 31, 1946

Electric Operating Income

Operating Revenues:

Sales of Electric Energy:

Commercial and Industrial Sales

\$ 49,842.34

Sales to Public Authorities

4,362.60

Sales to Other Public Utilities

169,903.57

Total Operating Revenues

\$224,108.51

Operating Revenue Deductions:

Operating Expenses:

Production--Hydraulic Power

\$ 52,784.76

Transmission:

Operation

\$34,782.78

Maintenance

16,332.30

Miscellaneous

7.00

51,122.08

Distribution

1,639.41

Customer Accounting and Collecting

160.28

Administrative and General

47,890.31

Total Operating Revenue Deductions

153,596.84

Net Electric Operating Income

before Depreciation (Carried Forward)

\$ 70,511.67

TABLE A-2 Continued

Net Electric Operating Income before Depreciation (Brought Forward)		\$ 70,511.67
<u>Other Income</u>		
Revenues from Leases of Others	\$ 2,078.50	
Physical Property	274.30	
Total Other Income	\$ 2,352.80	
Less, Non-operative Revenue Deductions	313.81	
Net Other Income		2,038.99
Gross Income		\$ 72,550.66
<u>Income Deductions</u>		
Interest on Long Term Debt		116,666.67
Net Loss before Provision for Depreciation		<u>(\$ 44,116.01)</u>

Source: Audit Report for the Period September 1 to December 31, 1946;
Grand River Dam Authority, Vinita, Oklahoma. (Robt. E. Garnett & Co., Certified
Public Accountants, Tulsa, Oklahoma) Exhibit B and Schedules B-1, B-2, and B-3.

TABLE A-2a

GRAND RIVER DAM AUTHORITY, VINITA, OKLAHOMA
Adjusted Statement of Income,^b Period
September 1 to December 31, 1946

Operating Revenues			\$224,108.51
Operating Expenses			
Production--Hydraulic Power:			
Operations and Maintenance	\$ 52,784.76		
Depreciation ^a	<u>55,910.26</u>	\$108,695.02	
Transmission:			
Operations and Maintenance	\$ 51,122.08		
Depreciation ^a	<u>35,280.03</u>	86,402.11	
Distribution		1,639.41	
Customer Accounting and Collecting		160.28	
Administrative and General:			
Operations and Maintenance	\$ 47,890.31		
Depreciation ^a	<u>8,212.74</u>	<u>56,103.05</u>	
Total Operating Expenses			252,999.87
Net Operating Loss			(\$ 28,891.36)
Other Income			2,038.99
Gross Loss			(\$ 26,852.37)
Income Deductions			116,666.67
Net Loss after Provision for Depreciation			<u>(\$143,519.04)</u>

^aCalculated as one-third annual depreciation.

^bTable A-2 adjusted by the writer for provision for depreciation shown in Table A-14.

TABLE A-3

GRAND RIVER DAM AUTHORITY, VINITA, OKLAHOMA
Statement of Income, before Provision
for Depreciation, for the Year Ended
December 31, 1947

Electric Operating Income

Operating Revenues:

Sales of Electric Energy:

Commercial and Industrial Sales

\$184,458.53

Sales to Public Authorities

43,953.40

Sales to Other Electric Utilities

709,360.16

\$937,772.09

Rent from Electric Property

360.00

Total Operating Revenues

\$938,132.09

Operating Revenue Deductions:

Operating Expenses:

Production--Hydraulic Power:

Operations

\$ 89,666.66

Maintenance

58,130.02

\$147,796.68

Transmission:

Operations

\$ 97,273.30

Maintenance

39,781.66

Miscellaneous

107.60

137,162.56

Distribution:

Operations

4,672.92

Customer Accounting and Collection

583.43

Administrative and General:

Operations

\$133,821.12

Maintenance

7,725.27

141,546.39

Depreciation (No Provision Made)

0

Total Operating Revenue Deductions

431,761.98

Net Electric Operating Income (Carried Forward)

\$506,370.11

TABLE A-3 Continued

Net Electric Operating Income (Brought Forward)		\$506,370.11
<u>Other Income--Non-utility Operations (Net):</u>		
Rents, Etc.--Grand Village	\$ 2,375.75	
Boat, Dock and Concession Permits	2,772.63	
Rents from Other Property	<u>1,135.97</u>	
Total Other Income		6,284.35
Gross Income		<u>\$512,654.46</u>
<u>Income Deduction:</u>		
Interest on Long Term Debt		350,000.00
Net Income (No Provision for Depreciation)		<u><u>\$162,654.46</u></u>

Source: Audit Report for the Year Ended December 31, 1947; Grand River Dam Authority, Vinita, Oklahoma. (Robt. E. Garnett & Co., Certified Public Accountants, Tulsa, Oklahoma) Exhibit C and Schedules C-1, C-2, and C-3.

TABLE A-3a

GRAND RIVER DAM AUTHORITY, VINITA, OKLAHOMA
Adjusted Statement of Income,^a Year 1947

Operating Revenues			\$938,132.09
Operating Expenses			
Production--Hydraulic Power:			
Operations and Maintenance	\$147,796.68		
Depreciation	<u>180,888.30</u>	\$328,685.06	
Transmission:			
Operations, Maintenance and Misc.	\$137,162.56		
Depreciation	<u>130,599.94</u>	267,762.50	
Distribution		4,672.92	
Customer Accounting and Collecting		583.43	
Administrative and General:			
Operations and Maintenance	\$141,546.39		
Depreciation	<u>26,815.11</u>	<u>168,351.50</u>	
Total Operating Expenses			<u>770,065.41</u>
Net Operating Income			\$168,066.68
Other Income			6,284.35
Gross Income			<u>\$174,351.03</u>
Income Deductions			350,000.00
Net Loss after Provision for Depreciation			<u>(\$175,648.97)</u>

^aTable A-3 adjusted by the writer for provision for depreciation shown in Table A-14.

TABLE A-4

GRAND RIVER DAM AUTHORITY, VINITA, OKLAHOMA
Statement of Income, before Provision
for Depreciation, for the Year Ended
December 31, 1948

Operating Revenues

Sales of Electric Energy:			
Commercial and Industrial		\$ 204,696.54	
Public Authorities		39,962.35	
Other Electric Utilities		768,111.95	
Gross Sales		<u>\$1,012,770.84</u>	
Less, Energy Produced by Steam Plant and Credited to Recommissioning Costs		<u>14,478.40</u>	
Net Sales--Hydro Energy			\$998,292.44
Rent from Electric Equipment			480.00
Total Operating Revenue			<u>\$998,772.44</u>
<u>Operating Expenses (Excluding Depreciation)</u>			
Production--Hydraulic Power:			
Operation	\$ 94,094.74		
Maintenance	<u>57,544.76</u>	\$ 151,639.50	
Transmission:			
Operating, Incl. \$65 Misc.	\$ 89,227.40		
Maintenance	<u>39,094.75</u>	\$ 128,322.15	
Distribution, Customers Accounting and Collecting		6,239.20	
Administrative and General:			
Operation	\$141,299.76		
Maintenance	<u>8,705.88</u>	<u>150,005.64</u>	
Total Operating Expenses before Depreciation			436,206.49
Net Operating Income before Depreciation (Carried Forward)			<u>\$562,565.95</u>

TABLE A-4 Continued

Net Operating Income before Depreciation (Brought Forward)	\$562,565.95
<u>Other Income--Non-Utility (Net):</u>	
Boat, Dock and Concession Permits	\$ 3,649.03
Rents from Grand Village and Other Property	<u>1,811.71</u>
Total Other Income	5,460.74
Gross Income before Depreciation	<u>\$568,026.69</u>
<u>Income Deductions</u>	
Interest on Long Term Debt	346,944.44
Net Income before Provision for Depreciation	<u><u>\$221,082.25</u></u>

Source: Audit Report for the Year Ended December 31, 1948; Grand River Dam Authority, Vinita, Oklahoma. (Robt. E. Garnett & Co., Certified Public Accountants, Tulsa, Oklahoma) Exhibit C.

TABLE A-4a

GRAND RIVER DAM AUTHORITY, VINITA, OKLAHOMA
Adjusted Statement of Income,^a Year 1948

Operating Revenues			\$998,772.44
Operating Expenses			
Production--Hydraulic Power:			
Operation and Maintenance	\$151,639.50		
Depreciation	<u>178,281.15</u>	\$329,920.65	
Production--Steam Power:			
Depreciation		17,922.56	
Transmission:			
Operation and Maintenance	\$128,322.15		
Depreciation	<u>131,752.66</u>	260,074.81	
Distribution, Customers Accounting and Collecting		6,239.20	
Administrative and General:			
Operation and Maintenance	\$150,005.64		
Depreciation	<u>27,296.54</u>	<u>177,302.18</u>	
Total Operating Expenses			791,459.40
Net Operating Income			<u>\$207,313.04</u>
Other Income			5,460.74
Gross Income			<u>\$212,773.78</u>
Income Deductions			346,944.44
Net Loss after Provision for Depreciation			<u>(\$134,170.66)</u>

^aTable A-4 adjusted by the writer for provision for depreciation shown in Table A-14.

TABLE A-5

GRAND RIVER DAM AUTHORITY, VINITA, OKLAHOMA
Statement of Income, before Provision
for Depreciation, for the Year Ended
December 31, 1949

Operating Revenues

Sales of Electric Energy:

Commercial and Industrial

\$ 210,362.35

Federal Government

46,622.47

Other Electric Utilities

1,477,860.44

\$1,734,845.26

Less, Energy Produced by Steam Plant Prior to
Commencing Operations and Credited to
Recommissioning Costs

(4,017.81)

Other Operating Income

1,455.02

Total Operating Revenues

\$1,732,282.47Operating Expenses (Excluding Depreciation)

Production--Steam Power:

Operation

\$289,401.10

Maintenance

37,275.95

Rent

13,538.88

\$ 340,215.93

Production--Hydraulic Power:

Operation

\$ 95,473.65

Maintenance

40,784.07

Purchased Power

372.35

136,630.07

Transmission:

Operation

\$ 72,509.49

Maintenance

48,171.26

120,680.75

Distribution, Customers Accounting and Collecting

8,763.42

Sales Promotion Expense

4,569.61

Operating Expenses (Carried Forward)

\$ 610,859.78

Total Operating Revenues (Carried Forward)

\$1,732,282.47

TABLE A-5 Continued

Total Operating Revenues (Brought Forward)		\$1,732,282.47
Operating Expenses (Brought Forward)	\$ 610,859.78	
Administrative and General:		
Operation	\$167,875.38	
Maintenance	<u>13,538.58</u>	
Total Operating Expenses	181,413.96	792,273.74
Net Operating Income before Depreciation		<u>\$ 940,008.73</u>
<u>Other Income</u>		
Boat, Dock and Concession Permits	\$ 4,166.50	
Rents from Grand Village and Other Property	2,008.70	
Interest on Temporary Investments	19,505.72	
Miscellaneous	<u>426.75</u>	
Total Other Income		26,107.67
Gross Income before Depreciation		<u>\$ 966,116.40</u>
<u>Income Deductions</u>		
Interest on Long Term Debt	\$ 535,710.99	
Amortization of Bond Discount and Expense	<u>14,947.66</u>	
Total Income Deductions		550,658.65
Net Income before Provision for Depreciation		<u><u>\$ 415,457.75</u></u>

Source: Audit Report for the Year Ended December 31, 1949; Grand River Dam Authority, Vinita, Oklahoma. (Robt. E. Garnett & Co., Certified Public Accountants, Tulsa, Oklahoma) Exhibit C.

TABLE A-5a

GRAND RIVER DAM AUTHORITY, VINITA, OKLAHOMA
Adjusted Statement of Income,^a Year 1949

Operating Revenues			\$1,732,282.47
Operating Expenses			
Production--Steam Power:			
Operation and Maintenance	\$340,215.93		
Depreciation	<u>107,535.37</u>	\$447,751.30	
Production--Hydraulic Power:			
Operation and Maintenance	\$136,630.07		
Depreciation	<u>181,025.02</u>	317,655.09	
Transmission:			
Operation and Maintenance	\$120,680.75		
Depreciation	<u>136,262.38</u>	256,943.13	
Distribution, Customers Accounting and Collecting		8,763.42	
Sales Promotion		4,569.61	
Administrative and General:			
Operation and Maintenance	\$181,413.96		
Depreciation	<u>28,136.13</u>	<u>209,550.09</u>	
Total Operating Expense			<u>1,245,232.64</u>
Net Operating Income			\$ <u>487,049.83</u>
Other Income			26,107.67
Gross Income			\$ <u>513,157.50</u>
Income Deductions			550,658.75
Net Loss after Provision for Depreciation			<u><u>(\$ 37,501.25)</u></u>

^aTable A-5 adjusted by the writer for provision for depreciation shown in Table A-14.

TABLE A-6

GRAND RIVER DAM AUTHORITY, VINITA, OKLAHOMA
Statement of Income, before Provision
for Depreciation, for the Year Ended
December 31, 1950

<u>Operating Revenues</u>		
Sales of Electric Energy:		
Commercial and Industrial		\$ 262,568.47
Lighting and Maintenance ^a		46,221.48
Other Electric Utilities		<u>1,318,746.61</u>
Gross Sales of Electric Energy		\$1,627,536.56
Other Operating Income		<u>1,154.89</u>
Total Operating Income		\$1,628,691.45
<u>Operating Expenses (Excluding Depreciation)</u>		
Production--Steam Power:		
Operation	\$193,604.52	
Maintenance	<u>83,912.90</u>	\$277,517.42
Production--Hydraulic Power:		
Operation	\$ 98,336.43	
Maintenance	<u>37,741.10</u>	136,077.53
Transmission:		
Operation	\$ 75,807.55	
Maintenance	<u>43,657.14</u>	119,464.69
Distribution and Customers Accounting and Collecting		8,714.11
Sales Promotion		13,402.13
Administrative and General:		
Operation	\$182,696.22	
Maintenance	<u>9,861.22</u>	<u>192,557.44</u>
Total Operating Expenses		747,733.32
Net Operating Income before Depreciation (Carried Forward)		\$ 880,958.13

TABLE A-6 Continued

Net Operating Income before Depreciation (Brought Forward)		\$ 880,958.13
<u>Other Income</u>		
Boat, Dock and Concession Permits	\$ 4,401.87	
Rents from Grand Village and Other Property, net	420.78	
Interest and Profits from Temporary Investments	31,127.07	
Miscellaneous	4.00	
Total Other Income		<u>35,953.72</u>
Gross Income before Depreciation		\$ <u>916,911.85</u>
<u>Income Deductions</u>		
Interest on Long Term Debt	\$651,499.98	
Amortization of Bond Discount and Expense	24,021.96	
	<u>\$675,521.94</u>	
Less, Interest Charged to Construction	45,204.08	
Net Income Deductions		<u>630,317.86</u>
Net Income before Provision for Depreciation		<u>\$ <u>286,593.99</u></u>

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^aThis account title is in error. According to GRDA records and Federal Power Commission requirements the title should be "Other Sales to Public Authorities, Account No. 604."

Source: Audit Report for the Year Ended December 31, 1950; Grand River Dam Authority, Vinita, Oklahoma. (Robt. E. Garnett & Co., Certified Public Accountants, Tulsa, Oklahoma) Exhibit C.

TABLE A-6a

GRAND RIVER DAM AUTHORITY, VINITA, OKLAHOMA
Adjusted Statement of Income,^a Year 1950

Operating Revenues			\$1,628,691.45
Operating Expenses			
Production--Steam Power:			
Operation and Maintenance	\$277,517.42		
Depreciation	<u>160,905.38</u>	\$438,422.80	
Production--Hydraulic Power:			
Operation and Maintenance	\$136,077.53		
Depreciation	<u>181,093.87</u>	317,171.40	
Transmission:			
Operation and Maintenance	\$119,464.69		
Depreciation	<u>137,832.26</u>	257,296.95	
Distribution, Customers Accounting and Collecting		8,714.11	
Sales Promotion		13,402.13	
Administrative and General:			
Operation and Maintenance	\$192,557.44		
Depreciation	<u>31,124.59</u>	<u>223,682.03</u>	
Total Operating Expense			<u>1,258,689.42</u>
Net Operating Income			\$ <u>370,002.03</u>
Other Income			35,953.72
Gross Income			\$ <u>405,955.75</u>
Income Deductions			630,317.86
Net Loss after Provision for Depreciation			<u>(\$ 224,362.11)</u>

^aTable A-6 adjusted by the writer for provision for depreciation shown in Table A-14.

TABLE A-7

GRAND RIVER DAM AUTHORITY, VINITA, OKLAHOMA
Statement of Income, before Provision
for Depreciation, for the Year Ended
December 31, 1951

<u>Operating Revenues</u>		
Sales of Electric Energy:		
Commercial and Industrial		\$ 381,829.52
Lighting and Maintenance ^a		15,759.74
Other Electric Utilities		<u>1,500,552.73</u>
Gross Sales of Electric Energy		\$1,898,141.99
Other Operating Income		<u>3,252.40</u>
Total Operating Revenues		\$1,901,394.39
<u>Operating Expenses (Excluding Depreciation)</u>		
Production--Steam Power:		
Operation	\$291,636.26	
Maintenance	<u>80,349.35</u>	\$371,985.61
Production--Hydraulic Power:		
Operation	\$114,737.35	
Maintenance	<u>37,512.21</u>	152,249.56
Transmission:		
Operation and Other	\$ 99,881.30	
Maintenance	<u>62,418.62</u>	162,299.92
Distribution and Customers Accounting and Collecting		6,770.74
Sales Promotion		7,075.21
Administrative and General:		
Operation	\$196,399.40	
Maintenance	<u>7,601.97</u>	<u>204,001.37</u>
Total Operating Expenses		904,382.41
Net Operating Income before Depreciation (Carried Forward)		\$ 997,011.98

TABLE A-7 Continued

Net Operating Income before Depreciation (Brought Forward)\$		997,011.98
<u>Other Income</u>		
Boat, Dock and Concession Permits	\$ 4,291.38	
Rents from Grand Village and Other Property, net	(614.69)	
Interest and Profits from Temporary Investments	<u>20,041.90</u>	
Total Other Income		23,718.59
Gross Income before Depreciation		<u>\$1,020,730.57</u>
<u>Income Deductions</u>		
Interest on Long Term Debt	\$651,500.02	
Amortization of Bond Discount and Expense	<u>24,021.96</u>	
	\$675,521.98	
Less, Interest Charged to Construction	<u>39,663.90</u>	
Net Income Deductions		635,858.08
Net Income before Provision for Depreciation		<u><u>\$ 384,872.49</u></u>

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^aThis account title has been used in error by the auditors since the Audit Report of 1950. According to GRDA records and Federal Power Commission requirements the title should be "Other Sales to Public Authorities, Account No. 604."

Source: Audit Report for the Year Ended December 31, 1951; Grand River Dam Authority, Vinita, Oklahoma. (Robt. E. Garnett & Co., Certified Public Accountants, Tulsa, Oklahoma) Exhibit B.

TABLE A-7a

GRAND RIVER DAM AUTHORITY, VINITA, OKLAHOMA
Adjusted Statement of Income,^a Year 1951

Operating Revenues			\$1,901,394.39
Operating Expenses			
Production--Steam Power:			
Operation and Maintenance	\$371,985.61		
Depreciation	<u>161,157.82</u>	\$533,143.43	
Production--Hydraulic Power:			
Operation and Maintenance	\$152,249.56		
Depreciation	<u>181,258.78</u>	333,508.34	
Transmission:			
Operation and Maintenance	\$162,299.92		
Depreciation	<u>161,919.25</u>	324,219.17	
Distribution, Customers Accounting and Collecting		6,770.74	
Sales Promotion		7,075.21	
Administrative and General:			
Operation and Maintenance	\$204,001.37		
Depreciation	<u>31,948.29</u>	<u>235,949.66</u>	
Total Operating Expense			<u>1,440,666.55</u>
Net Operating Income			\$ 460,727.84
Other Income			23,718.59
Gross Income			\$ 484,446.43
Income Deductions			635,858.08
Net Loss after Provision for Depreciation			<u>(\$ 151,411.65)</u>

^aTable A-7 adjusted by the writer for provision for depreciation shown in Table A-14.

TABLE A-8

GRAND RIVER DAM AUTHORITY, VINITA, OKLAHOMA
Statement of Income, before Provision
for Depreciation, for the Year Ended
December 31, 1952

Operating Revenues

Sales of Electric Energy:

Commercial and Industrial

\$ 626,203.33

Lighting and Maintenance^a

4,299.80

Other Electric Utilities

1,544,812.76

Gross Sales of Electric Energy

\$2,175,315.89

Other Operating Income

126,195.00

Total Operating Revenues

\$2,301,510.89Operating Expenses (Excluding Depreciation):

Production--Steam Power:

Operation and Other

\$666,033.95

Maintenance

83,381.62

\$ 749,415.57

Production--Hydraulic Power:

Operation

\$124,944.55

Maintenance

44,256.32

169,200.87

Power Purchased

13,307.00

Transmission:

Operation and Other

\$ 98,141.19

Maintenance

77,412.33

175,553.52

Distribution and Customers Accounting and Collecting

4,503.18

Sales Promotion

5,548.88

Administrative and General:

Operation

\$228,274.63

Maintenance

7,046.91235,321.54

Total Operating Expenses

1,352,850.56Net Operating Income before Depreciation (Carried Forward) \$ 948,660.33

TABLE A-8 Continued

Net Operating Income before Depreciation (Brought Forward)		\$ 948,660.33
<u>Other Income</u>		
Boat, Dock and Concession Permits	\$ 5,530.64	
Rents from Grand Village and Other Property, net	3,989.97	
Interest (Less Amortization of Bond Premium)	<u>17,099.40</u>	
Total Other Income		26,620.01
Gross Income before Depreciation		<u>\$ 975,280.34</u>
<u>Income Deductions</u>		
Interest on Long Term Debt	\$649,547.68	
Amortization of Bond Discount and Expense	<u>23,902.47</u>	
	\$673,450.15	
Less, Interest Charged to Construction	<u>29,488.87</u>	
Net Income Deductions		643,961.28
Net Income before Provision for Depreciation		<u><u>\$ 331,319.06</u></u>

^aThis account title has been used in error by the auditors since the Audit Report of 1950. According to GRDA records and Federal Power Commission requirements the title should be "Other Sales to Public Authorities, Account No. 604."

Source: Audit Report for the Year Ended December 31, 1952; Grand River Dam Authority, Vinita, Oklahoma. (Robt. E. Garnett & Co., Certified Public Accountants, Tulsa, Oklahoma) Exhibit B.

TABLE A-8a

GRAND RIVER DAM AUTHORITY, VINITA, OKLAHOMA
Adjusted Statement of Income,^a Year 1952

Operating Revenues			\$2,301,510.89
Operating Expenses			
Production--Steam Power:			
Operation and Maintenance	\$749,415.57		
Depreciation	<u>172,874.78</u>	\$922,290.35	
Production--Hydraulic Power:			
Operation and Maintenance	\$169,200.87		
Depreciation	<u>194,634.67</u>	363,835.54	
Power Purchased		13,307.00	
Transmission:			
Operation and Maintenance	\$175,553.52		
Depreciation	<u>172,842.01</u>	348,395.53	
Distribution, Customers Accounting and Collecting		4,503.18	
Sales Promotion		5,548.88	
Administrative and General:			
Operation and Maintenance	\$235,321.54		
Depreciation	<u>33,583.32</u>	<u>268,904.86</u>	
Total Operating Expense			<u>1,926,785.34</u>
Net Operating Income			\$ <u>374,725.55</u>
Other Income			<u>26,620.01</u>
Gross Income			\$ <u>401,345.56</u>
Income Deductions			<u>643,961.28</u>
Net Loss after Provision for Depreciation			<u>(\$ 242,615.72)</u>

^aTable A-8 adjusted by the writer for provision for depreciation shown in Table A-14.

TABLE A-9

GRAND RIVER DAM AUTHORITY, VINITA, OKLAHOMA
Statement of Income, before Provision
for Depreciation, for the Year Ended
December 31, 1953

Operating Revenues

Sales of Electric Energy:			
Commercial and Industrial		\$ 818,353.27	
Lighting and Maintenance ^a		4,466.14	
Other Electric Utilities		<u>1,614,581.67</u>	
Gross Sales of Electric Energy			\$2,437,401.08
Other Operating Income			211,562.63
Total Operating Revenues			<u>\$2,648,963.71</u>
<u>Operating Expenses (Excluded Depreciation):</u>			
Production--Steam Power:			
Operation and Other	\$1,137,108.08		
Maintenance	91,444.35	1,228,552.43	
Production--Hydraulic Power:			
Operation	\$ 122,744.86		
Maintenance	<u>60,875.82</u>	183,620.68	
Power Purchased		386,326.62	
Transmission:			
Operation and Other	\$ 115,458.60		
Maintenance	<u>82,911.36</u>	198,369.96	
Distribution and Customers Accounting and Collecting		3,116.20	
Sales Promotion		11,106.87	
Administrative and General:			
Operation	\$ 228,096.90		
Maintenance	<u>7,579.99</u>	235,676.89	
Total Operating Expenses			<u>2,246,769.65</u>
Net Operating Income before Depreciation (Carried Forward)			\$ 402,194.06

TABLE A-9 Continued

Net Operating Income before Depreciation (Brought Forward)\$		402,194.06
<u>Other Income</u>		
Boat, Dock and Concession Permits	\$	5,452.28
Rents from Grand Village and Other Property, net		3,551.94
Interest (Less Amortization of Bond Premium)		<u>12,843.29</u>
Total Other Income		21,847.51
Gross Income before Depreciation		<u>\$ 424,041.57</u>
<u>Income Deductions</u>		
Interest on Long Term Debt	\$	642,652.49
Amortization of Bond Discount and Expense		<u>23,507.28</u>
	\$	<u>666,159.77</u>
Less, Interest Charged to Construction		<u>3,297.09</u>
Net Income Deductions		662,862.68
Net Loss before Provision for Depreciation		<u>(<u>\$ 238,832.11</u>)</u>

^aThis account title has been used in error by the auditors since the Audit Report of 1950. According to GRDA records and Federal Power Commission requirements the title should be "Other Sales to Public Authorities, Account No. 604."

Source: Audit Report for the Year Ended December 31, 1953; Grand River Dam Authority, Vinita, Oklahoma. (Robt. E. Garnett & Co., Certified Public Accountants, Tulsa, Oklahoma) Exhibit B.

TABLE A-9a

GRAND RIVER DAM AUTHORITY, VINITA, OKLAHOMA
Adjusted Statement of Income,^a Year 1953

Operating Revenues			\$2,648,963.71
Operating Expenses			
Production--Steam Power:			
Operation and Maintenance	\$1,228,552.43		
Depreciation	<u>178,453.30</u>	\$1,407,005.73	
Production--Hydraulic Power:			
Operation and Maintenance	\$ 183,620.68		
Depreciation	<u>194,746.94</u>	378,367.62	
Power Purchased		386,326.62	
Transmission:			
Operation and Maintenance	\$ 198,369.96		
Depreciation	<u>179,688.79</u>	378,058.75	
Distribution, Customers Accounting and Collecting		3,116.20	
Sales Promotion		11,106.87	
Administrative and General:			
Operation and Maintenance	\$ 235,676.89		
Depreciation	<u>33,618.81</u>	<u>269,295.70</u>	
Total Operating Expense			2,833,277.49
Net Operating Loss			(\$ 184,313.78)
Other Income			21,847.51
Gross Loss			(\$ 162,466.27)
Income Deductions			662,862.68
Net Loss after Provision for Depreciation			<u>(\$ 825,328.95)</u>

^aTable A-9 adjusted by the writer for provision for depreciation shown in Table A-14.

TABLE A-10

GRAND RIVER DAM AUTHORITY, VINITA, OKLAHOMA
Statement of Income, before Provision
for Depreciation, for the Year Ended
December 31, 1954

<u>Operating Revenues</u>			
Sales of Electric Energy:			
Commercial and Industrial		\$1,381,956.67	
Lighting and Maintenance ^a		5,796.82	
Other Electric Utilities		<u>1,859,139.73</u>	
Gross Sales of Electric Energy			\$3,246,893.22
Other Operating Income			<u>441,690.18</u>
Total Operating Revenues			<u>\$3,688,583.40</u>
<u>Operating Expenses (Excluding Depreciation):</u>			
Production--Steam Power:			
Operation and Other	\$1,313,427.32		
Maintenance	<u>93,086.12</u>	\$1,406,513.44	
Production--Hydraulic Power:			
Operation	\$ 90,367.54		
Maintenance	<u>38,436.05</u>	128,803.59	
Purchased Power		776,014.89	
Transmission:			
Operation and Other	\$ 121,483.33		
Maintenance	<u>66,140.67</u>	187,624.00	
Customers Accounting and Collecting		4,188.73	
Sales Promotion		3,597.61	
Administrative and General:			
Operation	\$ 230,890.16		
Maintenance	<u>7,221.07</u>	<u>238,111.23</u>	
Total Operating Expenses			<u>2,744,853.49</u>
Net Operating Income before Depreciation (Carried Forward)			<u>\$ 943,729.91</u>

TABLE A-10 Continued

Net Operating Income before Depreciation (Brought Forward)		\$ 943,729.91
<u>Other Income</u>		
Boat and Dock Permits	\$ 5,480.25	
Rents from Grand Village and Other Property, net	6,588.19	
Interest	1,197.75	
Profit from Sale of United States Securities	<u>1,546.88</u>	
Total Other Income		14,813.07
Gross Income before Depreciation		<u>\$ 958,542.98</u>
<u>Income Deductions</u>		
Interest on Long Term Debt	\$ 635,046.27	
Amortization of Bond Discount and Expense	23,068.14	
	<u>\$ 658,114.41</u>	
Less, Interest Charged to Construction	<u>2,874.83</u>	
Net Income Deductions		655,239.58
Net Income before Provision for Depreciation		<u><u>\$ 303,303.40</u></u>

^aThis account title has been used in error by the auditors since the Audit Report of 1950. According to GRDA records and Federal Power Commission requirements the title should be "Other Sales to Public Authorities, Account No. 604."

Source: Audit Report for the Year Ended December 31, 1954; Grand River Dam Authority, Vinita, Oklahoma. (Robt. E. Garnett & Co., Certified Public Accountants, Tulsa, Oklahoma) Exhibit B.

TABLE A-10a

GRAND RIVER DAM AUTHORITY, VINITA, OKLAHOMA
Adjusted Statement of Income,^a Year 1954

Operating Revenues			\$3,688,583.40
Operating Expenses			
Production--Steam Power:			
Operation and Maintenance	\$1,406,513.44		
Depreciation	<u>179,910.40</u>	\$1,586,423.84	
Production--Hydraulic Power:			
Operation and Maintenance	\$ 128,803.59		
Depreciation	<u>194,781.37</u>	323,584.96	
Power Purchased		776,014.89	
Transmission:			
Operation and Maintenance	\$ 187,624.00		
Depreciation	<u>189,922.48</u>	377,546.48	
Customer Accounting and Collecting		4,188.73	
Sales Promotion		3,597.61	
Administrative and General:			
Operation and Maintenance	\$ 238,111.23		
Depreciation	<u>33,712.71</u>	271,823.94	
Total Operating Expense			<u>3,343,180.45</u>
Net Operating Income			\$ 345,402.95
Other Income			<u>14,813.07</u>
Gross Income			\$ 360,216.02
Income Deductions			<u>655,239.58</u>
Net Loss after Provision for Depreciation			<u>(\$ 295,023.56)</u>

^aTable A-10 adjusted by the writer for provision for depreciation shown in Table A-14.

TABLE A-11

GRAND RIVER DAM AUTHORITY, VINITA, OKLAHOMA
STATEMENT OF INCOME, YEAR 1955

Operating Revenues

Sales of Electric Energy:		
Commercial and Industrial	\$1,971,885.36	
Lighting and Maintenance ^a	6,277.18	
Other Electric Utilities	<u>1,583,948.16</u>	
Gross Sales of Electric Energy		\$3,562,110.70
Other Operating Income		<u>645,177.69</u>
Total Operating Revenues		<u>\$4,207,288.39</u>

Operating Expenses

Production--Steam Power:		
Operation and Other	\$1,325,935.82	
Maintenance	96,748.42	
Depreciation	<u>180,587.81</u>	\$1,603,272.05

Production--Hydraulic Power:		
Operation	\$ 97,832.76	
Maintenance	31,944.07	
Depreciation	<u>194,835.79</u>	324,662.62

Purchased Power		412,609.95
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Transmission:		
Operating and Other	\$ 138,953.94	
Maintenance	67,668.37	
Depreciation	<u>191,603.94</u>	398,226.25

Customers Accounting and Collecting		4,338.56
Sales Promotion		<u>8,698.20</u>

Operating Expense (Carried Forward)	<u>\$2,751,807.63</u>	
Total Operating Revenues (Carried Forward)		<u>\$4,207,288.39</u>

TABLE A-11 Continued

Total Operating Revenues (Brought Forward)			\$4,207,288.39
Operating Expenses (Brought Forward)		\$2,751,807.63	
Administrative and General:			
Operation	\$ 235,279.11		
Maintenance	10,436.47		
Depreciation	34,312.80	280,028.38	
Total Operating Expenses			3,031,836.01
Net Operating Income			\$1,175,452.38
Other Income			
Boat and Dock Permits	\$ 6,637.25		
Rents, Grand Village and Other Property, net	(2,579.74)		
Experimental Farm, net	(1,115.95)		
Total Other Income			2,941.56
Total Income			\$1,178,393.94
Income Deductions			
Interest on Long Term Debt	\$ 626,615.00		
Amortization of Bond Discount			
and Expense	22,577.37	\$ 649,192.37	
Less, Interest charged to construction		133.08	
Net Income Deductions			649,059.29
Net Income			<u>\$ 529,334.65</u>

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^aThis account title has been used in error by the auditors since the Audit Report of 1950. According to GRDA records and Federal Power Commission requirements the title should be "Other Sales to Public Authorities, Account No. 604."

Source: Audit Report to the Year Ended December 31, 1955; Grand River Dam Authority, Vinita, Oklahoma. (Paul C. Campbell & Co., Certified Public Accountants, Miami, Oklahoma) Exhibit C.

TABLE A-12

GRAND RIVER DAM AUTHORITY, VINITA, OKLAHOMA
STATEMENT OF INCOME, YEAR 1956

Operating Revenues

Sales of Electric Energy:		
Commercial and Industrial	\$2,208,533.40	
Lighting and Maintenance ^a	5,129.53	
Other Electric Utilities	<u>1,506,928.64</u>	
Gross Sales of Electric Energy		\$3,720,591.57
Other Operating Income		<u>727,465.60</u>
Total Operating Revenues		<u>\$4,449,057.17</u>

Operating Expenses

Production--Steam Power:		
Operation and Other	\$1,483,321.63	
Maintenance	86,136.39	
Depreciation	<u>181,050.88</u>	\$1,750,508.90

Production--Hydraulic Power:		
Operation	\$ 95,345.57	
Maintenance	38,875.48	
Depreciation	<u>194,835.84</u>	329,056.89

Purchased Power		1,059,760.26
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Transmission:		
Operation and Other	\$ 199,003.33	
Maintenance	75,084.74	
Depreciation	<u>191,831.81</u>	465,919.88

Customer Accounting and Collection		4,696.55
Sales Promotion		<u>3,645.43</u>

Operating Expenses (Carried Forward)	<u>\$3,613,587.91</u>	
Total Operating Revenues (Carried Forward)		<u>\$4,449,057.17</u>

TABLE A-12 Continued

Total Operating Revenues (Brought Forward)			\$4,449,057.17
Operating Expenses (Brought Forward)	\$3,613,587.91		
Administrative and General:			
Operation	\$ 222,504.91		
Maintenance	12,093.89		
Depreciation	<u>34,481.71</u>	<u>269,080.51</u>	
Total Operating Expenses			<u>3,882,668.42</u>
Net Operating Income			\$ <u>565,388.75</u>
Other Income			
Boat and Dock Permits, net	\$ 8,571.26		
Rents, Grand Village and Other Property, net	(3,182.85)		
Experimental Farm, net	(2,677.40)		
Interest on Investments	<u>18,018.02</u>		
Total Other Income			<u>20,729.03</u>
Total Income			\$ <u>586,117.78</u>
Income Deductions			
Interest on Long Term Debt	\$ 617,315.00		
Amortization of Bond Discount and Expense	<u>22,031.67</u>		
Total Income Deductions			<u>639,346.67</u>
Net Income			<u>(\$ 53,228.89)</u>

^aThis account title has been used in error by the auditors since the Audit Report of 1950. According to GRDA records and Federal Power Commission requirements the title should be "Other Sales to Public Authorities, Account No. 604."

Source: Audit Report for the Year Ended December 31, 1956; Grand River Dam Authority, Vinita, Oklahoma. (Paul C. Campbell & Co., Certified Public Accountants, Miami, Oklahoma) Exhibit C.

TABLE A-13

GRAND RIVER DAM AUTHORITY, VINITA, OKLAHOMA
STATEMENT OF INCOME, YEAR 1957

Operating Revenues

Sales of Electric Energy:		
Commercial and Industrial	\$2,207,103.38	
Governmental and Municipal	27,744.28	
Other Electric Utilities	<u>1,612,215.38</u>	
Gross Sales of Electric Energy		\$3,847,063.04
Other Operating Income		821,622.82
Total Operating Revenue		<u>\$4,668,685.86</u>

Operating Expenses

Production--Steam Power:			
Operation and Other	\$1,191,109.24		
Maintenance	82,600.65		
Depreciation	<u>181,438.75</u>	\$1,455,148.64	
Production--Hydraulic Power:			
Operation	\$ 108,568.10		
Maintenance	41,661.38		
Depreciation	<u>194,842.84</u>	345,072.32	
Purchased Power		666,012.58	
Transmission:			
Operation and Other	\$ 321,503.16		
Maintenance	87,964.26		
Depreciation	<u>192,526.53</u>	601,973.95	
Customer Accounting and Collecting		4,884.48	
Administrative and General		<u>247,221.54</u>	
Total Operating Expenses			3,320,313.51
Net Operating Income (Carried Forward)			<u>\$1,348,372.35</u>

TABLE A-13 Continued

Net Operating Income (Brought Forward)		\$1,348,372.35	
<u>Other Income</u>			
Boat and Dock Permits, net	\$ 10,781.48		
Rents, Grand Village and Other Property, net	4,560.38		
Experimental Farm, net	(235.56)		
Interest on Investments	42,607.30		
Commission on Sales of Telescopes	155.49		
Total Other Income		57,869.09	
Total Income		\$1,405,241.44	
<u>Income Deductions</u>			
Interest on Long Term Debt	\$ 607,102.49		
Amortization of Bond Discount and Expense	21,427.89		
Total Income Deductions		629,530.38	
Net Income		<u>\$ 777,711.06</u>	

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Source: Audit Report for the Year Ended December 31, 1957; Grand River Dam Authority, Vinita, Oklahoma. (Campbell & Adkison, Certified Public Accountants, Miami, Oklahoma), pp. 3, 25, 28, and 31.

TABLE A-14

ALLOCATION OF ANNUAL EXPENSE CHARGES FOR DEPRECIATION
OF GRAND RIVER DAM AUTHORITY ASSETS,
PRIOR TO DECEMBER 31, 1955

	Annual Rate	1941 ^a	1942	1943
Steam Production Equipment	.0290			
Hydraulic Production Equipment	.0115	\$17,525.36	\$160,197.98	\$164,819.23
Transmission Plant Equipment	.0313	4,622.33	55,691.53	95,970.60
General Plant Equipment	.1000	<u>175.40</u>	<u>2,573.59</u>	<u>12,933.85</u>
Total		\$22,323.09	\$218,463.10	\$273,723.68

TABLE A-14 Continued

	1944	1945	1946	1947
Steam Production Equipment				
Hydraulic Production Equipment	\$164,775.73	\$167,534.15	\$167,730.78	\$180,888.38
Transmission Plant Equipment	103,253.04	105,420.87	105,840.10	130,599.94
General Plant Equipment	<u>22,902.20</u>	<u>24,638.22</u>	<u>24,638.22</u>	<u>26,815.11</u>
Total	\$290,930.97	\$297,433.45	\$298,209.10	\$338,303.43

TABLE A-14 Continued

	1948	1949	1950	1951
Steam Production Equipment	\$ 17,922.56	\$107,535.37	\$160,905.38	\$161,157.82
Hydraulic Production Equipment	178,281.15	181,025.02	181,093.87	181,258.78
Transmission Plant Equipment	131,752.66	136,262.38	137,832.26	161,919.25
General Plant Equipment	<u>27,296.54</u>	<u>28,136.13</u>	<u>31,124.59</u>	<u>31,948.29</u>
Total	\$355,252.91	\$452,958.90	\$510,956.10	\$536,284.14

TABLE A-14 Continued

	1952	1953	1954	1955
Steam Production Equipment	\$172,874.78	\$178,453.30	\$179,910.40	\$180,587.81
Hydraulic Production Equipment	194,634.67	194,746.94	194,781.37	194,835.79
Transmission Plant Equipment	172,842.01	179,688.79	189,922.48	191,603.94
General Plant Equipment	<u>33,583.32</u>	<u>33,618.81</u>	<u>33,712.71</u>	<u>34,312.80</u>
Total	\$573,934.78	\$586,507.84	\$598,326.96	\$601,340.34

TABLE A-14 Continued

	Totals	Less, Depr. Expensed To Date ^b	Net Adjustment Necessary
Steam Production Equipment	\$1,159,347.42		\$1,159,347.42
Hydraulic Production Equipment	2,524,129.20	\$ 953,366.00	1,570,763.20
Transmission Plant Equipment	1,903,222.18	158,899.00	1,744,323.18
General Plant Equipment	<u>368,249.99</u>	<u>26,887.00</u>	<u>341,362.99</u>
Total	\$5,954,948.79	\$1,139,152.00	\$4,815,796.79

^aOn the basis of one and one-third months of operation.

^bSee Table A-15 for depreciation charges to expense while facilities were under the control of The Southwestern Power Administration, Tulsa, Oklahoma.

Source: Journal entry of December 31, 1955, Grand River Dam Authority, Vinita, Oklahoma.

TABLE A-15

ALLOCATION OF ANNUAL EXPENSE CHARGES FOR DEPRECIATION OF GRAND RIVER DAM AUTHORITY
ASSETS BY THE SOUTHWESTERN POWER ADMINISTRATION FOR THE PERIOD,
NOVEMBER 20, 1941 to AUGUST 31, 1946

	1941 ^a	1942	1943	1944
Hydraulic Production Equipment	\$23,066.00	\$199,900.00	\$199,200.00	\$199,200.00
Transmission Plant Equipment	1,866.00	24,500.00	24,200.00	24,200.00
Distribution Plant Equipment ^b	933.00	8,400.00	8,400.00	8,400.00
General Plant Equipment	<u>19.00</u>	<u>1,776.00</u>	<u>1,776.00</u>	<u>6,116.00</u>
Total	\$25,884.00	\$234,576.00	\$234,576.00	\$238,916.00

TABLE A-15 Continued

	1945	1946	Totals
Hydraulic Production Equipment	\$199,200.00	\$132,800.00	\$ 953,366.00
Transmission Plant Equipment	25,200.00	16,800.00	118,766.00
Distribution Plant Equipment ^b	8,400.00	5,600.00	40,133.00
General Plant Equipment	<u>10,320.00</u>	<u>6,880.00</u>	<u>26,887.00</u>
Total	\$243,120.00	\$162,080.00	\$1,139,152.00

^aOn the basis of one and one-third months of operation.

^bClassified as part of Transmission Plant Equipment by GRDA.

Source: Journal entry of December 31, 1955, Grand River Dam Authority,
Vinita, Oklahoma.

TABLE A-16

INDUSTRIAL POWER SALES SUMMARY
GRAND RIVER DAM AUTHORITY
ACCOUNT NUMBER 602

Year	Primary Power		Dump Power		Demand Charge	
	KWH	Amount	KWH	Amount	KWH	Amount
1946 ^a	11,413,600	\$ 45,716.00			12,916.8	\$ 4,584.82
1947	38,019,846	157,128.74			80,893.8	29,555.86
1948	44,776,910	171,263.30			89,371.8	33,198.81
1949	40,501,950	165,440.20			161,157.2	34,832.81
1950	48,688,270	186,271.78			98,158.6	37,049.17
1951	69,336,186	267,914.00			128,459	53,992.05
1952	116,587,686	444,040.54			234,342	88,668.65
1953	150,395,560	567,712.24			305,864	123,332.76
1954	212,991,420	803,094.08			435,647	185,115.33
1955	310,048,106	1,154,717.90	354,144	\$354.14	563,995	238,134.69
1956	377,501,900	1,389,836.60			663,113	280,236.57
1957	368,656,879	1,358,073.53	197,821	197.83	646,046	275,147.23

TABLE A-16 Continued

Year	Other Power Sales (Net)	15% Surcharge	20% Surcharge	Total	
				KWH	Amount
1946 ^a	\$ (458.48)			11,413,600	\$ 49,842.34
1947	(2,226.07)			38,019,846	184,458.53
1948	234.43			44,776,910	204,696.54
1949	349.08	\$ 9,740.26		40,501,950	210,362.35
1950	5,414.07	33,833.45		48,688,270	262,568.47
1951	10,612.35	49,311.12		69,336,186	381,829.52
1952	11,879.22	81,614.92		116,587,686	626,203.33
1953	9,191.64	105,035.51	\$ 13,081.12	150,395,560	818,353.27
1954	13,208.42	150,212.73	230,326.11	212,991,420	1,381,956.67
1955	51,259.04	216,615.30	310,814.29	310,402,250	1,971,895.36
1956	38,328.02	256,255.82	220,171.92	377,501,900	2,184,828.93
1957	51,794.13	252,752.25	269,138.41	368,854,700	2,207,103.38

^aFor the period September 1 to December 31, 1946.

Source: Operating Revenue Accounts Ledger, Grand River Dam Authority,
Vinita, Oklahoma.

TABLE A-17

SUMMARY OF SALES TO PUBLIC AUTHORITIES
GRAND RIVER DAM AUTHORITY
ACCOUNT NUMBER 604

Year	Primary Power		Demand Charge Adjustments		
	KWH	Amount	KWH	Amount	Other-Net
1946 ^a	757,360	\$ 4,362.60			
1947	8,249,200	43,953.40			
1948	7,402,178	36,583.25	87.60	\$3,066.00	\$ 313.10
1949	8,208,810	36,116.23	236.09	8,485.50	(594.36)
1950	7,741,655	31,445.06	2,409.6	8,765.00	152.38
1951	2,573,590	10,758.76	2,100	2,689.50	397.20
1952	535,080	2,408.16	2099	1,049.50	362.80
1953	559,120	2,543.74	2140	1,070.00	272.80
1954	628,220	2,898.44	2085	1,042.50	377.00
1955	778,400	3,510.50	2612	1,306.00	(99.00)
1956	3,973,740	16,216.80	9633	4,829.20	1,610.56
1957	3,618,470	14,795.64	9239	4,703.30	1,845.54

TABLE A-17 Continued

Year	15% Surcharge	20% Surcharge	Total	
			KWH	Amount
1946 ^a			757,360	\$ 4,362.60
1947			8,249,200	43,953.40
1948			7,402,178	39,962.35
1949	\$2,615.10		8,208,810	46,622.47
1950	5,859.04		7,741,655	46,221.48
1951	1,914.28		2,573,590	15,759.74
1952	479.34		535,080	4,299.80
1953	475.45	\$ 104.15	559,120	4,466.14
1954	512.76	966.12	628,220	5,796.82
1955	568.73	990.95	778,400	6,277.18
1956	3,285.87	2,891.57	3,973,740	28,834.00
1957	3,189.29	3,311.51	3,618,470	27,744.28

^aFor the period September 1 to December 31, 1946.

Source: Operating Revenue Accounts Ledger, Grand River Dam Authority,
Vinita, Oklahoma.

TABLE A-18

SUMMARY OF SALES TO ELECTRIC UTILITIES
GRAND RIVER DAM AUTHORITY
ACCOUNT NUMBER 605

Year	Primary Power		Secondary Power		Demand Charge Amount
	KWH	Amount	KWH	Amount	
1946 ^a	37,268,159	\$ 156,478.64			\$ 13,201.45
1947	106,973,140	509,187.05	22,789,700	\$56,974.25	67,519.90
1948	118,106,302	535,241.99	27,975,000	69,937.50	94,596.11
1949	227,783,407	1,121,336.87	38,441,000	96,852.50	119,668.82
1950	198,963,650	984,941.66	25,000	62.50	166,187.52
1951	226,626,824	1,058,994.86			227,123.32
1952	246,735,083	1,111,360.55			256,933.80
1953	264,755,862	1,147,134.99			300,292.95
1954	269,823,433	1,054,524.52			358,004.42
1955	242,897,785	837,938.30			387,842.75
1956	228,917,389	624,238.18			564,277.57
1957	244,887,784	656,610.84			555,324.62

TABLE A-18 Continued

Year	Dump Power		Other Power Sales Net	Stored Energy Returned
	KWH	Amount		
1946 ^a	969,200	\$ 969.20	\$ (745.72)	
1947	72,134,500	72,134.50	3,544.46	\$ 59,471.00
1948	51,876,500	51,876.50	16,459.85	132,801.00
1949	95,810,100	95,810.10	2,025.55	204.70
1950	110,076,500	110,076.50	(1,167.32)	
1951	131,265,500	131,265.50	3,566.01	
1952	53,927,400	53,927.40	27,127.56	
1953			28,898.29	
1954			13,635.35	
1955	3,109,800	3,109.80	12,367.11	
1956			17,656.78	
1957	17,782,900	17,782.90	30,691.29	

TABLE A-18 Continued

Year	15% Surcharge	20% Surcharge	Total	
			KWH	Amount
1946 ^a			38,237,359	\$ 169,903.57
1947			207,844,440	709,360.16
1948			211,237,884	768,111.95
1949	\$ 41,961.90		362,539,207	1,477,860.44
1950	58,645.75		309,065,150	1,318,746.61
1951	79,603.04		357,892,324	1,500,552.73
1952	95,463.45		300,662,483	1,544,812.76
1953	110,754.54	\$ 27,500.90	264,755,862	1,614,581.67
1954	130,814.19	302,161.25	269,823,433	1,859,139.73
1955	140,182.18	202,498.02	246,007,585	1,583,938.16
1956	162,185.90	138,570.21	228,917,389	1,506,928.64
1957	173,072.03	176,705.79	262,670,684	1,612,215.38

^aFor the period September 1 to December 31, 1946.

Source: Operating Revenue Accounts Ledger, Grand River Dam Authority.
Vinita, Oklahoma.

TABLE A-19

TOTAL POWER SALES SUMMARY, GRAND RIVER DAM AUTHORITY
ACCOUNTS No. 602, 604, and 605

Year	Primary Power		Secondary Power	
	KWH	Amount	KWH	Amount
1946 ^a	49,439,119	\$ 206,557.24		
1947	153,242,186	710,269.19	22,789,700	\$56,974.25
1948	170,285,372	743,088.54	27,975,000	69,937.50
1949	276,494,167	1,322,893.30	38,741,000	96,852.50
1950	255,393,575	1,202,658.50	25,000	62.50
1951	298,536,600	1,337,667.62		
1952	363,857,849	1,557,809.25		
1953	415,710,542	1,717,390.97		
1954	483,443,073	1,860,517.04		
1955	553,724,291	1,996,166.70		
1956	610,393,029	2,030,291.58		
1957	617,163,133	2,029,479.01		

TABLE A-19 Continued

Year	Dump Power		Demand Charge Amount	Other Power Sales (Net)	Stored Energy Returned
	KWH	Amount			
1946 ^a	969,200	\$ 969.20	\$ 17,786.27	\$(1,204.20)	
1947	72,134,500	72,134.50	97,075.76	1,318.39	\$ 59,471.00
1948	51,876,500	51,876.50	130,860.92	17,007.38	132,801.00
1949	95,810,100	95,810.10	162,987.13	1,780.27	2,047.00
1950	110,076,500	110,076.50	212,001.69	4,399.13	
1951	131,265,500	131,265.50	283,804.87	14,575.56	
1952	53,927,400	53,927.40	346,651.95	39,369.58	
1953			424,695.71	38,362.73	
1954			544,162.25	27,220.77	
1955	3,463,944	3,463.94	627,283.44	63,527.15	
1956			849,343.34	57,595.36	
1957	17,980,721	17,980.73	835,175.15	84,330.96	

TABLE A-19 Continued

Year	15% Surcharge	20% Surcharge	Total	
			KWH	Amount
1946 ^a			50,408,319	\$ 224,108.51
1947			254,113,486	937,772.09
1948			263,416,972	1,012,770.84
1949	\$ 54,317.26		411,249,967	1,734,845.26
1950	98,338.24		354,495,075	1,627,536.56
1951	130,828.44		429,802,100	1,898,141.99
1952	177,557.71		417,785,249	2,175,315.89
1953	216,265.50	\$ 40,686.17	415,710,542	2,437,401.08
1954	281,539.68	533,453.48	483,443,073	3,246,893.22
1955	357,366.21	514,303.26	557,188,235	3,562,110.70
1956	421,727.59	361,633.70	610,393,029	3,720,591.57
1957	428,913.57	449,155.71	635,143,854	3,847,063.04

^aFor the period September 1 to December 31, 1946.

Source: Operating Revenue Accounts Ledger, Grand River Dam Authority,
Vinita, Oklahoma.

TABLE A-20

DOLLAR SALES OF ELECTRICAL ENERGY, BY CLASS OF CUSTOMER, AS A PERCENT OF
TOTAL SALES REVENUE, GRAND RIVER DAM AUTHORITY, ANNUALLY, 1946 - 1957

Class of Customer	Percent of Total Sales Revenue			
	1946 ^a	1947	1948	1949
Industrial	22.2	19.7	20.0	11.1
Federal Authorities	2.0	4.7	4.0	2.7
Municipal Authorities	—	—	.2	1.0
Total Public Authorities	2.0	4.7	4.2	3.7
Municipal Utilities	9.4	13.6	18.2	11.8
Cooperative Utilities	5.2	4.1	5.2	6.2
Total Public Utilities	14.6	17.7	23.4	18.0
Private Utilities	61.2	57.9	52.4	67.2
Total Electric Utilities	75.8	75.6	75.8	85.2
Total	100.0	100.0	100.0	100.0

TABLE A-20 Continued

Class of Customer	Percent of Total Sales Revenue			
	1950	1951	1952	1953
Industrial	15.0	19.1	27.9	33.3
Federal Authorities	2.9	.8	.2	.2
Municipal Authorities	<u>1.1</u>	<u>1.0</u>	<u>.9</u>	<u>.7</u>
Total Public Authorities	4.0	1.8	1.1	.9
Municipal Utilities	14.5	14.9	14.4	14.6
Cooperative Utilities	<u>13.1</u>	<u>17.3</u>	<u>19.2</u>	<u>20.4</u>
Total Public Utilities	<u>27.6</u>	<u>32.2</u>	<u>33.6</u>	<u>35.0</u>
Private Utilities	<u>53.4</u>	<u>46.9</u>	<u>37.4</u>	<u>30.8</u>
Total Electric Utilities	81.0	79.1	71.0	65.8
Total	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>

TABLE A-20 Continued

Class of Customer	Percent of Total Sales Revenue			
	1954	1955	1956	1957
Industrial	41.7	54.6	58.7	57.4
Federal Authorities	.2	.2	.2	.1
Municipal Authorities	<u>.8</u>	<u>.7</u>	<u>.6</u>	<u>.6</u>
Total Public Authorities	1.0	.9	.8	.7
Municipal Utilities	16.8	16.0	15.4	14.6
Cooperative Utilities	20.3	19.9	21.8	24.5
Total Public Utilities	<u>37.1</u>	<u>35.9</u>	<u>37.2</u>	<u>39.1</u>
Private Utilities	20.2	8.6	3.3	2.8
Total Electric Utilities	<u>57.3</u>	<u>44.5</u>	<u>40.5</u>	<u>41.9</u>
Total	100.0	100.0	100.0	100.0

^aFor the period September 1 to December 31, 1946.

Source: Tables 16 through 52 and A-19.