

THE HISTORY OF THE ELECTRIC AND WATER SYSTEMS IN ROLLA, MISSOURI

1880 TO 1975

AND OTHER WELLS IN AND AROUND ROLLA

by J.B. Bronson

Prepared from old records and the stories of old residents, and early records of the Missouri Geological Survey (Missouri Department of Natural Resources' Division of Geology and Land Survey) and the files of the Rolla Municipal Utilities which have accumulated since 1924.

The American Utilities Company of Harrisburg, Pennsylvania, a holding company, purchased a number of electric and water properties in Missouri, Arkansas, and Kentucky from 1920 to 1926. They were small towns, not generally integrated and mostly in poor physical condition. In 1924, they purchased the Rolla electric and water system from Darlene Holcomb and her son-in-law George Silvers, and known as the Ozark Public Service Company. Mrs. Holcomb bought the electric and water system from the City of Rolla in 1918.

The operation of the electric and water systems by the City of Rolla from the first plant installed in the 1880s, until it was sold to Mrs. Holcomb in 1918, had been almost a complete failure. The management was under the Mayor and City Council with evidence of mismanagement and favoritism, so the City was very happy to sell the property to Mrs. Holcomb. She was a very aggressive and dynamic woman and while she had no previous utility experience she was determined to improve the service. This she did by converting the old 2 wire 120 volt DC electric system to AC, and extending the lines to more residences who could not be served by the DC lines. To accomplish this, she installed 3 Fairbanks Morse diesel oil engines and AC generators from 1919 to 1923. She installed an electric driven air compressor to pump water from the plant well into the water system. She shut down and removed the old boilers in the south side of the plant, and the 50 KW DC generator, and installed a 50-ton ice plant in the boiler room. The ice plant was not a profitable venture. After the property was acquired by the American Utilities, it was sold in 1931 to Devere Joslin. He moved the entire ice plant to the ice plant he was operating at 6th and Rolla Streets.

The first power plant building in Rolla, built about 1880, was a metal structure (a picture of this building is at the Rolla Municipal Utilities office). It was replaced by a brick structure about 1910. The new brick building at the same location was used not only for a power plant, but the north side of the building was partitioned off as a Council Chamber and Mayor's office, with the city jail

located in the east end. When Mrs. Holcomb bought the property and installed the diesel engines, the city offices and jail were removed.

In 1930, the Missouri Electric Power Company, now Sho-Me Power Corporation, a subsidiary of the Central States Light and Power Company of Dubuque, Iowa, built a 33,000-volt transmission line from a dam they owned on the Niangua River near Lebanon, Missouri, through Rolla to Sullivan and Cuba, Missouri, towns where they owned power systems. The Missouri General Utilities Company contracted to buy power from this line and the diesel engines were shut down and used only for emergency until 1950 when they were junked and removed. In the 1950s The Missouri General Utilities Company converted the electric system from 2400 volts Delta to 4160 volts Wye. It is still operated at this voltage.

In 1949, Rolla severed the Power Contract with Missouri Electric Power Company and contracted with Union Electric Company to serve Rolla. Union Electric brought two 33,000-volt transmission lines into Rolla from a substation about 3 miles north of Rolla known as Phelps Substation. This has been Rolla's source of power since that date.

In 1924, I came from the Dayton Power and Light Company in Dayton, Ohio, to Missouri to manage the properties that American Utilities had acquired in Missouri, Arkansas, and Kentucky. I spent a great deal of time in Rolla because both the electric system and water system needed immediate attention, but I lived for a short time in Kentucky and Arkansas. The situations there were not so acute because the power was purchased from other utilities and there were only two small water systems. The American Utilities incorporated all the Missouri properties as the Missouri General Utilities Company. The American Utilities Company was not well financed, and because of this, was caught in the depression in 1929 and 1930 and was unable to keep the properties they had purchased. To avoid bankruptcy,

they traded all the stock of the Missouri General Utilities Company to the Associated Gas and Electric Company of New York for Associated stock. It was a standing joke at that time that they traded nothing for nothing, as Associated was also on the verge of bankruptcy. I remained with Associated until they were forced by the 1938 Federal Holding Company Act to sell the properties they owned, which were not integrated, and this included all the Missouri properties. In 1945 they sold the Rolla properties and the City of Rolla purchased them for \$450,000. So after 27 years, the city again owned the electric and water systems in Rolla. The city had voted a bond issue to cover the purchase price and took over operation on November 1, 1945, under a Board of Public Works and called it the Rolla Municipal Utilities. The trustees of Associated offered to move me to Erie, Pennsylvania, and place me in charge of a group of towns they owned, but I elected to stay in Rolla. I operated the electric and water system for the city of Rolla from 1945 until 1970 when I retired and was succeeded by Mr. William E. O'Haver. Mr. O'Haver came to work for the Rolla Municipal Utilities as a laborer in 1952 at the age of 25.

In the early 1900s the only water available in Rolla for human consumption came from shallow wells and cisterns. Nearly every home had one or the other. There were several public wells used by the citizenry and during dry spells water was carried from these wells, which had the old type cylinder pump and the famous old pump handles. I never saw these wells, but when I first came to Rolla in 1924 the old timers told me about them. One was located at the end of Sixth and Pine Street and supplied a large watering trough. Another was somewhere in the front yard of the Courthouse at Third and Main. As late as 1930 the old stone base over this well was visible, but since then has been removed. Others were near the Frisco Depot, on Salem Avenue near East Fifth Street, and at the rear of the old Grant Hotel at Eighth and Pine. There were several large cisterns that had roof drains into them from nearby buildings, which were used for fire fighting. One of these was located at Eighth and Pine and was intact until recent years. The 8-inch water main at Eighth and Pine runs through the top of this cistern. Since 1924 several of these old cisterns have been discovered, but I believe all of them have been filled in.

Rolla's first fire fighting equipment was a bucket brigade. Later, a hand-operated fire pump and a hose cart were purchased. This cart is on display at the fire department building at Fourth and Main Street. Today, Rolla has a well-organized, well-equipped fire department.

About 1904, the population of Rolla was about 1,800 and the town started a campaign to drill a large well and install a system of mains and a storage tank. In 1905, 1906, and 1907 this system was installed. The mains were

8-inch, 6-inch and 4-inch, with valves, fire hydrants, and a concrete storage tank on the north side of the town at Tower Road. In 1915, this tank, which was never satisfactory because of leakage, was abandoned and replaced with a 240,000 gallon steel standpipe 30 feet in height, erected by the Chicago Bridge and Iron Company. The tank was replaced in 1954 by an 800,000 gallon steel standpipe, 30 feet higher to increase the water pressure by 12 pounds. It was also erected by the Chicago Bridge and Iron Company. The 240,000 gallon standpipe is now used for storage of electric and water supplies. The 800,000 gallon standpipe is still in use (1975). Many of the original Corey fire hydrants installed in 1905, 1906, and 1907 are still in use and all the original cast iron, lead joint mains are also in use. The Missouri School of Mines drilled a well in 1906 and 1907 and a 4-inch cross connection was made from the city system at Twelfth and Pine into the Missouri School of Mines system for the mutual benefit of the City of Rolla and the Missouri School of Mines. This connection was eliminated in 1968 when other larger connecting mains were installed.

In about 1906, the town let a contract for an 8-inch well to a Mr. H. W. Steinsick to be drilled on the south side of Eighth Street, east of the power plant building, east of the Frisco Railroad. He encountered many troubles drilling the well. He started two or three wells, but because of crooked holes and the loss of drilling tools, they were abandoned. Through the years, this has been verified by uncovering the old steel casings on the east side of the power plant. Finally, in 1907, he completed a well to 800 feet and the log shows that it pumped 200 gallons per minute. The well was pumped with air using a system devised by Professor Harris at the Missouri School of Mines. This was accomplished by running a 1½ inch steel pipe air-line into the well below the water-level (water level not known), and pumping air at 150 lbs. of pressure down this pipe. The water was forced up the casing and ran from the top of the casing into a 40,300 gallon underground concrete reservoir adjacent to the well. From this reservoir the water was pumped by a centrifugal pump, located inside the power plant, into the water system. The air compressor used for the first well was evidently operated by steam pressure. In 1924 there was an old steam engine still in the power plant, but it was replaced with deisel oil engines in 1918, 1922, and 1923. The production from this first well was given as 200 gpm when it was drilled, but in 1924 the well was only producing about 100 gpm. At times the water was cloudy and sandy, but by letting the water settle in the underground reservoir, the sand settled out and the water could be used. It was not good quality water. There were many complaints and considerable bleeding of the fire hydrants to get out part of the sediment. This well was plugged about 1935 and the underground reservoir was filled in about 1942. The old residents told many tales about the troubles the city had with this first water

system. The installation of the mains were completed about 6 to 8 months before the well and there was no way to test the mains for leaks. When water was finally pumped into the mains there were leaks everywhere. The city brought suit against the contractor who installed the mains (contractor not known), but he returned and dug up and repaired the mains and the suit was dropped. The mains did not make water available to all the houses by being installed on every street. The city permitted houses on side and back streets to lay their own service lines to the mains. There were many such lines installed and practically all of them were $\frac{1}{2}$ and $\frac{3}{4}$ inch iron pipe laid across private property through front and back yards or alleys, and even from one basement to the next. There were no records of valves on the water system, other than a designation on the plat map that a valve was located at or near a street intersection. Neither were there any maps of service lines to many homes. When a service line was found on a main with no indication where it went or who it served, it was common practice to open the goose-neck and pour in a small amount of peppermint oil. This soon brought a response from the customers that this line served. In many cases it served three or four houses, some with water meters and others not. It was not until the late 1940's that these conditions were eliminated and corrected by the installation of new mains, and the use of copper service, and the completion of a map of the water system.

A great many conferences were held in 1925, 1926 and 1927 between the American Utility officials, the citizens of Rolla, and the Missouri Geological Survey on what steps should be taken to furnish an adequate water supply. The American Utility officials investigated the possibility of building a large water plant on the Piney River at Newburg and pumping the water into Rolla, but they soon recognized that the cost of this was far more than they could finance. Finally, in 1928, it was decided that a new well should be drilled at a suitable location and a new turbine type electric driven pump installed. A lot was purchased on the north side of Seventh and Walnut streets. The specifications for the well were prepared by the Missouri Geological Survey, who asked that the well be drilled 12 inches in diameter down to 500 feet, and 8 inches in diameter through the Potosi, terminating at the base of the Lamotte at approximately 1,750 feet, or when the drilling samples showed the Lamotte had been penetrated. It was the general opinion of many geologists at that time that a big flow of water was available only from the Lamotte.

This Well #1 (known by Missouri Geological Survey Records as Well #2) was completed at 1,765 feet in 1930 and 1931. There was only about 100 feet of 12-inch steel casing installed. This casing was set down in concrete, and concrete filled in around the casing from the top.

The well was drilled by the Alexander Company of Springfield, Missouri, at a contract price of approximately \$8,500.00, but they were unable to complete the well because of financial problems; it was completed by the bonding company (driller not known). The first pump was a Byron-Jackson installed by Reeves and Skinner Pump Company of St. Louis. Evidently the pump was too light and fragile for the 400-foot setting in the well, and never operated satisfactorily. In removing the pump from the well in 1931, the column broke and part of the pump fell to the 500 foot level, and lodged in the 8-inch hole. After some three months the pump was fished out in pieces, but the well had caved in badly, and had to be drilled and bailed out from 800 to 1,200 feet, and a liner installed. In 1931 a Pomona, and later a Layne-Western pump was installed, which operated until about 1965 when the well was abandoned due to low production. Originally, the well produced about 350 gpm. It was a dependable supply for about 30 years. This well was plugged in 1966.

By 1930 there were signs that Rolla was destined to increase in population, due to the growth of Missouri School of Mines and the United States Geological Survey. In 1931 and 1932 Well #2 was drilled at Fourth and Rolla Streets. The same specifications were used as for Well #1, except 375 feet of 12-inch casing was installed. This well was completed to approximately 1,715 feet, and produced about 440 gpm of fine quality water. This well is still in production, but now has a capacity of only 270 gpm.

In 1942 there was a great influx of people into Rolla, due to the establishment of Fort Leonard Wood 35 miles south of Rolla. The federal government recognized that the towns near Fort Wood needed some financial assistance, and made funds available for improvements to the water and sewer systems in several towns. Rolla received a grant for a water well and additions to the sewer system. Well #3 was drilled in the northeast corner of Rolla at Arkansas and Holloway streets. It was a 10-inch hole down 500 feet and 8-inches down through the Potosi to 1,200 feet. This well produced 440 gpm. The well discharged into a 240,000 gallon concrete reservoir and was pumped from the reservoir by a centrifugal pump into the water system. This tank was abandoned in 1955 and converted to a storage facility for electric and water supplies. The deep well pump was rebuilt and connected directly into the water system.

In 1947, Well #4 was drilled on East Tenth Street and Well #5 at Walker Avenue and the Frisco Railroad. These wells were 12 inches in diameter down to 500 feet, and a 10-inch hole through the Potosi to approximately 1,200 feet. Each produced approximately 540 gpm. These wells were not drilled through the Lamotte at

1,700 feet because a well drilled by Missouri School of Mines in 1936 found that the water in this locality was coming from the Potosi instead of the Lamotte (see account of Missouri School of Mines Well #2 drilled in 1936 later in this report). Because of this, all wells drilled after 1936 were approximately 1,200 feet in depth.

In 1952, Well #6 was drilled on West Tenth Street, just west of Phelps County Memorial Hospital. This well was drilled by the same specifications as Wells #4 and #5, and produced approximately 545 gpm.

In 1954, Well #7 was drilled on Williams Road approximately 1,200 feet west of South Rolla Street. This well was drilled by the same specifications as #4, #5, and #6, and produced 525 gpm. There were signs of contamination from the first samples pumped from the well, but after the well operated for 15 or 20 minutes at 525 gpm the water tested okay. This continued for over a year. A 100,000 gallon storage tank was installed at the well and the well was discharged into this tank, treated with chlorine and then pumped into the system with a centrifugal service pump. This eliminated all contamination.

In 1960, Well #8 was drilled at the site of the old sewer plant south of Highway 72 at Sharon Avenue. This well was drilled to the same specifications as all the previous wells, but never produced a supply of water comparable with the previous wells. The maximum production was approximately 260 gpm. The well has been deepened and acidized several times and the pump setting lowered, but production has not improved.

In 1966, Well #9 was drilled on Bridge School Road, approximately 600 feet east of I-44 on land owned by the United States Forest Service, to the same specifications as all the previous wells. This well produced 750 gpm of good water.

In 1965, the city installed a 1,800,000 gallon steel standpipe on Lanning Lane on the south side of the city to maintain better pressure on the city's south and west side. This makes a total of 2,700,000 gallon storage capacity above ground (1,800,000 on Lanning Lane) (800,000 on Tower Road) & (100,000 at Well #8 on Williams Road).

In 1967, Well #10 was drilled on the north side of I-44 east of Vichy Road to the same specifications as all previous wells. This well produced 775 gpm of good water.

In 1972, Well #11 was drilled in Heritage Heights, a new subdivision at Liberty Drive and Lincoln Lane. This well was drilled by air rotary with detergent additives to the same specifications as all the other wells. This well produces approximately 1,000 gpm.

In 1936, the Missouri School of Mines (now University of Missouri at Rolla), due to their growth and the falling production of their original Well #1 drilled in 1907, decided to drill their Well #2 on the north side of the campus at Vichy Road and 16th Street about 25 feet south of their steel storage tank. The specifications for this well were reviewed and approved by the Missouri Geological Survey, and were the same as for the city's Wells #1 and #2. The Virginia Drilling Company of the State of Virginia was the low bidder and drilled the well. They lost their first hole at 200 feet, but moved over a few feet and drilled a second hole. It was never fully understood why the Virginia Drilling Company bid a well job some 1,000 miles from their home base. Hancock, who drilled the well, was an experienced and capable driller. When the well was down to 1,200 feet through the Potosi, the driller insisted that he had a big supply of water. He was so insistent that it was decided to install the pump and run a test on the well. This was done and the test showed that the well would produce 340 gpm. State Geologist Buehler and his Associate, H.S. McQueen, decided to stop the drilling at the base of the Potosi at the 1,200 feet level, and operate at that level.

As a result of the water production at the base of the Potosi, as this well indicated, all wells after 1936 have been drilled through the Potosi. This well was abandoned and plugged in the early 1970s.

In 1940 and 1941, the Uptown Theater asked the Missouri General Utilities Company, owner of the Rolla Water System, for permission to take water from the city water system and circulate the water through a system of coils in the Uptown Theater to cool the building. There was no way, without laying considerable main, to take water and return it, except to the same main. The State Board of Health would not approve of such a connection and the idea was abandoned. Against the advice of several engineers, the Uptown Theater decided to drill their own well on the east side of the Theater Building at 11th and Pine Streets for a supply of water. They drilled a 700 foot well in 1942, which produced approximately 80 gpm. They soon found that 80 gpm of 55 degree water would not cool the theater, so they abandoned the well and later put in air conditioning.

In the early 1950s, John Schuman had built and was operating the Busy Bee Laundry at 14th and Elm Streets. He had tried to use water from the Frisco Pond for his laundry, but he did not have the proper filtering equipment, and was not willing to finance the installation of this equipment. He thought the city water rates were excessive, so he drilled a well in 1953 at the west side of the laundry building. The well was 675 feet deep and a turbine type pump was installed. The well produced from 50 to 60 gpm and is still in operation. At the present time, it is producing approximately 5½ million gallons annu-

ally, but there have been a number of times when the pump has broken down and no water used from the well for a considerable time. This well was drilled by Roy Wallace. It is not properly cased and should be plugged as it is deeper than the point where the city wells are cased and could become a source of contamination.

In 1964, the University of Missouri at Rolla drilled their Well #3 on the west side of Rolla. The well was drilled by Clark and Son of Pacific, Missouri, to a total depth of 1,205 feet, with 390 feet of 12-inch casing, and producing 570 gpm. In 1967, the University of Missouri at Rolla and the Rolla Municipal Utilities entered into an agreement for the utility company to take over the operation of this well, and supply all the water used at the University of Missouri at Rolla.

In 1968, Zeno's Motel drilled a 545-foot well at their motel on Highway 66 Wes. It was drilled by Roy Wallace. This well is still being used and produces approximately 3 1/2 million gallons per year.

In 1962, Holiday Inn drilled a 650-foot well at their motel on Highway 66 Wes. It was drilled by Roy Wallace. The city installed an 8-inch main along Highway 66 West in 1964 and this well was abandoned. It is now used as an observation well by DGLS.

There are shallow wells at Plaza Trailer Park, and also Woodcrest Trailer Park on the west side of Rolla. Plaza Trailer Park well produces approximately 2 million gallons per year. Woodcrest Park well produces approximately 6 3/4 million gallons per year.

All the wells in Rolla always had iron content of .20 to .30 ppm. This caused a red rust deposit in the mains, and there were always complaints from customers on dead end mains, and mains with low flow, of red water and an odor. This necessitated a regular program of fire hydrant bleeding, and even this did not correct the trouble. As more water was pumped from the well the situation seemed to worsen.

In 1953 and 1954, Dr. W.T. Schrenk, Chairman of the Chemistry Department at Missouri School of Mines at Rolla, thought that cutting off mains from the system and circulating a lime solution through these mains would help the problem. It did some good, but we were told by others who had the same problem that the only solution was the use of chlorine injected into the system at the pump head.

In 1956, we retained Haskins, Riddle, Ordelleide, and Sharp Consulting Engineers to install some temporary chlorinators to see what results might be achieved. We learned that the chlorine cut the rust loose in the mains

and over a length of time would partially control the rust and odor problem. We installed permanent chlorinators, but after some 19 years the rust condition is still a serious problem; however the taste and odor has improved. Approximately 1 ppm of chlorine is added to the system.

The citizens asked for fluoridation of the city water system. The Board of Public Works said that it would be done if there was a referendum approving it. It was voted in and the fluoridation equipment was installed in 1968.

When the city purchased the utilities in 1945 from the Trustees of the Associated Gas and Electric Company, they set up a Board of Public Works, as provided by state law, to operate the electric and water system. The original Board members were F.H. Frame, H.E. Castleman, Eric Schuman, and Fred Cameron. These men are now deceased, but have always been credited with giving Rolla a sound utility background for the operation of the utilities.

In the early 1960s, the Missouri Inspection Bureau gave Rolla a Class VII Fire Insurance rating for all property inside the corporate limits. This was occasioned by the continued improvements to the water system, improvements in the fire department equipment and personnel, enactment of an improved building code, and inspection services covering construction.

All the wells that have been drilled in Rolla for the city, except the first well at the power plant and Well #1 on Seventh Street, were drilled and equipped by the Layne Western Company. All well locations and specifications were also approved by the Missouri Geological Survey (later by DNR) and the State Board of Health.

All wells in Rolla, except Well #11, have been drilled with cable tools. This consists of using a long steel drill stem approximately 5 inches in diameter, with a sharp edged bit on the end, and lifting and dropping this stem and bit by a steel cable to cut its way through rock and dirt to the well depth. Well #11 was drilled by the air rotary method with detergent additives to wash the drillings out of the hole. A hollow drilling stem with a sharp edged bit on the end is rotated, and the detergent pumped down the inside of this drill stem and up and out on the outside of the stem. Many advantages are claimed for this method, but because of their technical nature and length, are not included in this history.

Water samples from all the wells, and the distribution system, are continually checked by the Missouri Division of Health, and the analyses have shown Rolla water to be pure and of high quality. Periodically, they also do a chemical analysis of the water.