

**Development of Municipal Water Supplies for  
Benton and Washington Counties, Arkansas  
(Source: Beaver Water District. Updated in January 2016.)**

When Beaver Water District of Benton and Washington Counties executed a contract in June of 1960 with the U. S. Corps of Engineers, the domestic and industrial water supply needs of the two counties were assured for the foreseeable future. The purchase of sufficient storage space in the then proposed Beaver Reservoir would yield a firm water supply of 120 million gallons per day. While the first water supplies were developed in the 1880's or 1890's, it was not until this event in 1960 that the available water supplies matched or exceeded foreseeable needs.

Before the formation of Beaver Reservoir, the communities of the two-county area developed water supplies by using the cheapest sources available. These sources were generally adequate during periods of average or above average rainfall but were usually inadequate during periods of drought. From the beginning, most communities depended upon open stream flow or underground springs. As the water supply needs increased and the dependability of these sources diminished, other sources were found or the existing sources extended by the construction of storage capacity.

A brief discussion of the history of the development of water supplies by the four cities of Fayetteville, Springdale, Rogers and Bentonville serves to illustrate the relatively short-term solutions usually found for area water supply problems prior to the construction of Beaver Reservoir.

### **Fayetteville**

The first public water supply system for Fayetteville was constructed in 1894. The water supply consisted of the open flow of the West Fork of White River. Initial facilities installed included a 200 gallons per minute steam pump and a 6" cast iron line between the pump station and an open reservoir constructed on Mt. Sequoyah. In 1905, a 400 gallons per minute steam pump and a 10" line from West Fork to Mt. Sequoyah were installed. In 1908, a pump station with a steam pump was installed on Clear Creek northwest of the city. Also installed at this time were approximately 21,000 linear feet of 8" cast iron pipe.

The first water treatment plant was constructed in 1916 on Mt. Sequoyah. The plant had a design capacity of 1.0 million gallons per day. Also installed at this time was a 14" cast iron line from the West Fork River to the treatment plant site.

In 1923, a diesel powered pump was installed at the West Fork pumping station, and the filter at the water treatment plant on Mt. Sequoyah was expanded to a capacity of 2.0 million gallons per day.

In 1946, a new water treatment plant with a capacity of 700 gallons per minute was constructed on Clear Creek just south of the community of Johnson.

In 1949 and 1950, Lake Fayetteville on the upper reaches of Clear Creek was constructed. After the long-term droughts of 1952 through 1954 and 1963 through 1964, the firm capacity was estimated to be approximately 1.5 million gallons per day.

In 1954, a new 16" and 20" raw water line was laid from Lake Fayetteville to Mt. Sequoyah. A new 3.0 million gallons per day treatment plant was constructed and the old treatment facilities at this location were abandoned. In 1959 Lake Sequoyah was constructed on the main stem of the White River east of the city. A 20" concrete raw water line was constructed between Lake Sequoyah and Mt. Sequoyah. The Mt. Sequoyah treatment plant was expanded to a capacity of 6.0 million gallons per day.

In 1960, the city of Fayetteville joined with the other three cities in guaranteeing payment for storage space in the then proposed Beaver Reservoir. In 1967, the city of Fayetteville determined to use Beaver Reservoir as a source of water supply and, further, determined that treatment would be provided through the District's treatment plant located east of Lowell, Arkansas.

In mid-1971, the construction of approximately 17 miles of 36" treated-water line between the District's treatment plant and the city's distribution system was completed. The City of Fayetteville began utilizing water from Beaver Water District in January 1972.

## **Springdale**

Although it is not clear as to the exact date when the first water system was started in Springdale, information indicates that a water improvement district was formed in 1901. The water supply was from one of the springs on Spring Creek within the city. Information further indicates that the initial installation included a 100 gallons per minute pump and a small storage tank. The eight to 10 users paid whatever they were able with no definite rates being established. Water was used chiefly to sprinkle streets and for other municipal uses. Although unconfirmed, it is reported that some of the first pipes were made of wood.

Very little information is available for the period from 1901 to 1922. However, in 1922 the water supply moved to Shiloh Springs in the northwest part of the present city (then approximately two and one-half miles northwest of the city). Facilities constructed included a water treatment plant and a 6" water line from the treatment plant site into the city. At that time, the system served fewer than 50 customers.

In 1950, the water supply was expanded by the acquisition of Fulbright Springs and the construction of a 19 million gallon earthen reservoir.

In 1953, the water treatment plant was expanded to a design capacity of 2.2 million gallons per day. Then in 1954, a pumping station was constructed on Little Osage Creek approximately seven and one-half miles west of the water treatment plant. A 14" raw water line was installed from this pumping station to the treatment plant.

In 1960, rapid sand filters having a capacity of 1.1 million gallons per day were added at the water treatment plant, thus giving a total filter capacity of 3.3 million gallons per day. Also in 1960, Springdale agreed to pay their pro rata share for storage space in the then proposed Beaver Reservoir.

In 1963, the city determined that a new source of water supply must be developed immediately. Consequently, they proposed to Beaver Water District that Springdale be allowed to construct a raw water line and water treatment plant and install raw water pumps in the District's intake structure to supply water to the city of Springdale. However, the provision was made that when the District was ready to provide water to other cities in the area these facilities would be transferred to the District. Construction was started in 1964 and completed in mid-1966 at which time the city of Springdale commenced using water from Beaver Reservoir.

## **Rogers**

The records are unclear as to when the first water supply system was constructed within the city of Rogers. It appears that the first system was constructed by the St. Louis-San Francisco Railway Company to provide water for their steam engines. The railroad was built in 1881; consequently, it can be inferred that the first water system was built shortly thereafter. Although constructed primarily to provide water for the railroad, the system served a few customers from the very beginning.

The supply was from a spring located in the southeast part of the city, which later came to be known as Frisco Spring. When this spring proved to be inadequate, a pump was installed at Diamond Spring east of the city just upstream of the present-day Lake Atalanta.

Sometime after the initial installation, the water system, along with a direct current electrical system, was purchased by a private individual who operated it for a short time and then sold the entire works to Mr. Felker, a local banker. Mr. Felker operated the system and constructed a pumping station at Diamond Spring. Later, the water and electrical systems were acquired by Southwestern Gas and Electric Company (later Southwestern Electric Power Company) with headquarters in Shreveport, Louisiana. This company operated the water system until the early to mid-1940's at which time it was taken over by the City of Rogers. In 1954, a deep well was drilled near Diamond Spring to augment the flow from the spring. In 1956, a new water treatment plant was constructed to treat the water from the two springs. Provision was also made to utilize Lake Atalanta as a water source as needed.

In 1960, the city agreed to pay their pro rata share for storage space in the then proposed Beaver Reservoir. In 1968, the city completed jointly with the city of Bentonville a 24" treated-water line from the Beaver Water District treatment plant east of Lowell, Arkansas, through Rogers to Bentonville, enabling the city to start utilizing water from Beaver Reservoir. The City began using water from the District in February of 1970.

### **Bentonville**

The first water system for Bentonville was constructed in 1896. At that time, a spring located approximately three miles east of the city was developed as a source of supply. Facilities installed initially included a steam pump at the spring and a 6" cast iron line from the spring into the city. These facilities were expanded in 1913 and 1914.

In 1936, further improvements were made at the spring, and a sedimentation basin and chemical treatment facility were installed at the east edge of the city.

In 1948, a parallel 8" cement asbestos line was laid from the spring to the city's distribution system.

In 1954, construction was completed on a pumping station at Ford Spring located approximately three miles north of the city and a new water treatment plant located on the north edge of the city. Also installed at this time was a 12" raw water line between the spring and the treatment plant.

In 1960, the city agreed to pay their pro rata share for storage space in the then proposed Beaver Reservoir. In 1968 the city completed jointly with the city of Rogers a 24" treated-water line through Rogers to Bentonville from the Beaver Water District treatment plant east of Lowell, Arkansas. The city began utilizing water from the District in June of 1970.

### **Formation of Beaver Water District**

Due to a lack of financing, the four cities were unable to develop a long-range solution to the water supply problem on an individual basis. By the mid-1950's these cities were ready to discuss any proposed long-range solution.

A series of events began in the late 1930's or early 1940's when the initial idea of constructing a dam on the White River southwest of Eureka Springs was first urged by a group of Rogers businessmen. These businessmen and others began to implore Congress to provide funds for an engineering study on the feasibility of such a dam and resultant reservoir. Just after World War II an organization called the Beaver Dam Association was formed, and funds were raised to promote construction of a dam. In 1954, Congress authorized construction of Beaver Dam under the Flood Control Act for the multiple purposes of flood control and generation of hydroelectric power along with other beneficial uses. However, funds were withheld by the Bureau of Budget because engineering surveys and studies by the Corps of Engineers did not show sufficient cost-benefit ratio to justify construction based on power production, flood control, and recreational uses. Consequently, the dam might never have been built except for another purpose - perhaps the most important of all - the development of a water supply for Northwest Arkansas.

In 1958, Congress passed the Water Supply Act (Public Law 85-500). The Act declared the policy of Congress to recognize the primary responsibility of the states and local interests in developing water supplies for domestic, municipal, industrial, and other purposes and that the federal government should participate and cooperate with the states and local interests in developing such supplies in the construction, maintenance, and operation of federal navigation, flood control, irrigation, or multiple purpose projects.

It was the passage of this law that pulled Beaver Reservoir out of the "talked about" stage and into construction. This Act provided for the inclusion in the Corps of Engineers' projects storage space in reservoirs to yield specified amounts of water for municipal and industrial water supply. However, Congress announced a policy in adopting and authorizing such projects that no federal funds could be expended to supply water storage capacity for municipal and industrial purposes in the reservoirs to be constructed until some authorized local agency executed with the United States a contract of assurance that such local interests would make use of said water supply and pay such additional cost of construction of the reservoir as might be allocated to water supply for the municipalities and industrial users.

Anticipating congressional action in the passage of the Water Supply Act, the 1957 Arkansas Legislature approved Act 114<sup>1</sup> authorizing nonprofit regional water distribution districts to take advantage of the provisions of the Act. These statutes, in effect, authorized formation of a legal entity empowered to contract with the Corps of Engineers for acquisition of storage space in federal impoundments and to make contracts with consumers, including municipalities, for the sale of such water. On July 17, 1959, the Beaver Water District, including all of Washington and Benton Counties, was organized. Washington County Circuit Judge Maupin Cummings signed the order creating the District on August 27, 1959.

The estimated cost of the water supply storage was \$5,069,960 for the total 120 million gallons per day, and the initial water supply storage cost was \$1,478,738 for 35 million gallons per day. After much study and consultation between the District and the four cities, the cities each entered into contracts with Beaver Water District in January of 1960 to pay a pro rata share of the cost of storage space in the proposed reservoir to provide the initial water supply of 35 million gallons per day. An allocation for the storage rights was developed based on current city population and distance from the lake. The yearly allocations were set as follows:

<b>City</b>	<b>Initial Storage Rights in Gallons per Day</b>	<b>Options on Future Storage Rights</b>
Bentonville	4,000,000	3,000,000
Fayetteville	11,000,000	9,000,000
Rogers	10,000,000	8,000,000
Springdale	10,000,000	8,000,000
<b>Totals</b>	<b>35,000,000</b>	<b>28,000,000</b>

With the four contracts underwriting the initial water allocations, the District enter into a contract with the U. S. Corps of Engineers on June 16, 1960<sup>2</sup> which provided for sufficient storage space for the initial water supply of 35 million gallons per day at an annual cost of \$63,000. The contract also provided for storage space to provide an additional 85 million gallons of water per day for future use at an estimated cost of \$3.6 million. The contract was for 50 years with the District paying principal and interest plus a percentage of the Corps of Engineers operation and maintenance cost of the Beaver Reservoir project on the initial 35 million gallons of storage rights. Interest was deferred for ten years on the remaining 85 million gallons of storage rights.

Beaver Water District had 25 years from the start-up of the project (1966) to exercise its option on the remaining 85 million gallons of storage rights. The contract was amended to reflect the actual audited project costs with minor modifications in several sections. The deferred interest payment on the balance of the 85 million gallons of storage rights came due in 1976, and Beaver Water District elected to allow the interest to accumulate until exercising the option on the remaining 85 million gallons of storage rights.

After execution of the contract with the Corps of Engineers, efforts were started in 1961 to ensure that the water storage rights secured could be put to practical use. In conjunction with the four cities, the District set about to secure land to meet Arkansas Health Department requirements for an adequate intake site along with rights of way and land for water supply facilities. When this was completed, the District started construction of a raw water intake structure in the lake bed prior to the completion of Beaver Dam and the filling of the reservoir. Bonds in the name of Beaver Water District with the four cities pledging the annual payments were issued to finance the land purchase and construction costs. Bonds in the amount of \$411,000 were sold on November 27, 1962. The intake structure was completed in 1964. At the time of completion, the design capacity for the intake structure was 60 million gallons per day.

In 1963, the city of Springdale was confronted with the need for major improvements to its water system and for an additional source of water. Springdale, through the sale of water revenue bonds, was in a position to provide matching funds with a federal grant available to Beaver Water District sufficient to construct a water treatment plant on Beaver's plant site and to construct a 36" raw water line from the intake structure to the treatment plant site. Beaver Water District, Springdale, Bentonville, Rogers, and Fayetteville entered into a Memorandum of

<sup>1</sup> Reference Section 6

<sup>2</sup> Reference Section 8

Understanding in 1963 which set forth the conditions under which the first water treatment facility would be constructed and operated. The agreement also set forth how the District would reimburse Springdale for their interest in the treatment facilities and raw water line. Construction of a 36" raw water line, the installation of raw water pumps, and the construction of a 10 million gallons per day water treatment plant was completed in 1966. Growth and extreme drought conditions by 1966 resulted in Bentonville, Rogers, and Fayetteville needing to expand their facilities and secure a new source of water. The Directors of Beaver Water District devised a plan to meet these needs. Agreement was reached in 1967 when all parties signed the Memorandum of Understanding and Contract for Construction, Maintenance, Operation and Expansion of Beaver Water Supply Facilities<sup>3</sup>. This document still provides the operational relationship between the District and the four cities. In order to accomplish this expansion, \$1,800,000 of water revenue improvement temporary bonds were underwritten by the four cities and sold in December of 1968. Work was started to expand the existing treatment facilities by Beaver Water District while Rogers and Bentonville started construction on their 24" treated water transmission line. In late 1968, Fayetteville started on its 36" treated water line.

In January 1970, the Beaver Water District assumed operating control of the Joe M. Steele Water Treatment Facility. Construction was under way at this time on the plant expansion and new transmission lines. By mid-1971, expansion of the water treatment plant to a nominal design capacity of 25 million gallons per day and an overload capacity of approximately 32 million gallons per day had been completed. Also by this time transfer of facilities originally paid for by the city of Springdale to the District had come into effect, and the cities of Rogers and Bentonville had begun to utilize water from the District's facilities. Due to the rapid growth in this area, it became apparent that with the addition of Fayetteville in 1972, it would be necessary to expand the treatment facilities again as soon as possible.

In 1973, all of the outstanding bond issue debt service and cost of operation of the Beaver Water District was converted to a single cost of water and charged against the actual water used by each city as set forth in the 1967 Memorandum of Understanding. The storage rights contracts were not affected by the change and remained the same.

Also at this time, the District, with concurrence of the four cities, issued \$3,000,000 in temporary revenue bonds to fund the proposed new expansion. This expansion would build another raw water transmission line and enlarge the treatment facilities to 50 million gallons per day. The project was bid in late 1975, and was \$2,000,000 over the available funds. The District issued an additional \$2,000,000 in temporary water revenue bonds, and the expansion was started.

In April of 1977 as the expansion neared completion, the District completed its arrangements for its financing by selling \$7,680,000 of 25-year Water Refunding Bond Series 1977. This issue refunded all outstanding bonds of the District. The expansion was placed in use in 1977 and completed in 1978. In addition, the Board of Directors created the Storage Space Fund, effective September 1, 1979, to provide some relief from the financial costs which would fall due in 1990 when the District was required to begin payment of the remaining storage rights costs.

At this time services were being provided from the Missouri line north of Bentonville to a point south of Greenland, a distance of over 40 miles. Many smaller communities were being served through the facilities of the major cities of the area. Bentonville served Centerton and Bella Vista Village. Rogers served Pea Ridge and a large rural area. Springdale served Tontitown, Elm Springs, Cave Springs, Lowell, and a large rural area. Fayetteville served Elkins, Greenland, Farmington, and a large rural area. All in all, in excess of 80,000 persons were being supplied through the Beaver facilities. The cost of water was 27 cents per thousand gallons, which covered the District's debt service on outstanding revenue bonds, operating costs, and the required reserves.

The Board of Directors changed the method of payment by the Cities for the storage rights on April 10, 1980, from a direct assessment based on prior agreements. The new method converted the storage rights to the cost of water. The conversion took place on September 1, 1980.

With the rapid growth of Northwest Arkansas, it soon became apparent that another expansion would soon be needed. In 1989, the Board created the Expansion Reserve Fund and approved a rate increase from \$0.41 per thousand gallons to \$0.61 per thousand gallons. The J. M. Montgomery's Master Plan Study was presented for the

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<sup>3</sup> Reference Section 9

40 million gallon per day water treatment facility expansion. Also, the District started pilot plant work on proposed water treatment processes and installed the first 1000 Hp motor and pump at the intake to increase raw water capacity.

By 1990, design started on a 40 MGD plant expansion. In order to pay for this expansion the District issued the 1990 Water Revenue Improvement Bonds in the amount of \$10,000,000. The Board also approved another rate increase from \$0.61 per thousand gallons to \$0.81 per thousand gallons.

Hensel-Phelps Contractors was awarded the contract for the facilities expansion in 1991 and construction started. The 1991 Water Revenue Improvement Bonds were issued in the amount of \$28,570,000, and the rate increased from \$0.81 per thousand gallons to \$1.01 per thousand gallons.

In 1992, a six million gallon clearwell and high service pumping facility was placed in service, and in 1993 the Hardy W. Croxton Water Treatment Facility went on line. The total cost of the of the project including planning, pilot plant work, design, construction, inspection and the additional six million gallon clearwell that was originally scheduled for 2007 came to a grand total of \$38,567,832. The District exercised its option on the additional 85 million gallons of storage rights and entered into an additional contract with the Corps of Engineers in 1993. The 1990 and 1991 Bonds were refinanced with the 1994 Water Revenue Refunding Bonds to create an interest savings of \$11,000,000 and reduce the maturity date from 2011 to 2009.

In 1995, Beaver Water District received an Environmental Excellence Award from Region 6 EPA. Also in 1995, the District began work on the Fluoride Feeding facility and started on a design for rebuilding parts of the Joe M. Steele Water Plant. Phase 1-A refurbishing of the Steele Plant basins three and four started in 1996 and was completed in 1997. The Board also created the 1996 Construction Fund for improvements to the District's facilities. In an effort to improve the general water quality of the area the District started providing bacteriological lab service to the four cities in 1996 to speed the lifting of Arkansas Health Department issued boil orders. Then in 1997 the District prepared for the EPA Information Collection Rule Program.

Construction started on Phase 1-B Intake Transformer Project in 1998. The next year the District started work on getting Carroll Electric Coop to upgrade our electrical power service. The District requested a new Carroll Electric substation on or near the BWD facilities of adequate capacity to meet the current and future needs of BWD. The substation would be fed power from two separate transmission lines and would give the District the ability to pump and treat approximately 40 MGD using the District's own generating facilities. Work for the Auxiliary Power Generation Facility was started in 2000, and the District began upgrading their master plan in anticipation of the need for another expansion of the facilities.

This expansion was realized as construction began in 2003 on a \$104 million facility expected to meet the needs of Northwest Arkansas until the year 2020. This project was paid for with reserves and the proceeds from the \$60 million 2003 Water Revenue Bond Issue. Water rates were increased to \$1.16 per thousand gallons to cover the debt service for this bond issue.

The construction was divided into eight contract sections. Contract 1 consisted of an electrical expansion and was completed in late 2003. Contract 2, a new Intake Facility located on Beaver Lake, increased the District's intake capacity by 70 MGD and was completed in 2005. Contract 3 was a 60" Raw Water Pipeline, which runs approximately 10,000 feet from the lake to the treatment plant, paralleling the two existing raw water lines. The pipeline was finished in late 2004. Contract 4 was the new Treatment Facility. This facility increased treatment capacity by 60 MGD, making the District's overall treatment capacity 140 MGD. This \$26 million contract was completed in 2006. Contract 5 was a \$5.2 million Solids Handling Facility designed to meet the changing environmental concerns of our area by providing clarification and thickening of treatment plant waste streams. This facility includes retrofitting lagoons, a new sludge pump station, a new filter waste washwater pump station, a new clarification process, and new gravity thickeners. Contract 5B added three centrifuges in a separate building for the purpose of de-watering all waste process solids from the solids handling facility. The solids de-watering provided the District with an alternative solids disposal method (landfilling). These two contracts, totaling \$11.6 million, were completed in 2006. Contracts 6 and 7 covered the demolition of the original Steele facilities (with the exception of the filters and operations building), and the construction of new facilities, respectively. New construction included sedimentation basins, chemical feed facilities, and filter upgrades. The Steele plant upgrades were completed and the plant placed back on line in early 2009. The total cost for the Steele upgrade, including the demolition work, was \$29 million.

While not part of the larger expansion project, the District also constructed a pilot plant inside the Steele operations building consisting of two 5 gallons per minute parallel treatment trains designed to mimic the actual treatment facilities.

The District constructed a new Administration Center, which was completed in the summer of 2009. The facility was designed and constructed under the Leadership in Energy and Environmental Design (LEED) program, and received a LEED Gold certification. The Administration Center provides public access to the District and includes a meeting room, board room, and educational exhibit area.

In December, 2011, construction began on the Chlorine Dioxide Treatment Facility. This \$5.0 million project, which was completed in early 2013, was constructed to lessen the formation of chlorinated disinfection by-products, as required by EPA's Stage 2 Disinfectants and Disinfection By-products Rule.

In August, 2015, the District entered into a construction contract for the addition of two 2-megawatt diesel powered generators. This \$5.4 million project will provide emergency back-up power for a 20-year planning period, as well as improve the District's summertime electrical load shedding program. The project is scheduled for completion in May, 2016.

Beginning in 2008, the District instituted a 15-year Long Range Financial Plan. This financial plan is updated annually, and it projects income from water sales, operation and maintenance expenses, debt payments, and funding needed for the District's two major reserves – Expansion Reserve and Replacement & Refurbishment. The development of the Long Range Financial Plan has allowed the District to make more frequent, but smaller, rate adjustments. Beginning in 2008, the District has made six incremental rate increases, which has moved the District's wholesale water rate from \$1.16 per thousand gallons to \$1.29 per thousand gallons, effective October 1, 2015. The financial plan will continue to be updated annually.

In 2015, Beaver Lake provides drinking water to more than 300,000 people and industries; Benton-Washington Regional Public Water Authority serves about 60,000 people in western Benton and Washington counties; Carroll-Boone Water District serves about 26,000 people and sells water to Eureka Springs, Berryville, Green Forest, and Harrison, in Carroll and Boone counties; and Madison County Regional Water District serves about 21,000 people and sells water to Huntsville and the Madison County Water Facilities Board.