

A topographic map of the Aztec region in New Mexico, showing a network of rivers and streams. A large, stylized blue lightning bolt graphic is superimposed over the map, starting from the top left and extending towards the bottom right. The title 'Kini-K'eel' is at the top, and 'Currents' is written in a large, bold, black font across the lightning bolt.

# Kini-K'eel

# Currents

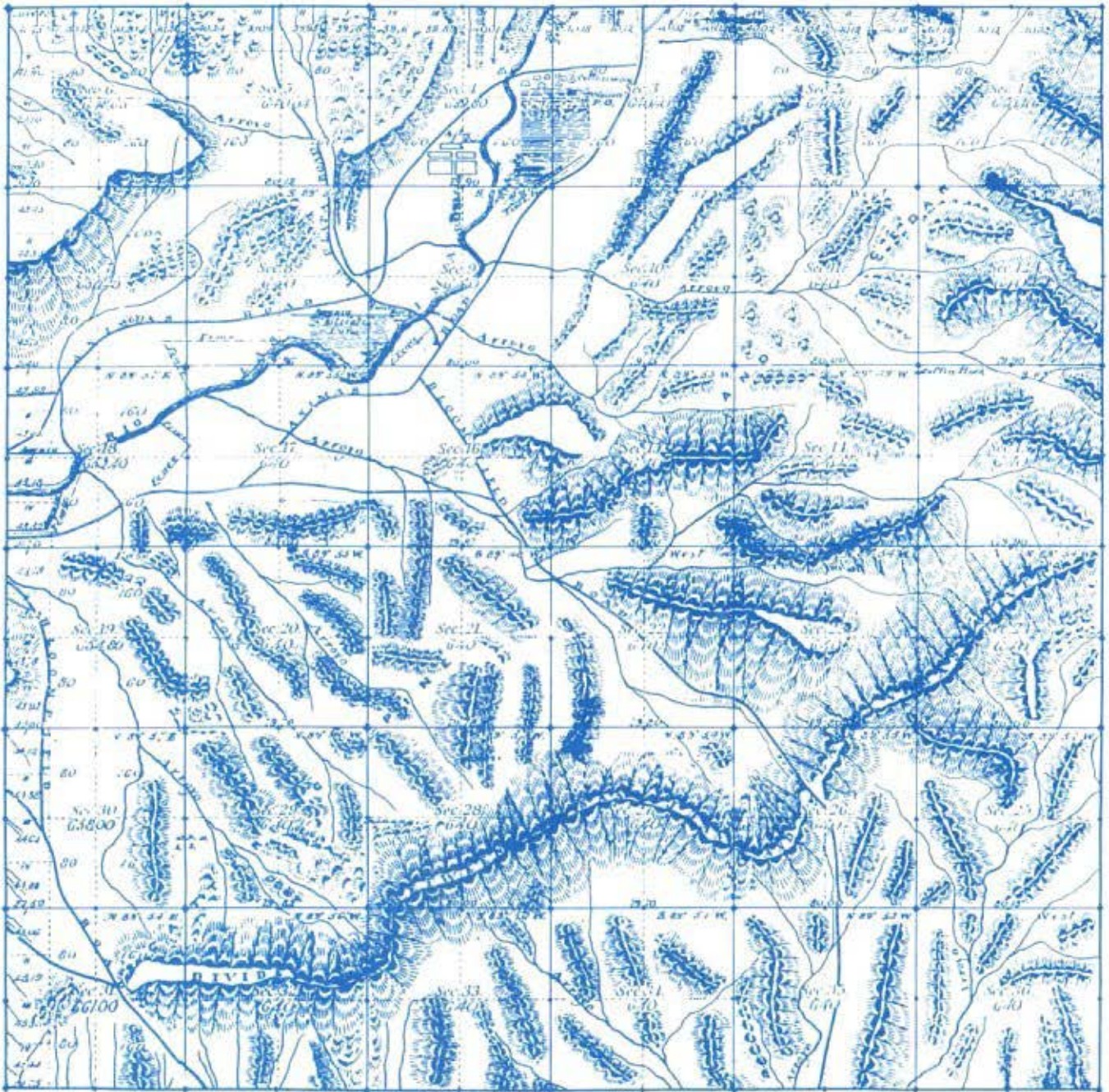
**An Electrical History  
of  
Aztec, New Mexico**

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By  
Tommy Bolack

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***Original 1877 (Aztec) Township (T30N, R11W) Survey filed in the U.S. Land Office in Santa Fe in 1881. The original is still at the Bureau of Land Management in Santa Fe.***

(Courtesy Bureau of Land Management – Santa Fe)

# **Kini-K'eel Currents**

## **An Electrical History of Aztec, New Mexico**

by  
Tommy Bolack



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3901 Bloomfield Highway  
Farmington, New Mexico 87401

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## ***Preface***

When Tommy Bolack stopped by my house to ask if I would look over (did he say edit? I don't remember) something he had written, the thought that crossed my mind was, "What's he done now?"

It wasn't by way of lament but rather, of wonderment. I had begun to realize some time ago that his talents are extensive indeed. Probably yet more than he himself may realize as a matter of fact.

What he handed me was a 36 page script, typed single space. My young friend had performed some rather extensive research and written an inter-woven story of the dual development of our Four Corners area up from pioneer days and what he likes to call "the art," the somewhat mystical force we know as electricity.

Reading the script one becomes more keenly aware of the part power — in this case electrical — plays in our daily lives, and how impoverished we would be without it.

Anyone who has had the guided tour through Tommy's Electromechanical Museum, located on the Bolack B-Square Ranch just south of Farmington, won't be surprised at the author's encompassing knowledge of electricity, but the research effort made in digging up area history is impressive by anyone's standards.

***Kini-K'eel Currents*** deserves a place in all area schools, libraries, and on desks of the various city administrations in the four corners. Not to mention bookcases in all homes where the value of history is recognized.

— *Dwight Payton*

## ***Introduction***

Since the beginning of time, a liquid we call water has been a prerequisite for life. Falling upon the alpine reaches, it thus begins its long journey to the sea, many hundreds of miles away.

It is by these thin ribbons, called rivers, that all civilization clings to for life. The **current** of this moving water would, in time, also produce something as seemingly vital to life as water itself – electricity.

***Kini-K'eel Currents*** is a story of electricity in Aztec, New Mexico. It strives to help us appreciate the people and lends awareness of the circumstances involved in electrical development. It gives reason for pride in our heritage and optimism for our future.

Development of this 'art' is but a small part of the overall picture, which began as a small independent and grew into an overall unified effort. It is this writer's hope that we may all continue to come together and as a whole, work for the common good.

This work is dedicated to the residents of the San Juan Basin who strive to make our lives better.

## ***Acknowledgments***

The author gratefully acknowledges the following who helped “pick up the pieces,” and hopes that this work will help to uncover many more:

Aztec Museum and Suzanne Belt  
San Juan Historical Society and Marilyn Shaw  
Farmington Daily Times  
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City of Farmington  
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Cecil McGee  
Garrison Graphics, Inc.

*“In our valley we call Aztec,  
Water’s current – many centuries known,  
From a recent beginning has lasted,  
**Kini-K’eel Currents will forever flow.”***

— *Tommy Bolack*

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# Chapter I

## On the Horizon

Derived from the Greek word for amber, the phenomenon of electricity has reportedly been described since the birth of Christ. Rubbing a piece of natural amber would cause it to attract small particles that led to centuries of speculation as to why. Through names such as Gilbert and Sir Isaac Newton its effect on different materials and the small scale production of 'static' charges continued.

In 1705, Francis Hawksbee communicated the first light, electrically produced by his 'mercurial phosphorus' which could be accomplished by mercury upon the sides of a glass vessel. Stephen Gray some twenty years later would prove the conveyance of electric charge from one body to another and coin the term 'conductor.'

Benjamin Franklin, Galvani and Volta experimented with collecting charges in sufficient quantity that they could be stored and possibly be put to practical use. In 1809, Sir Humphrey Davy accidentally pulled a wire from a 2,000 cell connection, the largest at the time, with the ensuing blinding flash being a crude beginning of practical light. The path of this jumping light takes the form of a bow, hence the name 'arc.'

Although awareness of electricity, a flow of electrons through a conductor, has been with man for several hundred years, its practical use only dates back to the mid-nineteenth century. Thomas Edison employing his electric lamp, perfected by the late 1870's, along with the successful carbon arc lamp would be the 'spark' giving birth to this new industry. As with a new science, development was slow; however, no one could have imagined then to what magnitude it would eventually grow. The idea of harnessing and distributing this energy in the United States came about in the early 1880's when Edison's Pearl Street Station in New York began operation in 1882. This system of direct or continuous current would operate both incandescent and carbon arc lamps. Because of the high currents and low voltages generated, the system was limited as to the area in which this energy could be distributed, being one of its biggest drawbacks.

This science, as with most pioneering, took place in the east and one would think that we 'out west' people would lag far behind. This case, however, would prove to be different as our attention need not shift more than one hundred miles to the north. The early mining days in Colorado brought prospectors, machinery, men and ideas to the rich deposits of metals on the western slope. With the railroad reaching Durango in 1880, and discovery of gold in 1885, southwestern Colorado with its rail and telegraph seemed only initially a step away from eastern civilization. The bustling town of Durango must have seemed like a diamond in the desert as the direct current electric servant was put to work there in 1887, only five years after the Pearl Street Station. This most unlikely place for development was soon to see a chain of events unfold that would attract worldwide attention, thus revolutionizing a new industry.

Many of the precious metal ore 'veins' outcropped high on the hillsides, some even above the timber line, making transportation of equipment and supplies difficult. Fuel for the boilers that would operate machinery for the crushing and milling of ore was obtained by close-at-hand wood. As time went on trees were cut with the fuel getting further away, making it and coal transportation more expensive, forcing many of the mines to close and many more to consider the same.



A 28-year-old lawyer, Lucien Lucius Nunn, came to Colorado in 1880, settled in Telluride and noticed the plight of the mining industry. The area abounded with swift running streams, a potential source of power, but in the wrong locations. Mr. Nunn saw the energy potential and began acquiring rights to use this energy to advantage in an ore stamp mill he operated. The Gold King Mine, perched at two and one-half miles elevation on Palmyra Peak, was one such operation on the verge of bankruptcy by virtue of fuel costs as nearby timber had been exhausted.

In a nearby valley, 2,000 feet below, ran Howards Fork of the San Miguel River with numerous falls of several hundred feet. Nunn had studied various means of power transfer: direct current electricity, cable drive and hydraulic; however, with a two and one-half mile distance these were impractical. Electricity seemed to be the only possibility, but with the common practice saying on direct current; "Take a bucketful at one end of the block and by the time you get to the other end you've got no more than a cupful," this too was doubtful. Thomas Edison himself had also made the comment that his direct current was "not yet perfected, enabling it to be transmitted long distances."

Electricity, the flow of electrons through a conductor, can be compared to water through a pipeline with voltage being the pressure and the current or amperage being the volume. The effective power transfer is the product of the two and to get more power either the current, the voltage, or both must be raised. The close proximity of generator windings and the crude insulating materials of this time limited generation to low voltages. The high voltage needed for long distance transmission is too high to be safe in the home or at the point of use. Direct current was extremely hard to change or 'transform' voltage, with any efficiency. The new current that was about to be used would certainly change that.

The true application of electricity in industry owes its credit to experiments by Orsted and Faraday on the rotating magnet generator or 'magnetolectric machine' later called a 'dynamo.' The dynamic or continuous current produced by these was of the direct current type. No one knows who at the Vienna Exposition of 1873, picked up some live wires that were connected to a running dynamo and connected them to an idle machine. That machine began to turn, thus being the first electric motor and was discovered purely by accident.

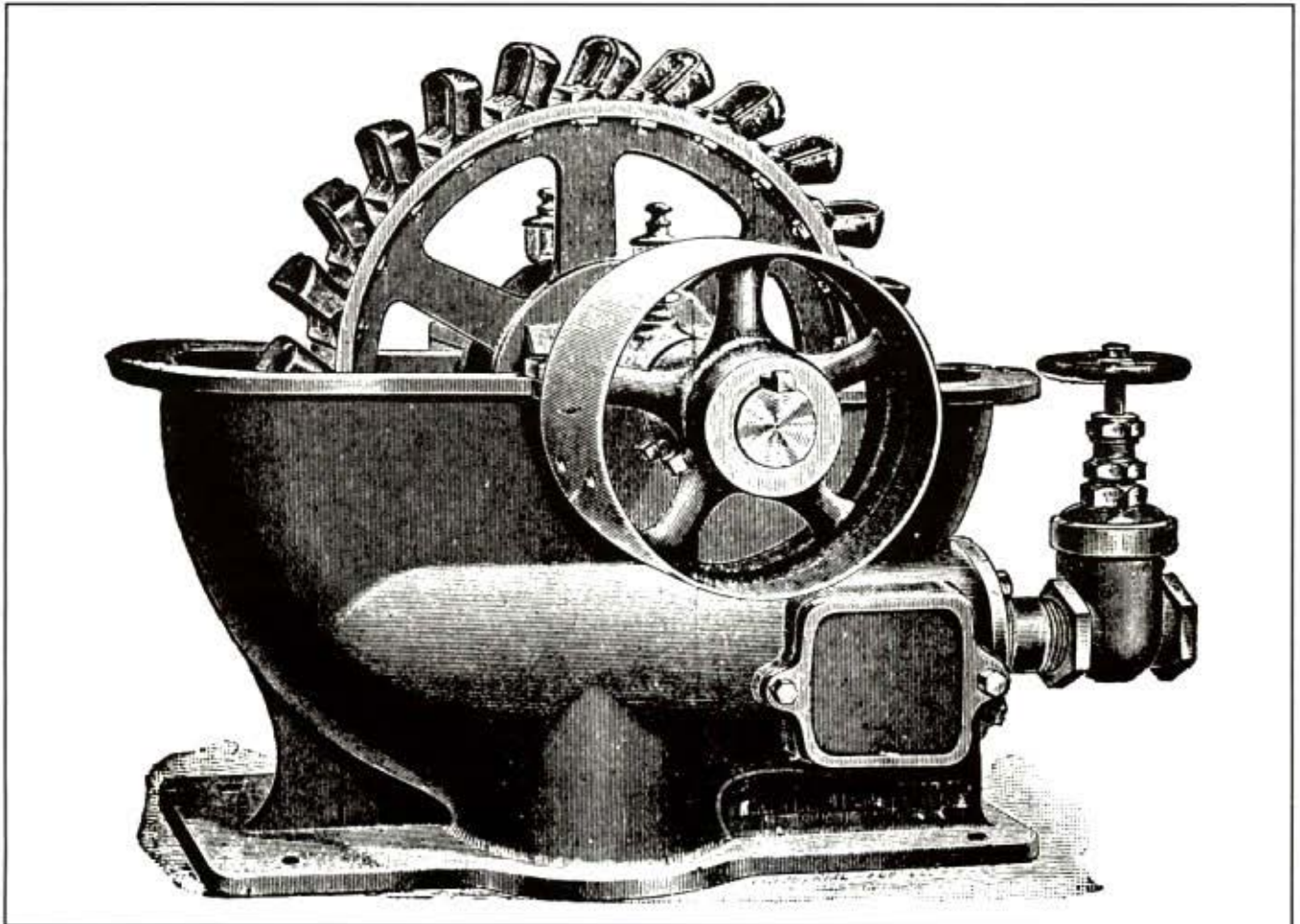
To describe an electric generator one needs to think of an electric motor operating in a 'reverse mode.' The process begins with mechanical energy being provided by a turning shaft to a small 'exciter generator,' which contains small permanent magnets, producing a low voltage direct current. This output is connected to the magnet coils of the main generator which is also rotating. The resulting magnetic field pushes electrons along a path, thus producing electricity. A resistance, which can be varied, is placed in the circuit between the exciter and main generator to adjust output voltage. To summarize, this unit simply converts mechanical to magnetic, then magnetic to electrical energy.

Nunn had heard of experiments by a man named George Westinghouse, labeled a 'crackpot' by Edison, on a new fangled 'Westinghouse' or alternating current for which he was developing devices for this yet to be tried idea. Westinghouse claimed that this current could be generated, transmitted over long distances, and the voltage changed or 'transformed' easily. Lucien and his brother Paul worked to 'sell' Westinghouse on the Colorado project, who was not absolutely sure of even his own creation: however, a large sum in gold coins quickly changed his mind. These three men formed an alliance and began construction of a generating plant. The skepticism of many almost caused the project to fail. Fortunately, a new gold strike in 1890 again stoked the fire, although skeptics



refused to believe that electricity would travel the nearly 3,000 feet uphill and that 40 degrees below zero temperatures would allow it to flow at all. That, along with hearing the speed being 186,000 miles per second and that the current traveled back and forth hundreds of times per second, made staunch disbelievers.

The Ames Plant would capture the energy of falling water by use of a pelton wheel, belted to a 100 hp, 133 cycle, 3,000 volt generator. This single-phase current was then to be transmitted a distance of 2.6 miles to an identical motor at the Gold King Mine. This



*Typical 'high pressure' pelton wheel used to provide power for electric generation.*

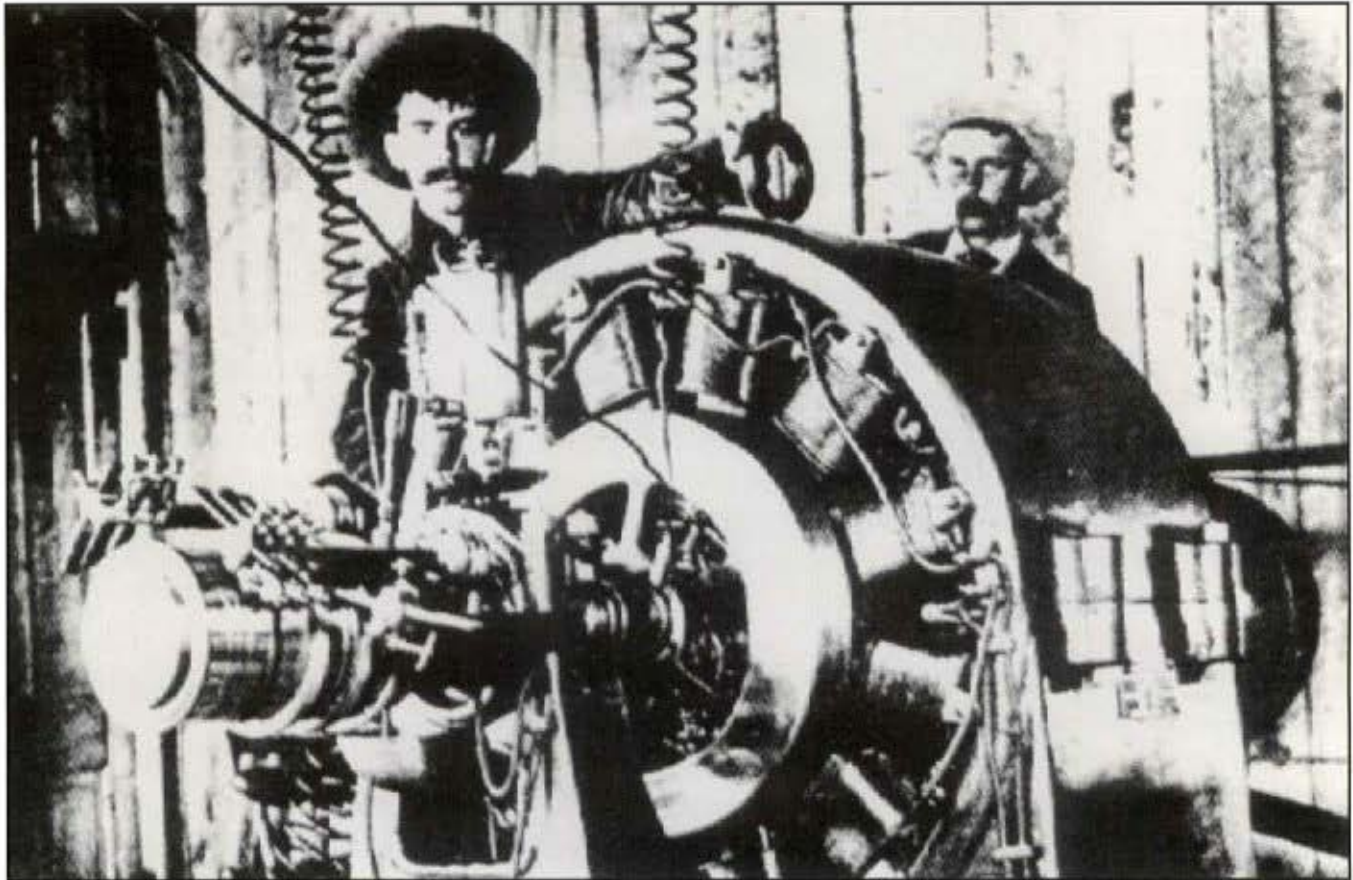
seemingly 'impossible' feat, accomplished in 1891, was the first electric transmission by alternating current in the world! These men certainly were creators of an industry and an education program putting our area on the map. Little did they know to what extent this industry would grow in the next one hundred years.

The renewable and seemingly endless power of water was now available at the most efficient locations with transmission lines carrying it to the place it was needed. Other towns such as Silverton, Rico, Ouray, Montrose, and Durango, were replacing their old D. C. systems with alternating current. Demand was high for the new equipment and even Edison remarked that his company (General Electric) would make and sell equipment for "their folly regardless of how short lived it might be."



The incandescent lamp would be used as an initial device, which in the home, would be followed by scores of other such inventions over the next hundred years. The “incandescence” is produced when an electric current passes through a fine wire or ‘filament’ of carbon or tungsten. Since this material is a poor conductor, this friction produces heat, and in turn, light. Since the glass envelope maintains an atmosphere void of oxygen, the filament will burn for a considerable length of time.

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### **they jeered, then cheered**

*People in the 1800's on Colorado's Western Slope just plain didn't know about this thing called electricity. The collective attitude was one of skepticism and ignorance.*

*For example, during the initial operation in 1891 of Ames plant, it was not uncommon for a large Sunday evening crowd to gather to watch the oft' times spectacular start-up of the machinery, shutdown the night before the Sabbath Day.*

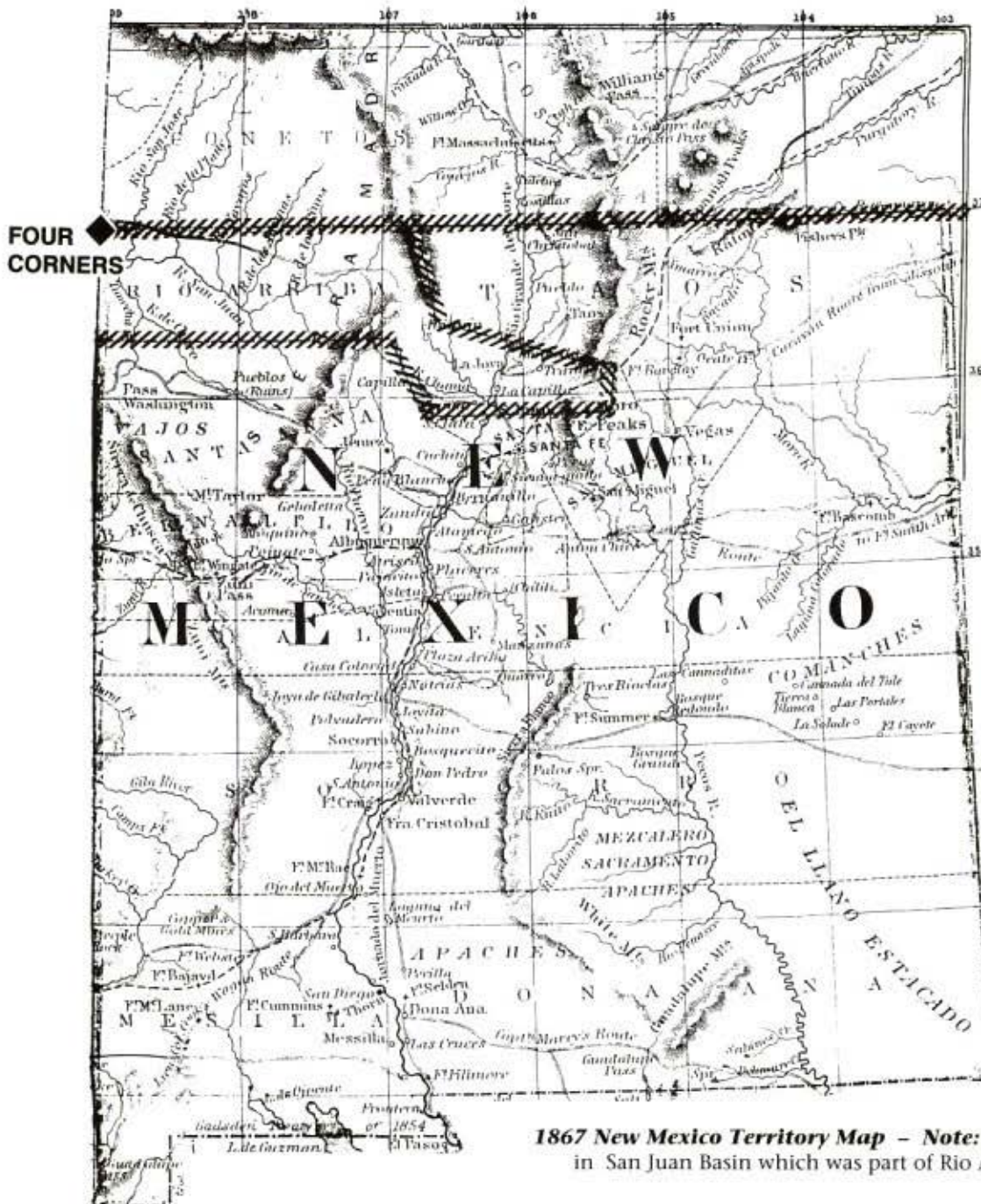
*Visitors would ask innumerable questions. A favorite was: "How long would it take the current to travel from Ames to Telluride, eight miles away?" Miners and other frontier folk were not backward in expressing doubt that it was impossible for anything to travel 186,000 miles a second. Some of the boldest were even willing to bet they could take hold of the return portion of the circuit and let go before the return current got back. Needless to say, the experiment was never demonstrated.*

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# Chapter II

## Down River

During the mid 1870's, a farmer from Pennsylvania, Joseph Howe, homesteaded near a large Anasazi Ruin, abandoned centuries ago. With the thought these might be ancient ruins of the 'Aztecs' of Mexico, the ruin and hence the nearby settlement was named Aztec. The early Navajos had a more fitting name calling it Kini-K'eel, meaning oblong house, as these walls were straight, not round. In 1878, a territorial post office was moved down the Animas river from Wallace to a settlement called Aztec and located in John





Koontz's store and stagecoach stop. An attempted development on the south flank of the ruins was attempted as Santa LuLu in 1888, in which John Hartman, who preferred this name to Aztec, offered 100 lots free to anyone who would build. This writer has found no clue as to why that name was chosen or why the giveaway did not succeed.

In 1887 the New Mexico Territorial Legislature created San Juan County, from the western part of Rio Arriba County and the Aztec hospitality shown to Governor Ross's assistants certainly helped in obtaining the temporary county seat location. The Aztec Townsite Company laid out the original townsite in 1890, the same year an election was held to select county officials and permanent location of the county seat. Junction City received the highest number of votes but had no building available. Aztec, with the second highest, refused to yield the records, even after Junction's building was nearly complete and records from Tierra Amarilla, the former county seat, mysteriously appeared at that site. Judge E. Seeds issued an order in 1891 to move the seat to Junction but after a year long court battle and recount of the votes the State Supreme Court gave Aztec the coveted seat, creating a rivalry that would, unfortunately, endure the test of time.

The coming of an age was slowly unfolding with telephone service established in 1903, and an extension of the Denver and Rio Grande Railroad in 1905 to Aztec and Farmington. The Rio Grande won out in a battle involving the Southern Pacific as to who had rights in the area.

Over the period 1900-1904, impressive plans were laid out by three other railroads that would have made the area a 'railroad center'.

In 1922, a proposed Stanley Electrified Railroad would have connected Pinal County, Arizona to Durango and Cortez, Colorado with hydroelectric plants to be built at the river crossings to provide the electric power. These, along with other railroad plans, were never realized.

What had been a day's stagecoach ride was now reduced to a phone call or several hours by rail to Durango, a seemingly mystical city with horse drawn street cars and modern electric lights. Many Aztec residents, reading by coal-oil lamps, certainly must have wanted a little of Durango here at home. In this desert environment the overabundance of water would soon play a pivotal role in events about to unfold.

In the Aztec area water from the Los Animas River had been diverted for agriculture since the mid-1870's. As in many small settlements this same water usually ran a local mill for making flour via one of these constructed ditches or an enlargement of one of them. This made available part of the basic machinery as a power source for generating electricity. Second hand direct current and high frequency alternating current generators were fairly easy to find with the biggest investment with starting an electric company being the wire, poles and light fixtures. Wire was expensive and poles had to be cut and hauled from the Bayfield area and with the mill over three quarters of a mile west of town added even more material. With Farmington's lights coming on in 1902, many Aztec residents probably wondered when it would be their turn. Financial problems and operating nightmares of the Farmington Plant probably convinced many of the difficulties involved in starting one up in Aztec, and particularly in keeping one operating. At this time there were around 3,000 central lighting plants in the United States.

The Eledge Ditch, one of the first in the area, was constructed in 1876 to divert around 35 cubic feet per second called second-feet for the irrigation of lands between Aztec and Flora Vista on the Animas Rivers' north side. In 1898, Charles N. Trew enlarged a 3,800



foot section of this canal from the heading near Aztec Ruins to a point near the south end of today's Light Plant Road. This would carry an additional 23 second feet to provide power for the flour milling operation with the enlarged section known as the Trew Mill Ditch. The machinery was known as a roller mill for the cleaning and grinding of grain to make flour.

Upon the death of Charles Trew, Monroe Fields acquired ownership with a stipulation that the water be used for milling for at least two years. In August 1901, Frederick E. Hyde, Jr. purchased the mill for \$3,500 along with the same stipulation. The Aztec Roller Mill came into the hands of H. Mosley and eventually, J. S. Hartman. This came about as the Hyde Exploring Expeditions of New Mexico, incorporated in 1902, by Fredrick Hyde, Jr., Benjamin T. B. Hyde and Richard Wetherill, as agent. Within a half-dozen years it became drowned in financial obligations, forcing sale of the mill property. This group was responsible for a large number of excavated Anasazi artifacts in the area.

W. Goff Black came to Arizona to construct a flowering mill and became Justice of the Peace. In 1896, he moved to Fruitland, New Mexico, and constructed a mill there also, and as a homesteader, obtained a patent on a 32 acre tract of land. He later moved to Aztec. As an enterprising young man he looked upon the lower Animas Valley as a possible 'Land of Eden' and saw great potential for agricultural and power development, just as Lucien Nunn did in Colorado. A business and financial mind netted him the County treasurer's post and ex-officio collection officer. With rail, telephone and telegraph service established along with formal town incorporation in 1905, Mr. Black surely felt good about Aztec as a home base. The incorporation petition to the County Commission on January 4, 1905, stated that there were now "more than 200 inhabitants," making it eligible for consideration.

The first 'electric convenience' was in a form offered from outside by the Colorado Telephone Company of Denver. In 1903, it was established with 40 subscribers in Aztec and 150 in Farmington, which was designated as the central exchange. Mrs. Parrie McClure was Aztec's 'hello girl' with the company offering county wide service with no toll charge. A toll line was run to Mancos, Colorado, in 1903, and soon to be number eight copper lines to Ouray, Rico, and Cortez.

Marshall C. E. Noble had the only telephone that was provided by the town.

The company applied to the town trustees several times during the period 1908-1910, to obtain a franchise but records show none was ever granted. The Colorado Telephone Company became the Mountain States Telephone and Telegraph Company in July 1911. Finally in 1937, Ordinance 65 granted a Franchise by which "One free phone will be provided for every 2000 population and is for town business only."

## THE TELEPHONE



Is a Time-Saver. Therefore it is a Money-Maker. It puts you in instant communication with any one of many thousand people. Try a TELEPHONE in your residence .....

THE COLORADO TELEPHONE COMPANY.





*Colorado Telephone Company line construction employees pause for a photo. Note: 'original' Aztec Railroad Depot in background on the right.*

(Photo courtesy Virginia Whitney)



## Through Unproductive Territory

The building up of a comprehensive telephone system requires the construction of a network of long lines connecting every exchange with every other exchange.

In this western country this means crossing wide barren stretches of desert plains and negotiating rugged and treacherous mountain passes.

Nowhere in the civilized world is this task fraught with more difficulties, more construction problems, or more human hardships than those which appear in the territory which we serve.

Nowhere else is construction so expensive and nowhere else is the maintenance cost so high.

And yet these long distance lines, often crossing miles of unproductive territory, are absolutely necessary to make your telephone service comprehensive, complete, and therefore valuable to you.

## The Mountain States Telephone and Telegraph Co.

1915 Newspaper Ad.

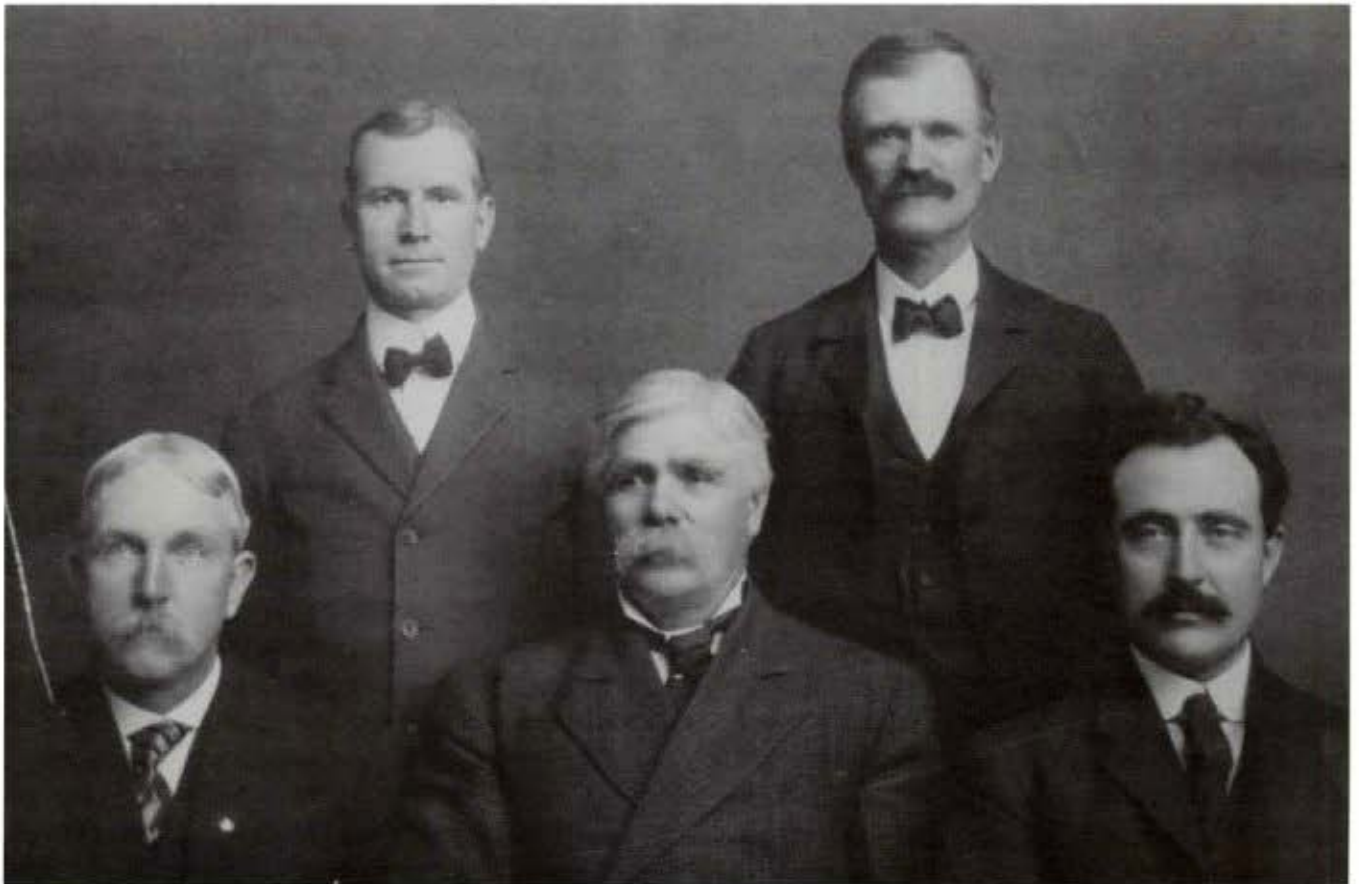
## Chapter III

# 'Eden' Plans Fail

In November, 1906, H. Matheson and G. E. Challen, electrical contractors of Durango asked the town trustees for an electric light franchise of ten years. They claimed eighty days to operation with the following rates per month: lamps of 16 candlepower – 75 cents; two – \$1.40; three – \$2.76; four – \$3.30 and five – \$4.00 or by meter rate at sixteen cents per kilowatt hour or about "one cent per hour." If the town takes five – 2,000 candlepower arc lights at \$80.00 per year per light, it will be given one free. Power would be on from dark till midnight with additional time at four cents per hour per light.

The plant was to be built by Lafayette Current's bridge in Aztec and would also later 'force' water to a reservoir above the town for a waterworks. This proposal included running a line to Farmington and doing away with the Farmington plant, "as they propose putting in an alternating current with transformers so that lamps 50 miles from the generator will give just as good lighting as the ones at the plant." Records show this group's plans never got off the ground.

Mr. Black, seeing the possibility and needing the financial resources, joined forces with two Denver men, Edwin Jones and Arthur Pondsford. This group worked on plans for an



*Aztec Town Board of Trustees during formation of Aztec Light and Power Company. Left to right, E.S. Whitehead, Charles Bailey, Mayor C.G. Brewer, Lafayette Current and E.P. Wilson.*

(Photo courtesy Aztec Museum)



electric light plant for Aztec along with a massive canal for irrigation. They made application for, and in May 1908, were granted, a franchise for lighting the town, as Ordinance 20. This was approved by Town Trustees: C. Brewer, C. Bailey, Lafayette Current, P. Wilson, and E. Whitehead, granting the Eden Canal Land and Power Company a twenty year franchise.

The franchise had some interesting rates and requirements such as 80 cents per 16 candle-power lamp per month or 15 cents per kilowatt hour if metered with \$1.90 meter rental and a \$1.70 minimum on usage. Two thousand candlepower arc lights would cost the town ten dollars per light per month and with every three ordered, a fourth would be provided free.

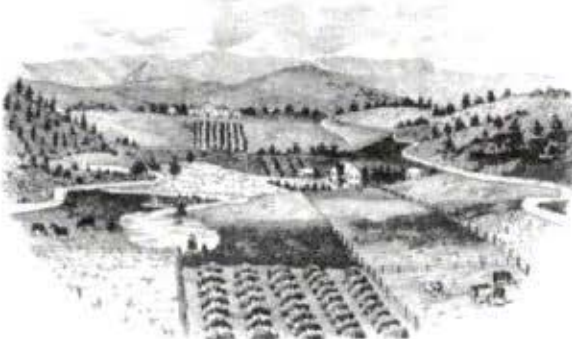
Lights were required to be on at dusk and burn till midnight for every night for 20 years. The town reserved the right to review and adjust rates after five years and had an option to purchase the system in ten years. A \$1,000 penal bond was required as guarantee that work would start in ninety days with completion of the project in one year. By March 1909, problems had arisen, putting construction far behind, for which town trustees made note, but were willing to grant an extension and remain in possession of the penal bond.

# THE EDEN CANAL-LAND AND POWER CO.

THE LAND OF ETERNAL SUNSHINE

**CAPITAL**

NORTHERN NEW MEXICO'S IRRIGATED LANDS ARE PAYING FROM 20 TO 100% ON THE INVESTMENT EACH YEAR FURNISHING EDUCATION AND PROSPERITY TO ALL



**\$1,500,000**

FRUIT,  
HAY, GRAIN,  
SUGAR BEETS,  
CATTLE,  
HOGS, CORN.

40,000 ACRES FRUIT LAND

OFFICE OF W. GOFF BLACK, PRESIDENT

**AZTEC, NEW MEXICO**

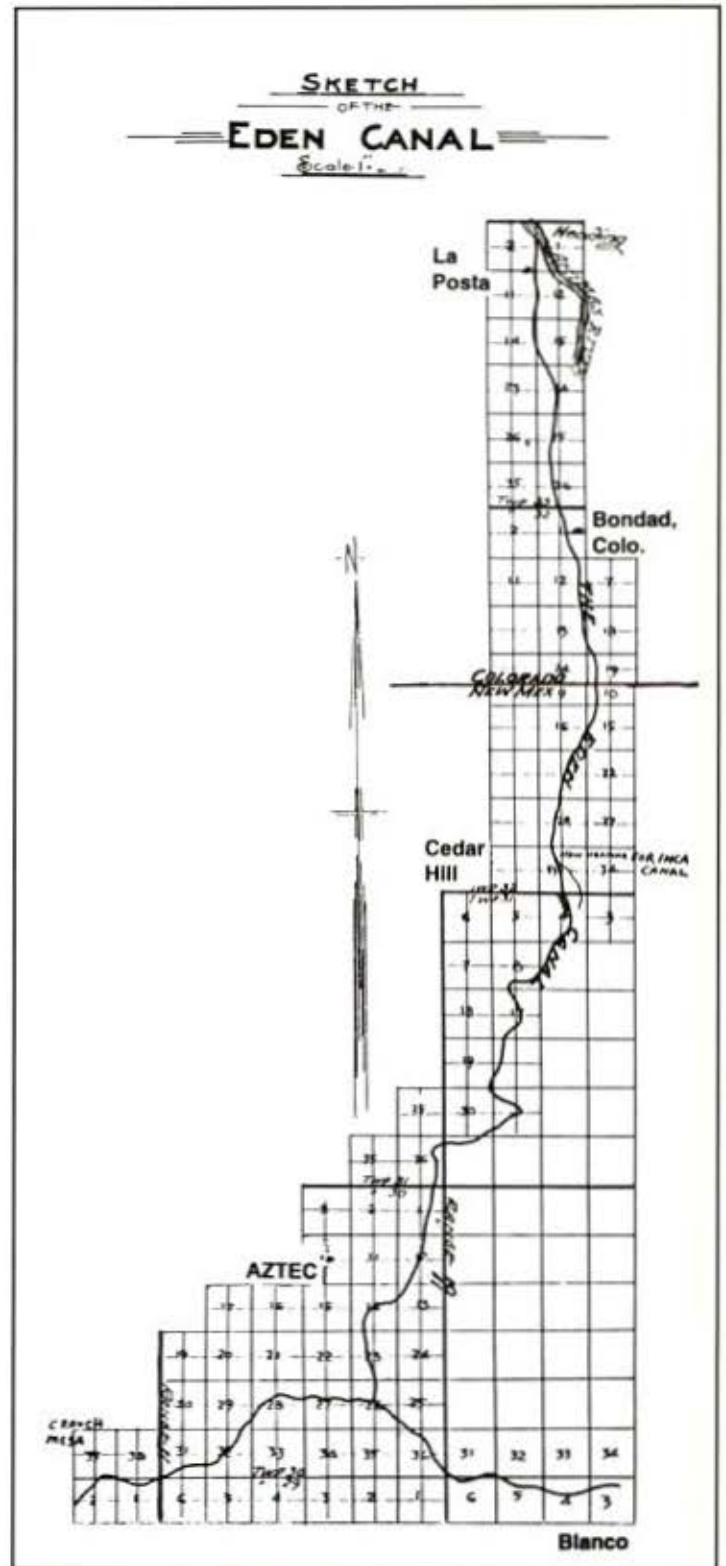
These negotiations were but a small part of the activities of the Eden Canal Land and Power Company, which was incorporated in March 1909, with a capital of \$1,500,000. in Denver, Colorado. The Eden Canal Project, almost unbelievable in scope, would divert 750 second-feet of Los Animas water near La Posta, Colorado, and its 32 mile main canal and two 15 mile laterals would provide irrigation and water power for some 60,000 acres in six townships. Hydroelectric power would also be provided for Cedar Hill, Bloomfield, Aztec and Farmington through this canal, along with domestic water for these communities.

An application for appropriation was made to New Mexico Territorial Engineer Sullivan in 1907, under permit 40, soon after the 1907 Water Act requiring a license to divert water. An article in *Colorado Magazine* talked of Mr. Pondsford, Mr. Jones, and Mr. Black as "proposers of the largest project in the United States in 1908." Even today the scope of this

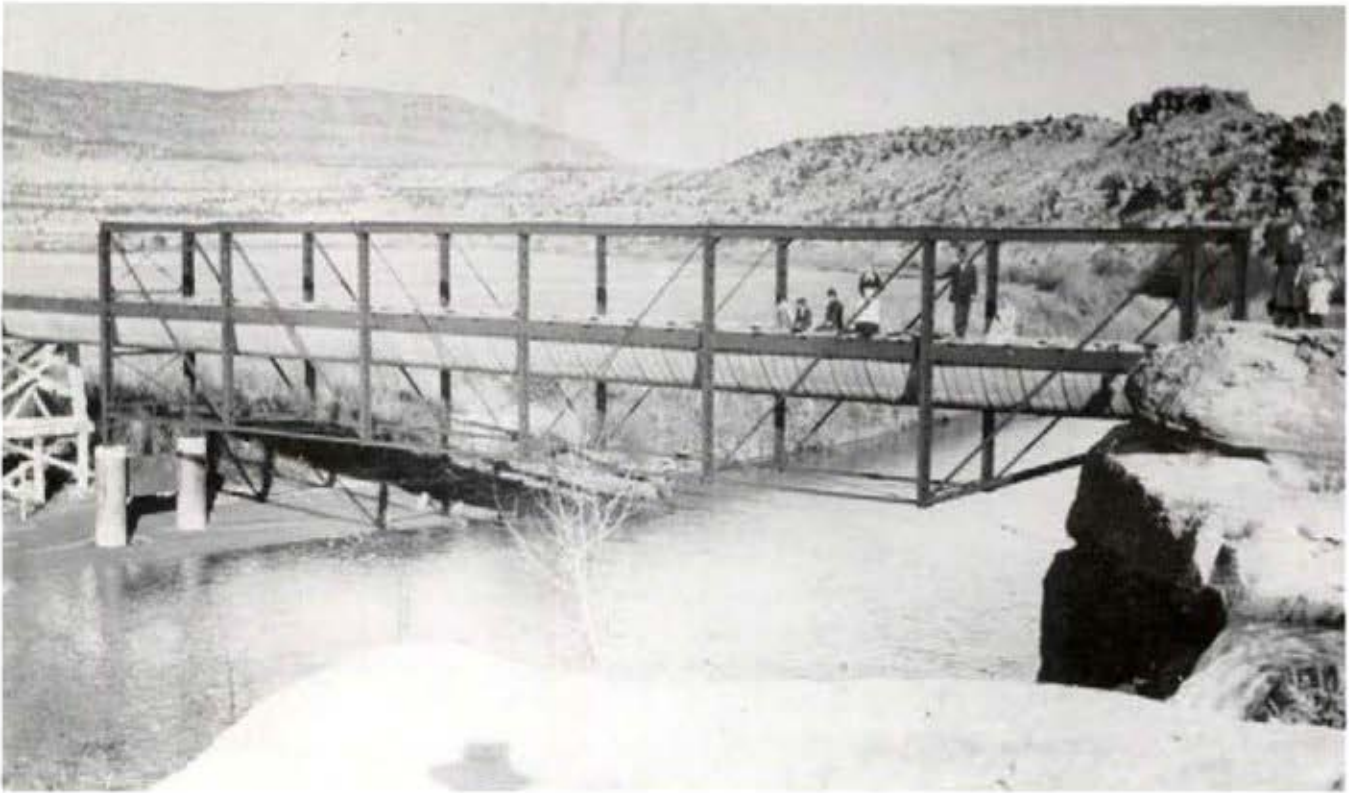
undertaking simply boggles the mind, as one can only imagine how much different the valley would have looked today had that canal been built, as the entire Crouch Mesa would have been under irrigation.

Word of this upcoming project worried many downstream that this large diversion would take all the Animas River water and resulted in a suit being filed in 1910. This questioned whether the New Mexico Territorial Engineer could appropriate water within the State of Colorado. One year later a Supreme Court decision of *Turley vs Furman* ruled the appropriation invalid, sealing the fate of the Eden Canal. Two other projects, namely the Standard Ditch and Black-Pondford Ditch, would also later prove to be doomed.

Undaunted, this group set out on a plan to divert waters in New Mexico at Cedar Hill. Application was made for 250 second-feet as the Inca Ditch in 1911, with this 'watered down' plan only to irrigate 25,000 acres and cost \$150,000. An effort was made to construct this canal eventually providing water as far south as Hart Canyon. However financing, numerous construction problems, and reportedly falling short on elevation to reach Crouch Mesa soon doomed the two-thirds completed project. Much acclaim was given the construction of massive flumes crossing rivers and the boring of tunnels hundreds of feet in length. At a point north of Aztec was to be a reservoir to provide a filtered water supply for a gravity fed waterworks with the "water level 125 feet above Main Street." This would have given approximately 55 pounds pressure. This canal would have been operated by the newly formed Aztec Irrigation Company with G. S. Willhoite as engineer. A portion of this canal above Hart Canyon continued operation for a number of years.







***River crossing of Inca Ditch Flume near Cedar Hill around 1912.***

(Photo courtesy McGee Family)



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***Picture of W. Goff Black taken around 1910.***

(Photo courtesy Aztec Museum)

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## Chapter IV

# Kini-K'eel Glows

Despite the bad news on progress of the big plans, the Aztec electric plant was slowly moving ahead with the Aztec Light and Power Company being incorporated on August 14, 1909, with a capital of \$20,000. Earlier that year these interests had been transferred from the Eden Canal Land and Power Company to Edwin D. Ridley of Denver, who at the time of Incorporation was 75 percent owner. W. Goff Black, as agent, owned 20 percent and Ward A. Wilson having 5 percent, with the principle office being in Aztec, NM. It was reported that a few houses had been wired with the earlier unrelated 1906 proposal of a light company, anticipating its arrival in 1907.

Construction on the electric plant itself began in October 1909, as soon as the irrigating season was over at the already in place Aztec Roller Mill site. A small amount of work was needed on the flume and in belting the 35 kilowatt, 250 volt direct current generator to the mill shaft that would use the millworks, for generating electricity when the mill was not operating. The previous months had seen the setting of 25 poles in town to suspend the arc lights in the center of street intersections and serve the dozen or so homes and businesses connected and ready.

An arc light is a device using carbon rods about one half inch in diameter by fourteen inches long. An electric current is passed through them forming an arc where the ends touch, producing a light similar to a welding arc. These rods burn away at approximately one-tenth inch per hour making replacement or 'trimming' necessary every week or so. The fixtures were suspended by rope and pulleys in the center of intersections and could be lowered for cleaning and rod replacement. The same type of arc light is still used today in large search lights and movie house projectors. An interesting part of an article carried in a November 1909, Aztec newspaper reads:

*"Mr. Ridley of the Electric Light Company is staying close to the electric light plant these days as he fully expects to have the town of Aztec lighted within the specified time. A few of us are only waiting patiently when we can bid defiance to 'Jawn D.' and let him convert our part of his oil into butter, since a pound of butter is now worth one and one half gallons of oil. Electricity is one of the elements 'Jawn D.' can't corner."*




**A carbon arc light fixture of the same type used in Aztec. They were in widespread use from 1895 until 1929.**



Aztec Barber Shop owner Ray D. Current, soon to be arc light 'trimmer', was anxiously waiting, with the first electric lamp in his business, the soon-to-be flow of 'current.' The town trustees were also awaiting the moment and in mid-December ordered four arc lights and worked to solicit funds for two more. With the free lights included, the town would initially come on with a total of eight. The waiting continued as cold temperatures in December slowed the setting of final poles with the day before Christmas *Review* reporting that "a full force of men were working to get lights on by the first of the year."

W. GOFF BLACK, *President*  
 WARD A. WILSON, *Secretary*  
 E. D. RIDLEY, *Treasurer*

## The Aztec Light & Power Co.



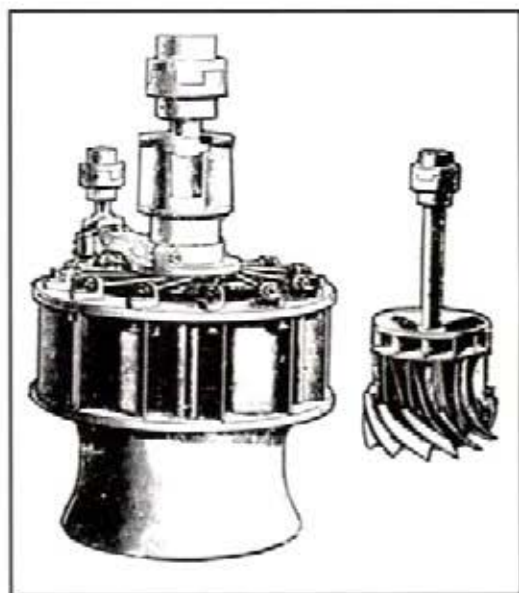
*1910 Newspaper Ad*

soon be overloaded. To make things worse the winter freezeups and mechanical problems became almost like a plague. The numerous 'dark nights' as noted by the town trustees were pointed out and quickly deducted from the monthly billings. If the new company was to succeed it simply had to improve its lot and look into the future. The little plant at Farmington was similar to Aztec's but by this time an alternating current system had been installed there and was reported to be much more reliable.

The Aztec Light and Power Company purchased the Aztec Roller Mill and borrowed \$4,000.00 from a Durango bank in March 1910. With assistance from J. A. Clay of San Juan Power Company in Durango, a plan was laid out by which the plant could have dedicated machinery for electric generation only by the installation of a new Samson turbine. The second widening of the Trew Mill Ditch allowed the additional 176 second feet of water, being more than was needed to operate this turbine. Under the direction of G. S.

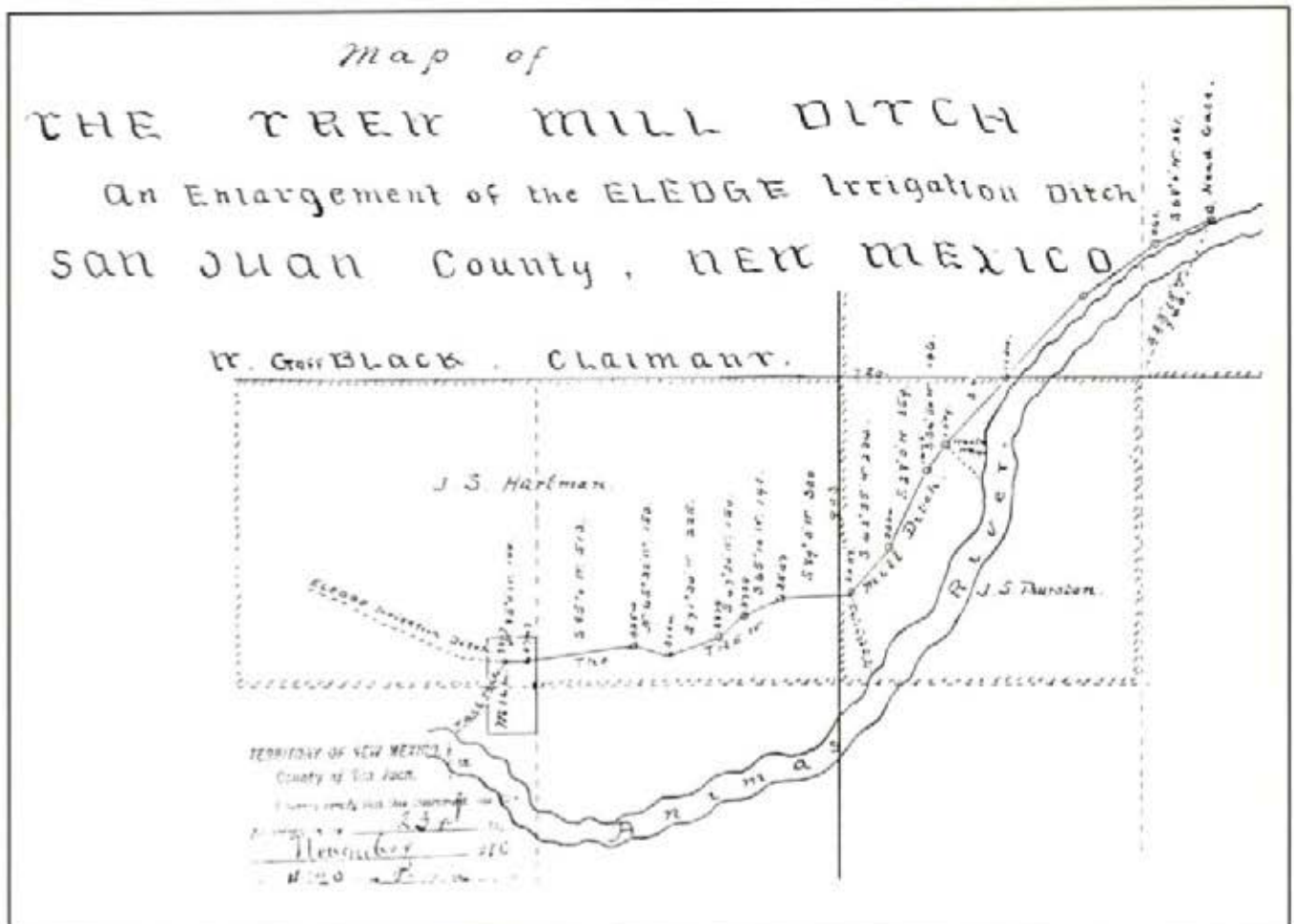
A couple of days into the new year of 1910 finally made true the promise: Ice was broken from the ditch, generator belt engaged, thus producing 250 volt direct current instantly surging along the two wire path, sputtering arc lamps and glowing filaments within gas filled globes with seemingly sunlight brilliance. The elated townspeople celebrated under the flickering lamps somehow forgetting this was a winter evening. It was not too long before the handful of customers had quickly grown to over forty, keeping all concerned busy wiring houses. To promote new patrons the company would wire their houses at cost. As few in the area knew much about this new 'juice,' this service was especially welcome.

Almost from the start it was obvious that the little generator and long feedline would



*Drawing of Samson Turbine in a vertical shaft operating layout.*

Willhoite, engineer for the company, plans were made for a boiler and steam engine for use when the ditch was frozen or otherwise out of commission.



The early days were not easy ones as many townspeople were hesitant to accept this strange new form of energy. Selling the new service resulted in giving it away to new customers for a short time to win them over as patrons. One of the first appliances that helped convince many, particularly the women, was the electric flat iron with the word 'convenience' used freely. In December 1912, the 80 horsepower sixteen thousand pound boiler arrived and by early the following year, the new turbine was turning a 133 cycle alternating current, 1,100 volt single phase generator. The December 1913, *Aztec Review* boasted:

*"Aztec has fine electric power and light plant, flour mill, large sanitarium, good schools, three churches and **NO SALOONS.**"*

Since lights were the only customer load nearly everyone was on the 'flat rate' with metering not coming about till around 1916.

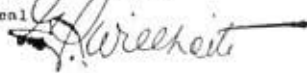
Most water turbines, including the Samson, can be thought of as a pump operating in a 'reverse' mode. Simple in design, the device consists of an outer ring of stationary gates and a central rotating core called a 'runner.' The elevation of water or head, at the Aztec site was around 20 feet, this being the difference between ditch and tail way. Water running through this unit would transfer its energy and turn the runner providing the



## AZTEC LIGHT AND POWER CO.

AZTEC, NEW MEXICO.

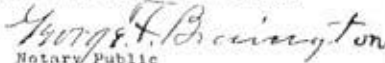
I, G.S. Willhoite, Engineer for the Aztec Light and Power Company having first been duly sworn state upon my oath that the terms of the statement towards the enlargement of the Ellice ditch as outlined in Application No37 0 for the appropriation of water out of the Animas River, San Juan County, New Mexico, Claimant being W.Goff Black, Aztec, New Mexico have been complied with, that a permanent headgate has been constructed, that the full appropriation of water is being carried through the ditch, being used for the development of power for the operation of the Aztec Light and Power Co's power plant and mill.

Seal 

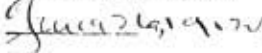
State of New Mexico S.S.  
County of San Juan

On this 13th day of January, 1912 before me personally appeared G.S. Willhoite to me known to be the person described in and who executed the foregoing instrument and acknowledged that he executed the same as his free act and deed

In WITNESS whereof, I have hereunto set my hand and Notarial seal the day and year in this certificate first above written

  
Notary Public

My Commission expires





mechanical energy for milling or electric generation. A governor is connected to the gates, which open and close as load varies, to maintain the proper speed. In summary this unit provides mechanical energy from moving water.

Not always operating, the troublesome arc lights were noisy and often offered a 'waving' or flickering light. As a boy, Joe Hartman remembers playing 'kick the can' by their light and comments "those things sure did draw the bugs." The 2,000 candlepower lights were an extremely bright or 'high temperature' light and would be visible to insects for a long distance giving merit to their bug attracting capabilities. Willa Current Hampton remembers the numerous bats feasting on those bugs. Carbon rods would not melt but would slowly vaporize at 3,700 degrees centigrade, over half the temperature at the surface of the sun, which is estimated at 6,000 degrees centigrade.

The next few years saw the system continue to pick up new customers and in 1918 prompted its first

decrease in rates as reflected in the new charge for arc lights being 25 cents per light per night, roughly a 25 percent decrease. This was certainly needed as the Spanish Flu epidemic had a death grip on the little town that would last over three years, not to mention the country's fear of the first World War in progress. The following ten years would be trying for the company with this period seeing three changes in ownership.

Mr. Black could also see more than lights for Aztec and in 1914 requested, and was soon granted, a franchise to construct a water system for the town, the pumping of which would use some of his electricity. However, it was not until 1924, by a citizen vote of 124 to 66 that Mayor C. E. Rippey would declare water was about to be. Ordinance 33 would require a \$60,000 bond indebtedness to install the waterworks and 25 fire plugs. With the water system nearing completion the following year, Ordinance 33 was enacted creating the Aztec Fire Department.

The spring of 1919 saw the Southwestern Colorado Alfalfa Milling Company purchasing the Armstrong Mill in Durango, Colo. and taking over the mill and Aztec Light and Power Company. Mr. A. M. Hubbard and Mr. H. D. Abrams, as directors, decided to keep "sixty percent of the stock control in the San Juan Basin" as reported in the *Aztec Independent* in February 1919. The remaining directors were J. W. Jarvis, W. L. Myler and A. N. Linebarger.



*Electric lines and 'arc' light in Aztec around 1915.*

(Photo courtesy Aztec Museum)



*Aztec Light and Power Company's generating plant on South Lightplant Road around 1916. The building on the right is the Aztec Roller Mill.*

(Photo courtesy Virginia Whitney)



## \$100. FINE

As a preventive measure against the spread of Spanish Influenza the Aztec Town Board has issued the following order:

The following places shall be closed until further notice:

Churches   Schools   Lodges   Sunday Schools  
Theatres and Motion Picture Houses   Club Rooms  
Dance Halls and Private Dances   Pool Halls  
All Public or Social Gatherings of any Nature

Limit of five besides office force in any business house at one time, Hotels and Restaurants, excepted.

\$25.00 Fine for children of school age leaving their home yard without permit.

\$100.00 Fine for any member of household, where there is case of Influenza, leaving the home yard without permit.

\$100.00 Fine for any person from west of the Sever arroya or from La Plata county, Colorado entering Aztec without a permit.

R. M. Jackson, Clerk      A. G. Ramsower, Mayor

The Company's four mills were to provide flour and mixed feeds for stockmen as well as to continue to operate the light plant in Aztec, with Arthur Pondsford, W. A. Wilson and the Herbert Bros. in charge.

In August 1921, disaster struck Farmington light plant, flour mill and ice plant whereby fire destroyed everything except the water wheel. It would be four months before that town would again have lights. This would also place ice at a premium as part of Aztec's supply came from this Farmington plant.

It was also about this time that Mr. W. Goff Black decided to move on to California, where he spent the rest of his life, passing away at Long Beach in 1949. This loss of local ownership and operation would have its effect on customer service despite the placement of a larger one hundred horsepower generator and updating the mill.

Electric appliances began appearing from 'hither and yon' which caused complaints about the non-standard alternating (133 cycle) current and the part-time-service. Sixty cycle was fast becoming the standard in the United States and in 1925 Western Colorado Power of Durango was contacted about running a 'standard frequency' line to feed Aztec. An answer was quick in coming with Durango Manager, J. A. Clay, stating:

*"The present estimated earning capacity of Aztec and Farmington as disclosed by an audit on our part, and which I assume has increased but little since that time, is far from being sufficient to justify or even make possible the financing of the cost of a power line from Durango to that territory."*

The discontent among Aztec Light and Power Company customers spurred a campaign to urge cooperation as they struggled to provide better service and seek outside funding. This resulted in the company being sold to J. T. Marron and F. M. Burt of Hot Springs Light and Ice of Hot Springs, New Mexico. These men made an almost monumental effort to make the system better, however, success would not be in the cards dealt to them either.

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**HOT SPRINGS LIGHT & ICE CO.,**

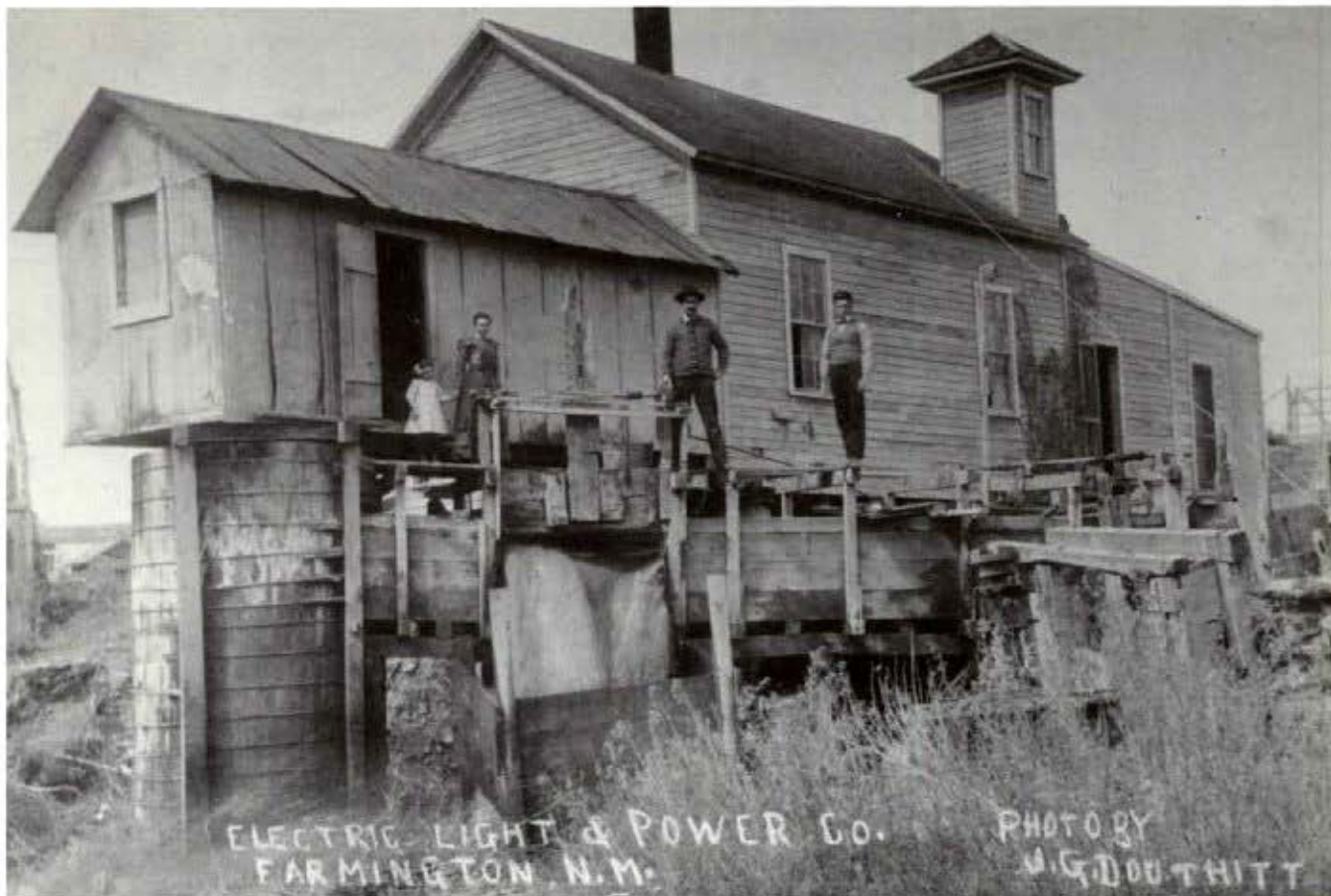
(NOT INCORPORATED)

**F. M. BURT, PROPRIETOR**

HOT SPRINGS, NEW MEXICO

*F. M. Burt*

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*The Farmington light plant went into operation in 1902 being the Basin's first electric generating plant. It was located just east of Main and Butler intersection and used water from the Wright-Leggett Ditch.*

## **SERVICE**

Our aim is to give service. Consumers can aid us in giving better service by cooperation.

**Aztec Light and Power Company.**

Herbert Bros. Lessors.





# Chapter V

## Enter the 20th Century

This outside help was, for the time being, certainly the 'shot in the arm' that the struggling company needed to survive as Mr. Marron and Mr. Burt already had a state of the art electric and ice plant. A new franchise was quickly submitted to the town trustees on April 2, 1926, as Ordinance 39, of 30 years duration. Also spelled out would be three-phase, 24 hour, 60 cycle service and all electric rates. The town agreed to purchase electricity for

pumping water at the rate of nine cents per 1,000 gallons of water pumped, possibly due to the fact that metering the 20 hp 2,300 volt direct connected motor would have been difficult. A June 1926, *San Juan Review* reported that "the first of next month would see all night service and as soon as the new outfit was installed would give twenty-four hour service which we will all be pleased to see." With this overhaul, conservation was urged until the new equipment could be installed.

**Sec. 5. The Grantees are hereby authorized to charge for electric current the following rates:**

**Residence and Commercial Lighting Rates.**

For first 10 KWH used in any one month..... 16¢ per KWH  
 For next 15 KWH used in any one month.....15¢ per KWH  
 For next 25 KWH used in any one month.....12¢ per KWH  
 For all over 50 KWH used in any one month.....10¢ per KWH  
 The minimum bill per meter shall be \$1.50 per month.

**Power Rates.**

For first 100 KWH used in any one month..... 8¢ per KWH  
 For next 100 KWH used in any one month..... 6¢ per KWH  
 For all over 200 KWH used in any one month..... 5¢ per KWH

**Cooking Rates.**

For first 100 KWH used in any one month..... 6¢ per KWH  
 For all over 100 KWH used in any one month..... 4¢ per KWH  
 The minimum rates for cooking and power shall be \$1.50 per month per KW of transformer ~~xxxxxxx~~ demand.

**Delayed Payment Penalty.**

A penalty of two cents per KWH shall be added to bill if not paid within ten days from its date.

**Street Lighting.**

The Town hereby agrees to use not less than 20 100-watt street lamps, to be located under direction of the Board of Trustees; the Grantees to furnish the street lighting equipment and maintain same in good working order, and for which the Town agrees to pay \$4.00 per month per light, payable on or before the 10th of each month. lamps are to burn from dusk to daylight every night and all night.

### Part of Ordinance 39

This modernizing would call for expenditures of around \$30,000 to construct the third enlargement of the Trew Mill Ditch, installation of a 316 horsepower horizontal shaft turbine, manufactured in York, Pennsylvania, concrete head works and turbine house, requiring two carloads of concrete, 2,300 volt delta three phase 250 kilowatt sixty cycle generator and construction of an ice plant. Under the direction of J. H. Gebhaur a completely new three wire line was run to feed the town. Down would come the arc lights to be replaced by a series incandescent of twenty-two 100 watt lamps.

A series circuit consists of a single wire running from lamp to lamp and generally in a large circle all around town. These are wired the same way as the old Christmas lights were, where in one lamp goes bad and the whole string is off. A film wafer, however, is placed at each street light so when the lamp fails the disc will short that lamp out of the circuit, leaving the remainder burning. A special supply transformer then automatically adjusts the current so the remaining lamps burn at the same brilliance.

Shipped from the Green Mountain Mine near Silverton, Colorado, was a 150 hp, 26,000 pound boiler that was brought via Flora Vista as it was feared the Animas River Bridge at Aztec would not carry it. The work was completed during the latter part of 1926 on what was thought to be a system set for the duration. As the *Republican* reported in December 1926: "A large improvement outlay and 25 employees under Superintendent Thomas C. White had



certainly done a good job." By this time all customers had been placed on meters with two afternoons a week electricity being provided for ironing and washing, before 24 hour service was finally established in April, 1927. The January 7, 1927 San Juan Review reported:

*"The first of the week the new generator at the Aztec Light and Power Company plant was installed and put into operation. Aztec streets are now lighted up like Broadway. The new street lamps, in series, being in operation and the old fashioned arc lights being taken down. The new current furnishes juice for all kinds of electrical equipment such as irons, sweepers, hot plates, toasters, etc.*

*Electrical equipment can be purchased in Aztec at the following stores: sewing machines, Lon Beatty; irons and toasters, Music and Electrical Store; sweepers and household equipment, Hillstrom and Fisher; percolators, E. C. Waring Store; wiring and sockets, E. O. Dial.*

*The Aztec Confectionery and Bakery have installed a new mixer on their soda fountain. Chas. Goulding has an electric bottle washer and Ray Current a new vibrator for massage and shampoo. Arrangements will soon be made for two afternoons a week with current for ironing and washing."*

It certainly seemed to be looking good as the first electric service was delivered to the newly installed town pump in April, 1927, fulfilling the requirements of Ordinance 39. The Aztec Review reported in April, 1928:

*"As far as we are able to find out the only shearing plant to be operated by electricity is in operation on the east edge of Aztec with eight shearers. Guy Simmons and Chester Thompson plan to shear 24,000 sheep a season with Bud Noble, Glen Swire, Glen Lane, George Thomas, Roy Johns and John Hart. The electric power is far superior to a gasoline engine as it is steady and smooth."*

Now let us take a pause and look back at the mechanics of the early electric systems. The initial 250 volt D. C. line consisted of two wire number six weatherproof copper on 36 inch crossarms atop twenty five foot poles of approximately 150 foot spans. Once the line reached town many poles were placed in alleys to serve houses and along streets to suspend arc lights over the middle of intersections, with some wires being strung in trees.

The eight arc lights of 2,000 candlepower consumed around 500 watts each with new rods having to be placed in them regularly by means of lowering the suspended fixture. These lights drew half of the capacity of the feeder lines or around four kilowatts in 1910.

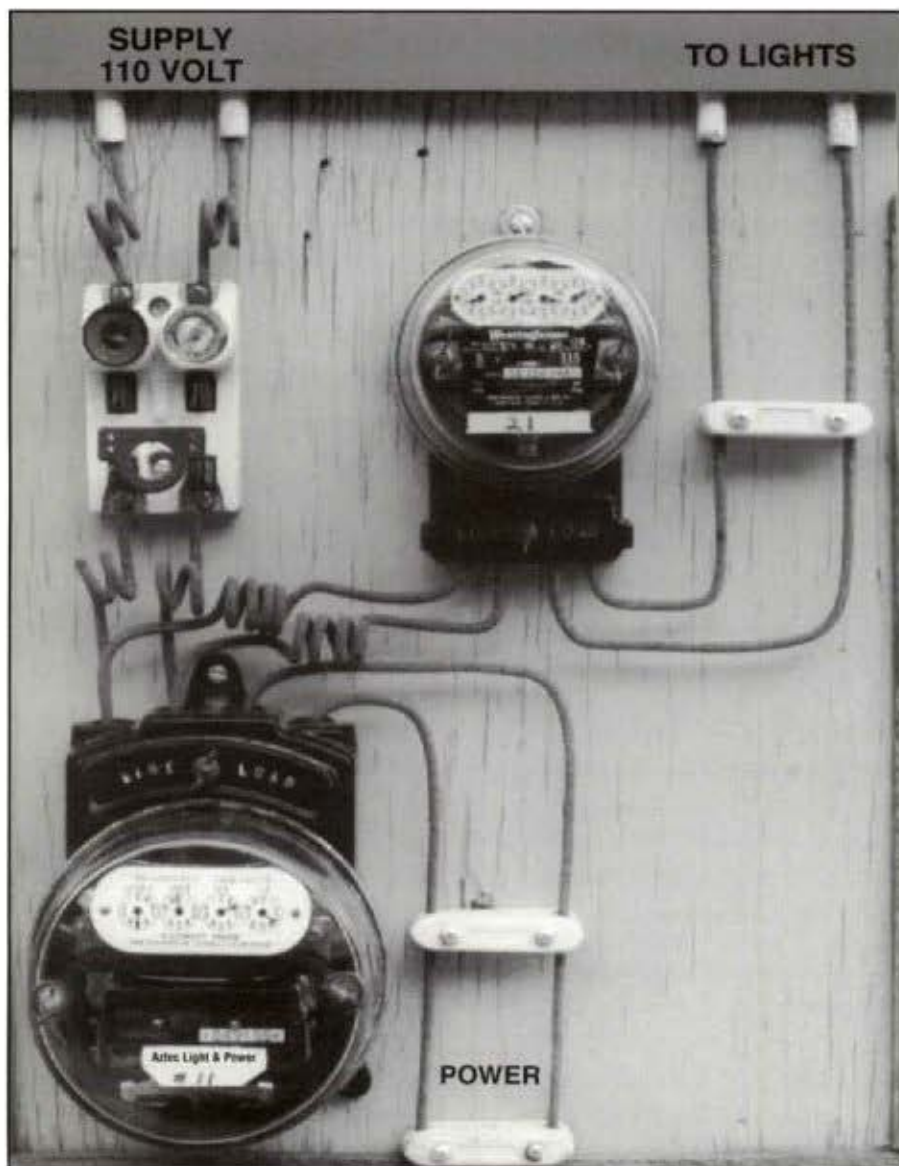
Buildings were 'haphazardly' direct connected to the main line by number ten weatherproof copper and attached to the house eave or apex by means of side pins and insulators. From these through porcelain 'knob and tube' work, wires ran in attics from light to light. These sixteen candlepower lights of around forty watts were suspended in the center of the rooms with the only control being a switch on the fixture itself. The D. C. system was simple but very limited in capacity by virtue of the low voltage.

The same feed line was utilized on the early 133 cycle alternating current system and single phase 1,100 volt pressure, more than quadrupling the capacity of the line. This voltage would have been dangerous to use on arc lights or in houses so the first transformers were added near the points of use to step down to 110 volts. At this time a mere six transformers, of two kilowatt or smaller size, were probably sufficient to carry all the load in 1913.

Fixture problems and fires prompted the company to install fuse blocks and knife-blade disconnects near the point that electric service entered the buildings, usually inside near the ceiling. The only other change was from 250 volt to 110 volt incandescent lamps.

The third revision of the line involved placing larger insulators and adding a third conductor. This 60 cycle, 2300 volt three phase now more than triples the capacity of the 1100 volt line. The existing transformers were reconnected to work on the new voltage along with additional capacity to add many more. The system at this time had grown to over 20 transformers with one as large as ten kilowatt. The 4,000 watt limited area arc lights were replaced by 2,000 watt series incandescent, lighting twice the area in 1926.

As customer loads began to increase meters would now come into widespread use with some houses having two or three meters depending upon the rates utilized. These were then mounted on an inside wall near the fuses and switches. The company had grown to around 200 customers by this time. Three phase service (220 volt) and both 110 and 220 was now available.



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*Typical layout on a two rate residential service around 1918.*

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The fourth revision would occur in the 1950's with a conversion to a 2400/4160 volts four-wire-wye system with larger feed conductors. This would quadruple the capacity of the old 2,300 volts delta. The same transformers could easily be reconnected to the new voltage. The series street lighting would give way to more efficient mercury vapor lighting.

Because of the greatly increased load old 'knob and tube' would become inadequate. Conduit, enclosed wiring and easily changed 'socket' meters would become standard along with the simplifying of rate classes to do away with multiple meters. The customer voltages available were wider in range with the customer count swelling to over 600.

The fifth and final to date revision occurred in 1989, by which the 2400/4160 volt feeders were assigned to five feeders at 7200/12470 volt four-wire wye. This represents a ten fold increase in capability which we now look at as megawatts, not kilowatts. This required the replacement of all system transformers.

Customer services are much more in need of high capacity with so many electrical appliances with the average home running a three kilowatt demand. This would supply three city blocks just 70 years ago. A thought to ponder is that the capacity has increased to 1,000 times over that of 80 years ago. In 1992, as the system stands, it should prove adequate for handling the load 30 years into the future.

With the new system first operating 24-hours a day in early 1927, one simply could not imagine what was about to happen. Throughout the summer a series of floods on the Animas River began destroying the heading and upper portion of the ditch, which had become more vulnerable with each widening. The last of these floods destroyed the heading and a large section of the ditch putting a halt to the 24 hour service enjoyed for only six months. Repairs to the ditch were going to take quite some time, and a lot of money with the plant going entirely on steam power, setting the stage for disaster.

At 1:30 a.m. in the early part of October, 1927 a fire broke out on the roof of the electric plant boiler room completely destroying the plant. With no water in the ditch and no water mains nearby, all could only watch it burn. What nature had done to wound by flood, fire nearly struck the fatal blow! The business district was crippled as Kini-K'eel current ceased its flow. Small generators, gas and oil, were pressed into service to save what they could and keep water service operating. The October 7 paper reported: "The Aztec Theatre was running shows, obtaining current from the C. E. Rippey private power plant and several other merchants are using Delco Light plants. Citizens throughout the city are using natural gas and oil lamps for light."

A small engine driven generator was brought in by the frustrated and dying company to supply temporary electricity. It is certainly interesting to note how dependent everyone had become on the servant they had enjoyed for such a short time.

Calls quickly went out as outside help was once again needed to save the company. Mr. R. I. Nightingale of Durango, who had bought the Farmington system in 1925, had been working with some Chicago connections engaged in utilities holdings, which appeared to be the salvation. The William A. Baehr Organization placed the operation into a holding company named North Continent Utilities Corporation and formed an operating company, The New Mexico Public Service Company, in 1928, headquartered in Farmington. This company operated both the Aztec and Farmington systems. The company quickly repaired the ditch and rebuilt the plant, resuming 24-hour service, only to have another major flood in 1929 wash out the heading again.



The October 25, 1929 *Independent* reported under the heading:

***ELECTRICITY OFF, WORK STOPS***

*“What would happen without electricity? We saw that answered in Aztec Thursday afternoon. Mrs. J. F. Eubanks sat in one chair at the Paramount Beauty Parlor, with her hair partly curled, Mrs. Rich Whitney sat in another with a finger wave all made ready for the electric fan. The Aztec Independent was on the press, Clyde Hubbard was just beginning to saw a roast, Ethel Coon left a column of figures without a total, Frank Bowra couldn’t freeze his ice cream, Ray Current had to use his hand clippers on a customer who was partly sheared and we have not heard whether anyone had lunch late enough to have their coffee grow cold or not.”*

Despite the problems the company worked with the town trustees in obtaining some new decorative lamp posts for Main Street with the Aztec Band celebrating by giving an open air concert by their radiant lights.

During the latter part of that year the first longline building was beginning to link the basin communities with A. C. Kittell at Mily-Kittell Refineries at Bloomfield getting power from New Mexico Public Service plant at Farmington and retiring their old generators.

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*Upper part of Trew Mill Ditch showing the narrow levy of ‘rip-rap’ between ditch on left and the Animas River on the right. This was taken in 1934.*

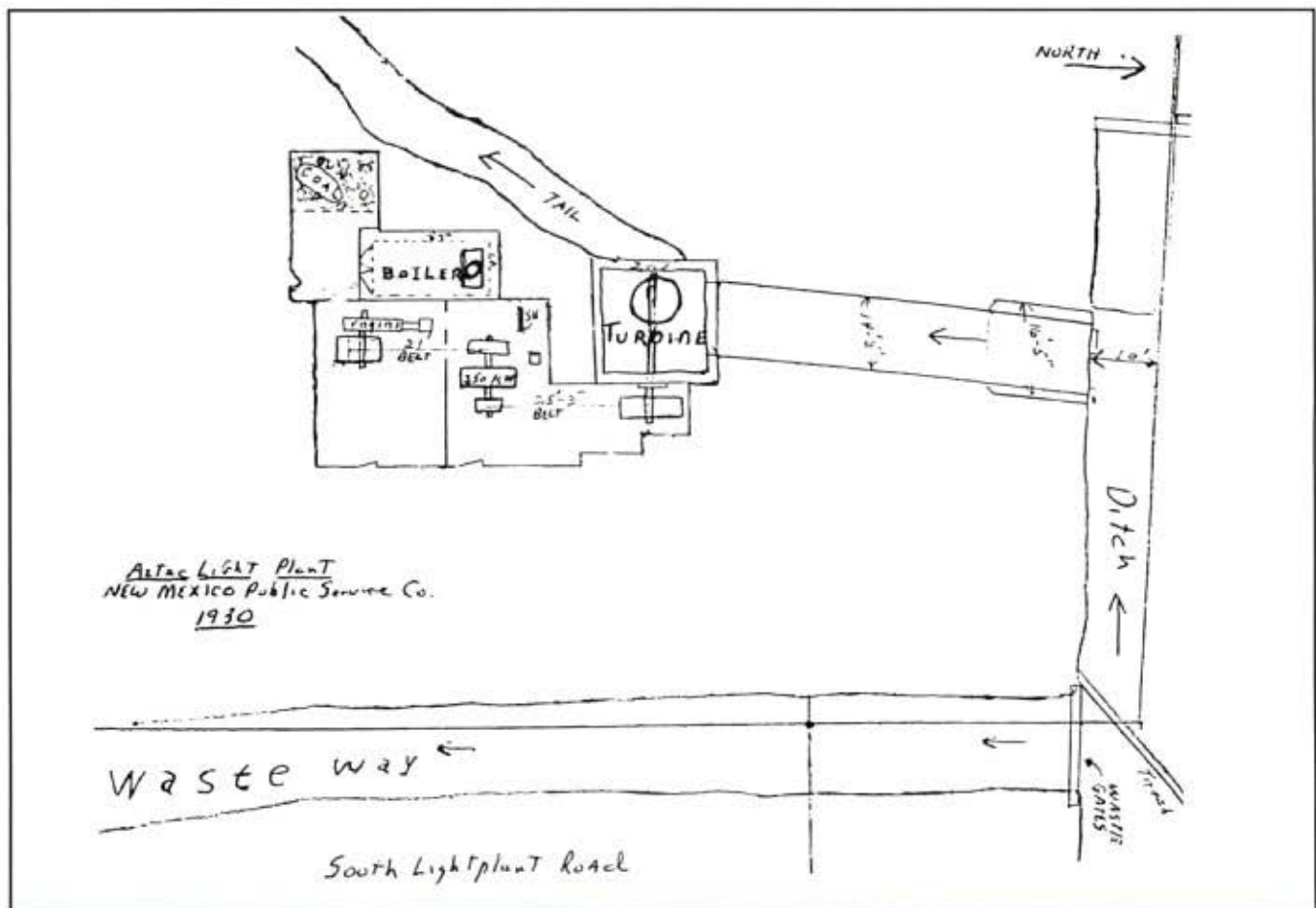
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With a broad resource and engineering base this new company was not to be discouraged and with foresight and aggression, pushed forward. The single source, single location of electric generation had proved very costly to many small utilities, not to mention Aztec, so a plan to tie Aztec and Farmington generating plants together was undertaken. In 1930, the second step to a basin wide system was accomplished with the Farmington to Aztec 13,200 volt, three-wire delta tie line being completed with other ties to La Plata and Kirtland made within a few years. A December, 1930 *Republican* reported that either the Farmington or Aztec hydro plant could now supply the entire basin system should the need arise. The effect was, for this area, pioneering on what we have today in 'interconnection' by which service reliability is improved by having multiple sources and connecting lines called a 'grid' or network. The 24-hour service was now almost guaranteed which in itself increased the amount of energy being sold and the diversity of its use. A large number of customers were added along these new line routes, truly serving the basin.

The New Mexico Public Service Company also launched an aggressive promotion program to market almost every kind of electrical device and appliance imaginable from apple peelers to waffle irons. With the basin wide system operating more effectively and with the demand for electricity steadily increasing, this allowed a two cent per kilowatt hour decrease and introduction of a special cooking rate. Much of the profit from operation was 'plowed' back into the system in improvements and rebuilding that would certainly prepare the company for upcoming unforeseen events.



**Layout of the light plant around 1930 showing, turbine, generator, steam engine and boiler.**

THE

# New Mexico Public Service Co.

ANNOUNCES A SPECIAL CHRISTMAS GIFT TO ITS  
CUSTOMERS IN THE FORM OF A

## Reduction in Rates

**NEW**—Reduced Rates, in three classifications of electric service will take effect with all bills rendered after January 1, 1931. Customers of the NEW MEXICO PUBLIC SERVICE COMPANY now using current under the present lighting, cooking or power and commercial refrigeration rates will benefit greatly, for the revised rate schedule includes decreases in charges per kilowatt hour in each of these three classes of service. Both the old and new rates are shown below. A comparison between them will reveal the benefits every customer will derive from the lowered charges to be made for these services.

### Old Lighting Rate

First 100 Kilowatt hours	-	17 1-2c
Next 200 Kilowatt hours	-	15 1-2c
Over 300 Kilowatt hours	-	13 1-3c
Discount 10 per cent.		

### New Lighting Rate

First 10 Kilowatt hours	-	16c
Next 15 Kilowatt hours	-	15c
Next 25 Kilowatt hours	-	12c
Over 50 Kilowatt hours	-	10c

### Old Cooking Rate

All energy	-	5c
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### New Cooking Rate

First 100 Kilowatt hours	-	5c
Over 100 Kilowatt hours	-	4c

### OLD POWER and Com. Refrig. Rate

First 100 Kilowatt hours	-	10c
Next 100 Kilowatt hours	-	9c
Next 100 Kilowatt hours	-	8c
Next 100 Kilowatt hours	-	7c
Next 100 Kilowatt hours	-	6c
Over 500 Kilowatt hours	-	5c

### NEW POWER and Com. Refrig. Rate

First 100 Kilowatt hours	-	8c
Next 100 Kilowatt hours	-	6c
Over 200 Kilowatt hours	-	5c

**SAVING TO CUSTOMERS WILL BE**  
**\$6,000 YEARLY**

THE New Reduced Rates will bring a SAVING of \$6,000 annually to consumers receiving the services affected by the decrease. The lowering of rates is possible partly because of increased use of the service supplied by the New Mexico Public Service Company and because installation of modern plant equipment has enabled the company to bring about greater operating efficiency. As it grows, the company will adhere to its policy of giving its customers more service at less cost.

**New Mexico Public Service Co.**  
FARMINGTON · NEW MEXICO

*A December, 1930 Republican carried this ad.*



The depression of the 1930's had a profound effect on all aspects of business in this country and this utility was no exception. The implementation of the National Recovery Act of 1933 imposed a three percent tax on electric sales of which the company was forced to pass on to the customers. With money tight and concern to be as fair to the rate payers as possible, a flat rate increase of 50 cents residential and one dollar commercial per month was imposed. For the sake of convenience and saving of fuel the company opened an office in Aztec. By this time Aztec was not to be spared the profound effects the depression would bring. Then town trustee, Joe Hartman, remembers the struggle to remain solvent reached a state of chaos with all non-essential town services being eliminated. The electric street lights would then, and for some time to come, revert back to burning only part of the night. This tightening of the financial belt led to the assessment of every part of the operation in order to cut out any waste.

In 1937, upgrade was done on the Aztec electric powered water system pump at the river, placing the motor for the first time on an electric meter. For the ten years that the nine cents per thousand gallons was in effect no one was sure who was getting the better end of the deal, however the new rate seemed fair. The first 1,000 kilowatt hours were at five cents, the next two thousand four cents and all over three thousand, three and one half cents.

System expansion had its many benefits, however it had at least one downfall and during the late 1930's experienced numerous interruptions of service. As this 'spread out' system was more difficult to patrol, vandals had been 'target shooting' at the poles and insulators and wet weather would cause the 13,000 volt lines to 'flash' or completely burn

# REWARD

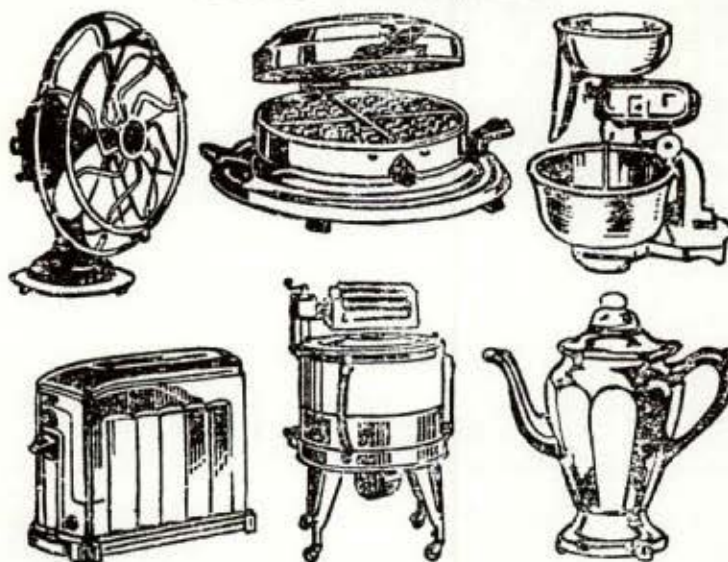
\$25.00 reward will be paid by the undersigned for information leading to the arrest and conviction of any person or persons destroying insulators or other property, or interfering with electric power lines of the New Mexico Public Service Company.

**New Mexico Public Service Company**

poles. Warning signs offering a \$25 reward were posted throughout the system along with a public awareness program outlining the dangers of such activity. The depression had idle-timed many people, giving some an opportunity to engage in such activities.

As electric customers continued to increase the diversity of their electric appliances, the old rate structure was fast becoming cumbersome and difficult to administer fairly. The dual and sometimes triple metering at locations made accounting by hand a nightmare. These and other problems led to public outcry for regulation to simplify operations of these 'allowed monopolies.' This came in the form of a Public Utility Commission in 1939, forcing a reduction in and the simplifying of rates into two categories. J. B. Austin, a 23-year veteran, retired with Glen Duffy assuming the managers post. Leaving this era would see recovery and some prosperity but would certainly not be a return to the previous decade.

## USE ELECTRICAL SERVANTS THIS SUMMER



Have a cooler kitchen and do less fatiguing work during the summer months by using electrical appliances.

### New Mexico Public Service Company



In March 1940, a letter from company attorney, George Bruington, made application to the board of County Commissioners for the right to use, for the construction of electric lines, all public highways within the County of San Juan. As requested by the company's resident manager, J. D. Hubbard made public the intention to branch out and serve most of the area. The following resolution outlined rights and responsibilities and held the county harmless of any liability. It was passed by Commissioners: W. L. Hare Chairman, Frances David, Troy King and Charles Holly.



# ANNOUNCING

ANOTHER REDUCTION

## Electric Rates

for San Juan County

Applying to Aztec, Farmington, Bloomfield, Flora Vista, Kirtland, Fruitland, Waterflow and all rural communities served by the New Mexico Public Service Company.

**Effective on all bills rendered March 1, 1940 and thereafter**

Residential Service, Available for residential service in single, private residence or apartments  
First 20 KWH at 10c per KWH; next 80 KWH at 5c per kwh; over 100 KWH at 4c per kwh

**Minimum Bill \$1.50**

Commercial Service, Available for all commercial uses including lighting, heating, refrigeration and automatic power service

First 50 KWH at 10c per kwh; Next 50 at 6c per kwh; Next 100 at 5c per kwh, over 200 at 4c

**Minimum \$1.50**

The Domestic rate situation will be considerably simplified in that domestic minimum bills will now be uniformly \$1.50 and there will be no further necessity for specific appliances as heretofore. Small commercial customers will get a satisfactory reduction in their lighting bill. All large commercial customers will likewise enjoy a substantial saving. As this applies to the entire county, all of the rural communities minimum bills will be reduced to \$1.50.

New and old rates are available for examination and explanation at the company's office in Aztec.

**New Mexico Public Service Co**

The early 1940's were especially tense times for America as an impending second world war was at our doorstep. The War Department began a series of preparedness and Civil Defense programs, one of which was 'blackout' drills. New Mexico had the distinction of being an experimental state for this program. During the fall of 1941 the Aztec Blackout Committee, the power company and all citizens took part in practice blackouts with Army planes attempting to locate the towns. This was due in part to the fact that the state was quite important to the war effort by virtue of nuclear research and helium production. It was reported that San Juan County was so dark that not a town could be spotted. What had been an electric company fear by nature for decades was now for a short time the goal; 'blackout.' The company street lights, series wired with a single control point, were easily and quickly doused when the alarm sounded. Today, with many more and individually controlled lights, nothing short of a total shutdown of all electric power would accomplish the same result, if it were possible at all, due to the multiple feed points presently used.

The utility industry during this period continued to lose more of its independence as consumers continued to call for more regulation. A consumer council was formed along with the Federal Power Commission, which began to place more and more control on operations and rates. In late 1941, New Mexico Public Service was ordered to implement an across-the-board five percent decrease in rates.

The waters would only become more turbulent as the Securities and Exchange Commission began looking at companies with large and varied utilities holdings. In 1944, the S.E.C. ruled that North Continent Utilities Corp. must divest itself of numerous holdings of which New Mexico Public Service was one. An offer to sell the company to the Town of Farmington for \$300,000 was made. However, state law prohibited municipalities from owning electric systems outside their corporate boundaries. Other offers were received but company president, A. C. Winters, was aware of the fact that Farmington was most interested in finding a way to own the entire electric system and that local ownership would benefit the area.

After a year of negotiating and searching for legal means, it was agreed a trust company named Basin Light and Power would be set up to operate, the town of Farmington's portion being two-thirds and the balance of the 'outside' system including Aztec. J. D. Hubbard was made president and a 25-year agreement basically gave the town control until such time as the Public Service Commission might allow municipal ownership outright. C. C. Mumma, Perry Smoak, D. Maxom and J. D. Hubbard were named as initial trustees for the company. In late 1945, the new company took over all of the 'San Juan System' including generating plants at Farmington, Aztec and an unbuilt Cedar Hill site.





# BLACK OUT



**Friday, September 12**  
Sometime between 8 to 10 p. m.

**Be Alert.** - Cooperate with this vital part of Civilian Defense.

**Remain at Home**, or wherever you are, during the Blackout. Do not move around. **The Telephone** should not be used during the Blackout, except by committees who are requested to call Aztec Independent-Review Tel. 55-J if the planes are heard approaching the county.

**New Mexico is the experimental state for the Blackout**  
**Your cooperation is requested.**

**When word is received** that the planes are approaching, the Methodist church bell will ring as the Alert Signal. A few minutes later the Fire Alarm will be sounded as the general Alarm for the Blackout and then you should turn out all lights on your premises and automobiles, or make provisions so that no light you might have can be seen. Army Bombers will fly over the county and after they have gone for a safe distance from town the ALL CLEAR signal will be sounded by the fire alarm, then turn your lights back on and go on your way as usual.

In neighboring communities cooperating each has its own organization and system of alarms. Listen for the ringing of a bell or rifle shots in these communities and follow general instructions by extinguishing all lights until the all clear is sounded.

**AZTEC BLACKOUT COMMITTEE**  
**H. R. Bowra, Chairman**

## Chapter VI

# Growth and Conflict

By the late 1940's the electric link had been well established via a 13,800 volt connection, which began to become more of a lifeline as the Aztec Hydro-Plant began to show its age. The earlier installed Rathburn-Jones and Bruce-McBeth low speed engines in the Farmington plant on East Main Street and their hydro plant were still able to supply the entire system with less than three quarters of a megawatt output. By now the Aztec Hydro Plant would no longer be capable of supplying the entire Basin System. As loads increased the system was once again becoming a single source dependent. Beginning in the 1950's Basin Light and Power Company would not just experience growth, but 'explosive boom'.

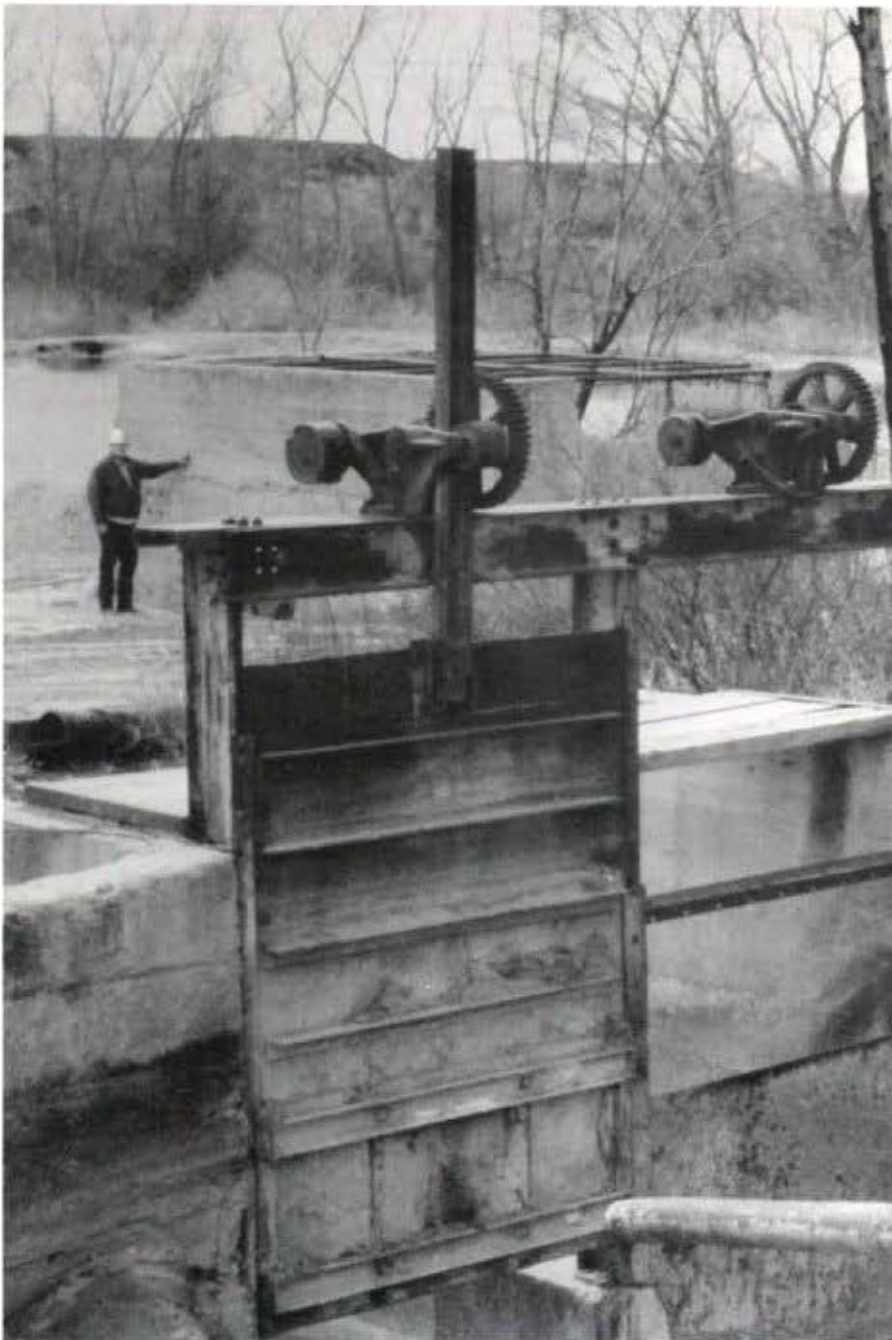
In 1950 only about 1,000 customers were on the 'outside system,' however, in seven years that number would quadruple. The link lines, especially Farmington to Aztec, quickly became inadequate and with Aztec's hydro barely able to produce enough to earn its keep, was forced into retirement in 1953, thus ending a 43 year hydro generating history in Aztec. In its place now stood two 800 kilowatt natural gas engine driven generators to supply Aztec, Cedar Hill and Bloomfield lines. According to former Aztec Mayor, Sandy Scott, the old hydro plant would see its demise in the early 1960's with only the concrete turbine house, remaining today, which had been used for fire department practice. With the need for the Trew Mill Ditch enlargement gone, the right to use the water would pass on down the river and the canal to the Eledge Ditch Company.

Aztec had grown from 840 in 1950 to 4120 in 1960, further testifying to this phenomenal growth. The modern engines performed without a hitch with plant operator, Ray Chapman, remembering an interesting incident. A new operator was in the process of starting one of the twelve cylinder natural gas, air start engines and had been turning it over with it failing to start. He suddenly noticed that the ignition was off, which he quickly turned on. With the cylinders and exhaust full of unburned fuel, the resulting explosion blew the outside muffler into the air. The return trip saw it piercing the bed of the operator's new pickup truck, pinning it to the ground. Fortunately, no one was hurt, but it made all concerned a little more conscious of safety procedures.

In a short four year period these generators too would be swallowed up, as was the little hydro, due to the mushrooming electrical demand. The men and machinery of the oil and gas development had certainly left their impression on all utility systems in the area. In 1957, Aztec was reorganized to operate under a commission-manager form of government, which it operates under today. That same year construction began on the Basin's first large steam turbine generating plant at Farmington with an initial output of six megawatts and a soon to be added unit doubling that output. As loads were higher, so would be the need for higher transmission voltages and in 1959, a 69,000 volt line, constructed between Farmington, Bloomfield, Aztec and Turley, would give the Basin a solid electrical link. All of the previous generating means were placed on emergency standby, ending Aztec's half century of electric generation. This line at Turley was to carry power generated by the soon to be Navajo Dam, which was completed in 1962. However, 30 years would pass before the hydro plant became a reality.

From afar one would view the unbelievable growth and sales by the company as a cornerstone of stability. However, clouds were looming on the horizon. No sooner had the





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*Author standing by all that remains of the Aztec generating site on South Light Plant Road. Shown in the foreground is the waste gates, with the turbine enclosure in the background.*

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new 'power' of the steam plant been placed in operation than a 'power' struggle between the Town of Farmington and Basin Light and Power was secretly heating up. The town wanted more voice in the operation and felt the Basin Company Trustees were not acting in the town's best interest. The mud slinging continued with now public accusations of mis-management, gross inefficiency and negligence abounding from the town board. This news, along with numerous electrical outages, would certainly compound customer's fears that the lights might soon go off and stay that way. In 1958, Farmington Mayor J. L. (Mutt) Foutz was appointed 'citizen' trustee of Basin Light and Power with I. J. Coury, Willis Martin and J. D. (Deb) Hubbard.

It was now time for the town to get this ownership problem resolved. In 1959 Mayor Foutz introduced bills in the New Mexico State Legislature to legalize acquisition of Basin



***The Basin's first steam plant located in Farmington. Built in 1957, its 32 megawatt output would be exceeded within eight years. Fired by natural gas, this plant remains in operation today.***

(Photo courtesy City of Farmington)



***Farmington's Hydro-electric plant at Navajo Dam with 30 megawatt capacity was built nearly 30 years after the dam itself.***

(Photo courtesy City of Farmington)



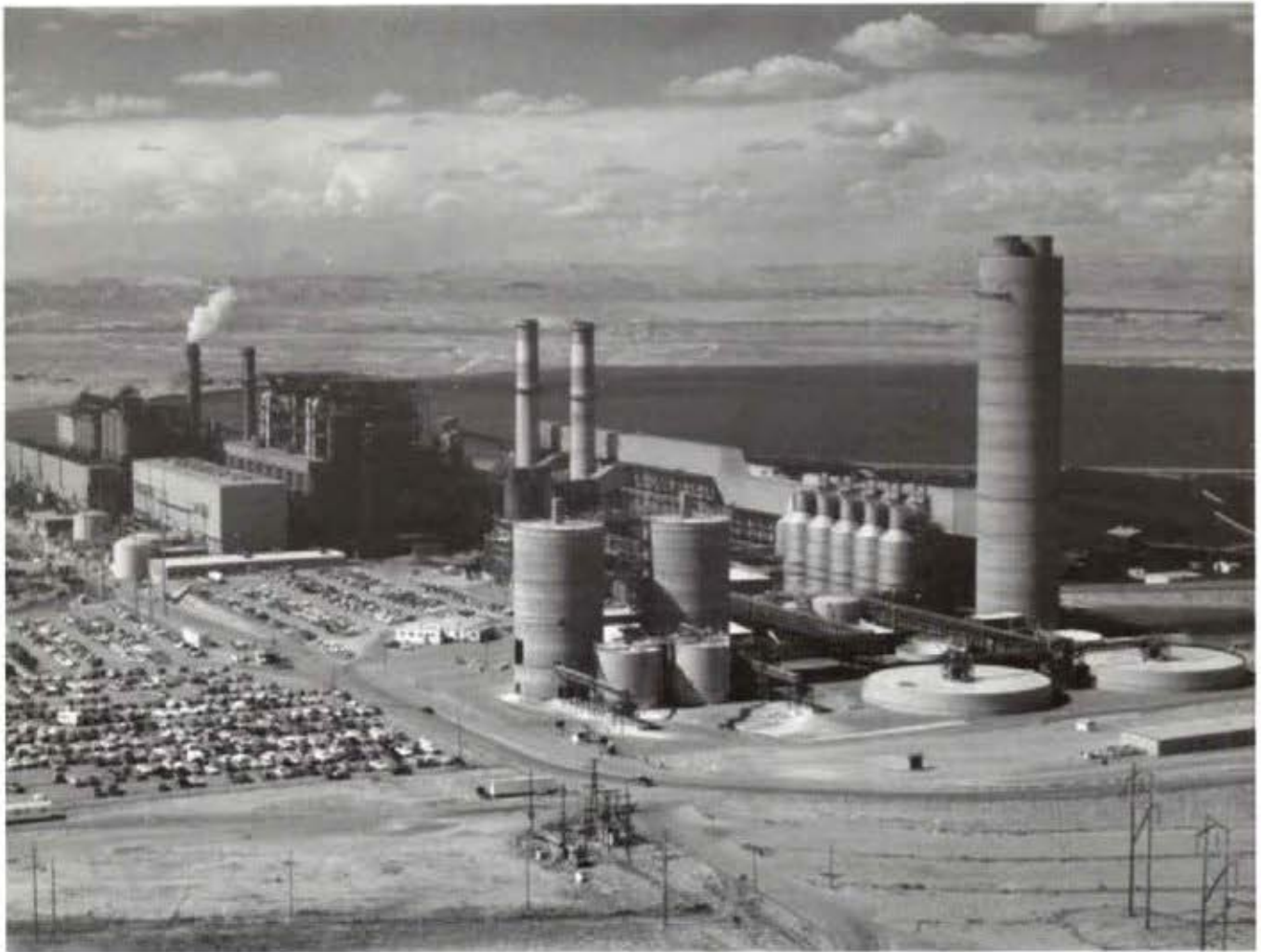


***'Military style' takeover of Basin Light and Power on May 27, 1959 by which the Town of Farmington began operating the Basin system. Left to right, Farmington Mayor 'Mutt' Foutz, Bob Foutz and Gordon Woods.***

(Photo courtesy Farmington Daily Times)

Light and Power, form a public utility commission to manage and allow sale of properties (Aztec system was part) without a citizen vote. The signing into law was not to end the controversy as negotiations to transfer continued to fail. A final demand was made which was rejected and during the latter part of May, Mayor Foutz, Gordon Woods and Bob Foutz, armed with razor blades, 'occupied' the Basin Light and Power office in Farmington, removed the name and declared it the Town of Farmington Electric Department. Mr. J. D. Hubbard was made manager with Aztec office head Stanley Bozart, assistant, with a quit claim deed closing the transfer a few days later.

This 'military style' takeover was not being taken lightly, raising hairs of many Aztec citizens, who held the decades old rivalry at heart. In January, 1960, by a vote of 323 to 83, the city proceeded to exercise its option and obtain the electric system within the Aztec city limits. This severance would certainly not be as simple as '1, 2, 3', as controversy seemed, at the time, to be in the air. The city's right to acquire was not at question, however the price certainly was. Litigation that had begun in 1959, and a year long district court suit would finally sift out a reported \$790,000 price tag. With then \$223,000 annual revenue and with the possibility of receiving Glenn Canyon Federal Hydro power in 1967, the outlook was good. A dream of trustees 50 years prior was about to become a reality. With help from Sterling Arnett and C. H. Hoper the several month physical severance went ahead with little incident.



***View of Four Corners Power Plant of Arizona Public Service Company with Morgan Lake in the background. Construction began in 1961 and the plant now has a generation capacity of 2,040 megawatts and consumes seven million tons of coal annually.***

(Photo courtesy Arizona Public Service Company)

With abundant shallow coal beds west of Farmington, Arizona Public Service Company would begin construction of a massive project near Fruitland to generate electricity. This plant would dwarf the Farmington Steam plant which had grown to nearly 30 megawatts capacity. Later Public Service Company of New Mexico would construct the San Juan Generating plant to the north, making the area a vital part in serving the entire region. Once again, the Farmington steam plant would be swallowed up by the increasing load, which would require the 'buying-in' to these new 'mega' plants to meet the requirements of the Basin's energy needs.

Construction began in 1961 on units one and two at the Four Corners Power Plant. By 1970 two additional units had been built with total expenditures exceeding \$283 million. Low sulfur coal, from the adjacent Navajo Mine, would provide the 20,000 tons needed daily. The 2040 megawatts output is capable of powering over 300,000 homes in an area from California to Texas. Besides Arizona Public Service, other owners include El Paso Electric, Public Service Company of New Mexico, Salt River Project, Southern California Edison and Tucson Electric Power Company.



The plant went into operation in 1963 after numerous inspections and acceptance testing. With the 25 degrees below zero of the winter of 1962, the operation was put slightly behind schedule. The June, 1963, *Spark and Flame* reported from Hugh Cocklin, "All this time – from mid-January through May – we had double shifts. Our men worked 12 hour days, seven days a week in addition to operators from Ocotillo, Yucca, and Cholla plants."

Morgan Lake, at approximately 1,250 acres, was built to provide circulating water for the plant and required a 6,800 foot earth fill dam. This also provides excellent recreation and fishing potential for the area.

Construction began on a second large plant, the San Juan Generating Plant, in 1972, which would be operated by Public Service Company of New Mexico. A decade later, the four units would have an output of over 1,600 megawatts. This plant, located north of the San Juan River near Fruitland, would also utilize the same fuel source as the Four Corners Plant.

Besides Public Service Company of New Mexico, other owners include Tucson Electric Power, Century Power, M.S.R. (Modesto, Santa Clara, Redding, California), City of Farmington and Los Alamos County. Farmington's interest, at 42 megawatts, will supply nearly half of the Basin's 90 megawatt demand in 1992.



**Public Service Company of New Mexico – San Juan Generating Plant, near Fruitland, built in 1972, would add around 1,600 megawatts to the Basin's capacity.**

## Chapter VII

# Home at Last

In late 1962, the City of Aztec, with Sandy Scott as Mayor, began operating its own electric utility system by Resolution 49. Limited to serving within the corporate boundaries, Aztec would purchase its power from City of Farmington at a wholesale rate of nine mills or nine-tenths of a cent per kilowatt hour. The power market was a totally new experience for the new utility owner and the best rate 'shopping' immediately began. However, some cheaper power had interruption clauses attached and was due to the fact that this 'surplus power' could, at any time, go to the highest bidder. With the electric network in the United States, electricity could virtually be generated in New York and sold in California allowing this to truly become a commodity to be traded as easily as stocks. Terms, such as demand, load factor, peaking, interruptible, replacement and inter-connection were quickly learned by this 'new kid on the block.'

The Aztec generating plant was just barely able to handle the city load. With overhaul recommended and growth expected, a 'firm' or non-interruptible, long term, low cost source was definitely needed. As this was an unusual situation whereby two municipalities were dealing for energy, numerous Federal Power Commission rules had to be 'waded' through, which, during the next ten years, would even require some legislative cleanup of these regulations. Application was made to the Bureau of Reclamation for an allocation of Colorado River Storage Project hydroelectric power. Physical cleanup of the system was also winding up as to pole purchase and joint use agreements with the Mountain States Telephone Company and Telmets Cable Television.

Aztec's first load promotion was in sponsoring a Christmas lighting contest in 1964 and as it turned out much more additional electricity was sold, far exceeding the prize money. Other promotions also included twenty-five dollar rebates on any new electric range or water heater installed inside Aztec; however, these promotions would soon spell trouble.

The generating plant was still used whenever the Farmington line failed. In 1965, however, one of Aztec's 'furrer' examples of wildlife had decided to take up residency in the switchboard causing a fire that would do an estimated \$10,000 damage and shut down the plant for some time. The aging engines in 1968 began to erode confidence in the plant being any more than 'standby.' City Manager John McGinn mentions a 'mini' overhaul done in an effort to maintain proper standby.

Squabbling over boundaries and service area continued between Aztec and Farmington, particularly over the water treatment plant. Farmington refused to sell the feeder line in 1965, and wanted to lease it to Aztec, forcing the construction of a new line and a 'cutting down' of Farmington's line when Aztec decided to serve the plant. These actions were not making for a good relationship, prompting Aztec to consider building its own 69,000 volt line to Shiprock to carry the soon to be available Bureau of Reclamation power from Glenn Canyon Dam Hydro-electric Plant. Under the Reclamation Project Act of 1939, the incorporated municipality of Aztec was eligible for an allocation of energy as a preference customer, for which application was made. This three mill interruptible power would be available at a third of the cost being paid to Farmington. However, it was at Shiprock 'point of delivery' with Aztec having to make transportation arrangements



for the little more than 1,800 kilowatts demand, and maximum of 750,000 kilowatt hours per month. At that time Farmington did not have a 69,000 volt tie to the B.O.R. Shiprock substation, limiting the amount of power that could be transported. With the Bureau acting as go-between and engineer, a 27 mile 115 kilovolt line from Shiprock to Aztec was proposed with a \$375,000 price tag. Aztec, having difficulties with obtaining its system, simply wanted independence from Farmington but could not afford the price.

Conflicts with equipment, right of way, and cost brought the two powers to the negotiating table with Farmington Mayor Davis and Manager Woodbury presenting new contracts in 1965 and 1966. The now firm federal Hydro Power would cost nearly nine mills, more expensive than Farmington's; however Aztec wanted independence. A District Court suit in 1965, along with a counter suit, forced an agreement by which Farmington would, for a mill per kilowatt hour, transport or 'wheel' Aztec's power over its system from Shiprock to Aztec. A supplemental power agreement was put in place should Aztec's requirement exceed its federal allocation. Negotiating with the bureau continued, with problems arising over free use of facilities at Shiprock Substation, along with concern over an emergency backup mobile substation should Aztec lose its main transformer. In February 1966, Aztec entered into a long discussed twenty year contract for firm and surplus power with the Bureau of Reclamation.



***Glenn Canyon Dam on the Colorado River was constructed in the mid 60's and is a major source of W.A.P.A. hydro-power. This is a test flow at 50,000 cubic feet per second in 1984.***

(Photo courtesy Bureau of Reclamation)



In July 1967, for the first time in its 57 year history, Aztec began receiving electric power from outside the basin. Farmington was certainly not elated over losing this revenue as the word 'dumped' came up regularly, keeping a tense relationship and keeping the city rivalry very much alive.

The years of 1964-67 saw virtually no growth in Aztec which led to load projection problems. The new utility department was still unfamiliar with the many new requirements placed upon it by the Bureau which led to many problems in estimating, loads and demands. The utility, because the demand was a critical factor, undertook a program to keep large loads off during peak hours. This was a gallant effort aided by Superintendent Martin Saline, an attempt to reduce rates and hopefully promote growth.

Aztec kept up a slow growth and, as expected, the time would come when the federal power supply would be exceeded. By 1973, peak demand was exceeding the set amount and the option of running the engines or purchasing high cost 'supplemental' power was upon the system. The nationwide 'network' of interconnected lines or "grid" could then allow electricity to be generated in New York and used in California and would also allow Aztec access to an increased area from which power could be purchased. The first of many rate increases from the Bureau would come into effect along with a five times penalty charge for using more power than allotted. The city made an offer in July 1974, to the Bureau to generate during peak times. However since the Bureau's peak lasts longer than Aztec's and not necessarily at the same time, the offer was refused. In the following year a temporary capacity overrun of 300 kilowatts was granted while a mad search for supplemental power was made. Later a supplemental power agreement was entered into with Farmington which at that time was the only option due to the limited wheeling capacity of their system.

It was about this time that the question as to Aztec generating its power full time was raised and whether this small load would justify the extra personnel. A study was done in late 1975, resulting in several alternatives; however, the initial costs were high and nothing was ever done.

A foresight concern of ten years prior was about to take the front burner in a big way. In the mid 1970's the Aztec system was receiving their entire electric supply through a single transformer with no 'backup' on site. Less than a dozen days into July 1976, a reported electrical storm lightning bolt struck the 69,000 volt supply line destroying that one and only transformer. The supply line was cut, pressing the two natural gas engines into service, however, the 1600 kilowatts was only 67 percent of the peak demand. Food loss was high as the 'brownout' which would last nearly a week, immediately turned Mayor John Powell, Chuck Wimpy, Flavio Chavez, Jerry Parker, Sandy Scott, and manager Mike Holder to declare a 'state of emergency'. This would result in all non-essential electric and water service, including street lights and churches (except Sunday) being turned off and a moratorium on all new hookups, as Kini-K'eel Current was at a premium.

The call went out for any 'loaner' units with Leadville and Denver answering the call, however when the units arrived they were found to be the wrong voltage. Attempts to re-connect failed and a call to Arizona Public Service of Phoenix finally located some correct units which were purchased and remain in service today. This \$55,000 lesson was certainly learned as the damaged transformer was subsequently rewound and installed as a 'spare.' Many citizens did what they could to help during the emergency, including R. D. Dial loaning barrels to store oil while the transformer was being repaired.



This emergency simply compounded the water shortage as treatment facilities were running at maximum and still falling short along with Aztec exceeding Farmington's wheeling ability from Shiprock. During 1978-79, the 115/69 kilovolt tie was made by Farmington at Shiprock reducing the transmission losses from five percent to 1.75 percent as announced in a letter to Mayor Brooks. This intensified the search for additional low cost power from the now Western Area Power Administration (W.A.P.A.) as part of the Department of Energy which had taken over Bureau of Reclamation control of marketing in October 1977. In July 1980, Aztec began purchasing fuel replacement energy from W.A.P.A. as a supplemental source for part of the needs over and above the allocated energy. Some work had been done on the system in the early 1980's that had reduced losses, nevertheless, the struggling and scrambling to obtain supplemental power occupied much time, effort and money. The chain's weakest link was about to be tested giving truth to the knowledge that all parts of a basin system must work together.

The close-at-hand servant had been taken for granted for a number of years; however certain events would understandably make all take a second look as 'Murphy's Law' attests, "Things will happen at the worst possible time." The 1978 football season had brought two area teams, namely the Denver Broncos and Dallas Cowboys, to the Superbowl which promised to be an exciting game. That is certainly how that Sunday game started out; however, the Basin 'fans' would not be allowed the privilege of watching that game. Electric power in the Basin would fail early into the game and last the duration.

This event will be remembered for many years to come with the Farmington Electric Utility System becoming 'paranoid' even to this day, placing extra people on call each time the event comes around. This also was the turning point by which the system would begin to look seriously into improved customer service and system reliability.

According to Bill Statton, Farmington Electric Utility Director, the 15,000 irate fans that missed that three hour game, were not soon to forget. The utility was transformed, within three years, with a hundred million dollar investment from an isolated utility to one of the most self-sufficient and diversified utilities in the southwest. With ownership in gas, coal, and hydropower resources, 24 hour system control center, participation in two western power pools, and interconnection to three electric utility systems, reliability has been greatly improved to carry the half billion kilowatt hours annually over its system.

This is certainly a change from the early days when the power plant operator would climb onto the roof of the town's 300 kilowatt hydroplant and watch for more than half the lights to be turned off, allowing him to shut down the plant and go home to bed.



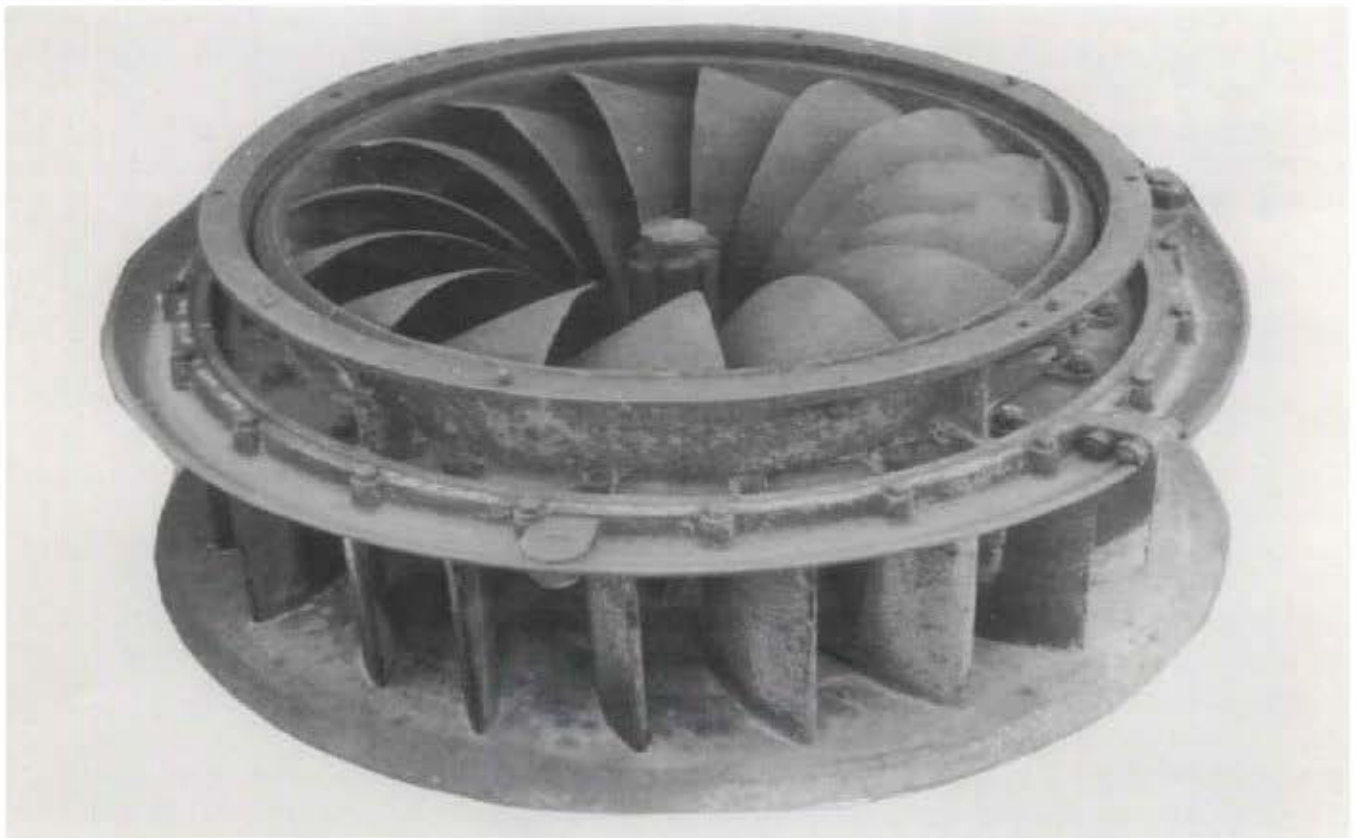
*Exterior view of the Farmington Hydro Plant just north of the steam plant. This unit was overhauled in the 80's and still produces its original 300 kilowatts. A giant in its day – now dwarfed by the Basin's nearly 90 megawatt demand.*

(Photo courtesy City of Farmington)





*Since earth's creation, this electricity has played a vital role. These massive discharges remain untamed today. A typical arc, lasting one-tenth second, may equal 300,000 kilowatt hours of energy.*



*All that remains of the 316 horsepower Aztec Turbine which was installed in 1926. This is on display at the Bolack Electromechanical Museum in Farmington, New Mexico.*

## Chapter VIII

# Frontier

Throughout the course of this story, the area has been blessed with an abundance of energy either in the form of water power or inexpensive fossil fuels. Increased demand and ever mounting regulation has imposed quite a different circumstance on the electric utility business. In the early 1980's this caused a drastic increase in the cost of fuel and in turn the cost of electricity. The long since dismantled Aztec Hydroelectric Plant was once again a possible alternative for which a detailed study was made. Funding was not available for construction on the plant and the idea died. The early 1980's saw several rate increases from W.A.P.A. and the renegotiating of a new wheeling agreement. An interesting letter to W.A.P.A. from Aztec City Manager Harold Lavender in April 1984 reads, "Farmington can impose almost anything it wants. We prepare to go swimming with sharks," once again rings with the decades old rivalry.

By 1982, Aztec experienced growth to the west, particularly from the new county complex and sewer plant on South Oliver. A fifth circuit was added to the system. Mayor Parker, despite customer complaints over rising rates, had been told by many to "hang on to the electrical system."

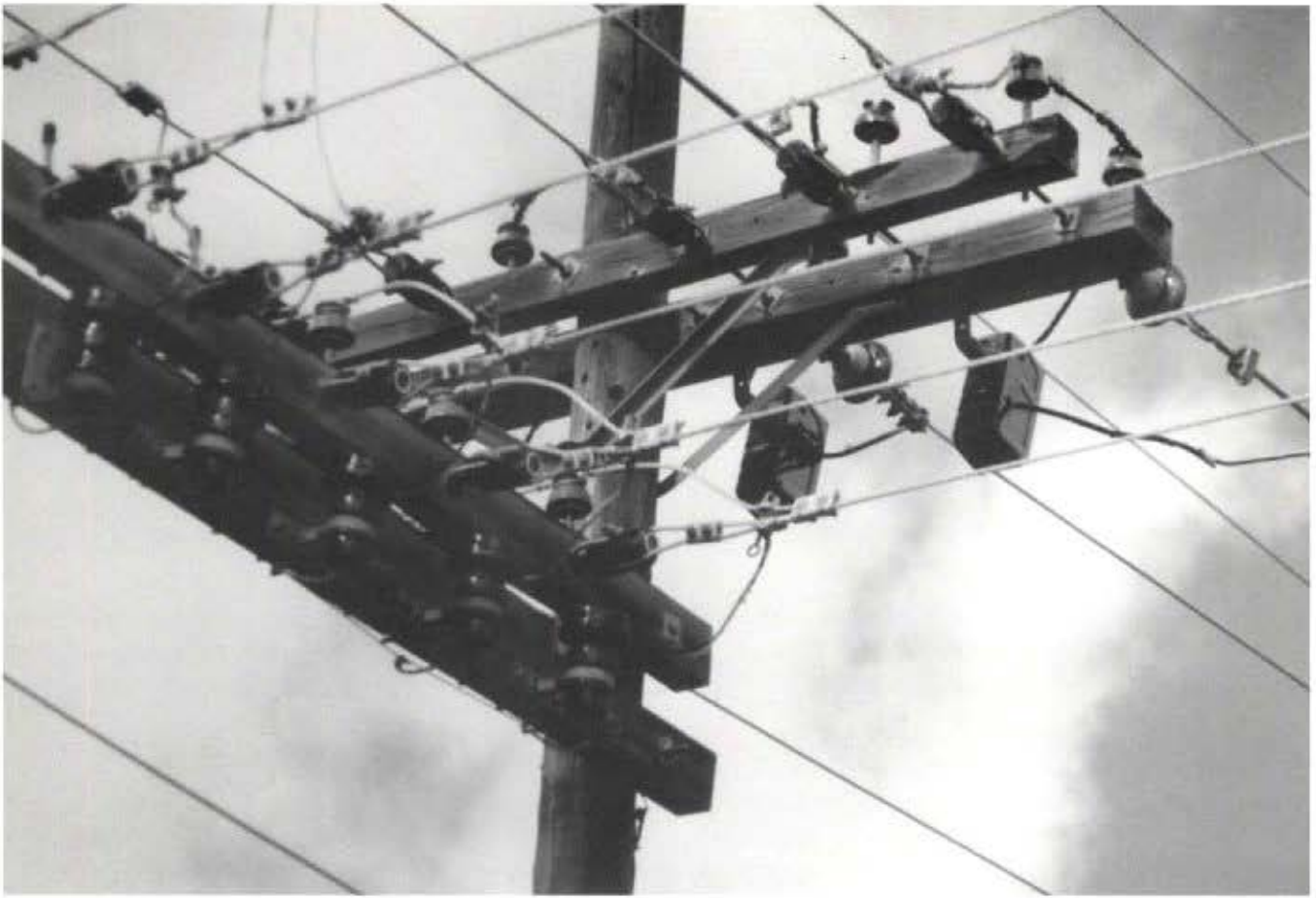
This additional transmission 'wheeling' capacity was certainly important as in 1983 and 1984 high runoff had surplus power available. An agreement was finally worked out allowing 2,850 kilowatts at 1.31 per kilowatt per month, allowing for transmission line and transformer loss, with this wheeling agreement on a five year term. This proved a good move as 1985 and 1986 also saw high runoff. The following year would see shortages, the implementation of the conservation and renewable energy program to require all W.A.P.A. customers to practice conservation along with Farmington coming in with a rate increase for supplemental power. The search was once again on for an outside source with proposals from several including Colorado-Ute Electric Association for which Aztec would have had to build a transmission line north to the Colorado border.

During the latter 1980's, high energy costs contributed to a lack of funds for yearly repair and upkeep of the aging system, which began catching up in the form of reduced profits. The higher loads imposed upon a '1950 Basin Light and Power' type system were helping to cause numerous outages and lower efficiency. If the city was going to remain in the business something had to be done to increase efficiency, which once again prompted a search for an alternate source of supply. Due to the times this would prove to be burdened down with numerous requirements for even 'interruptible' power and was backed away from.

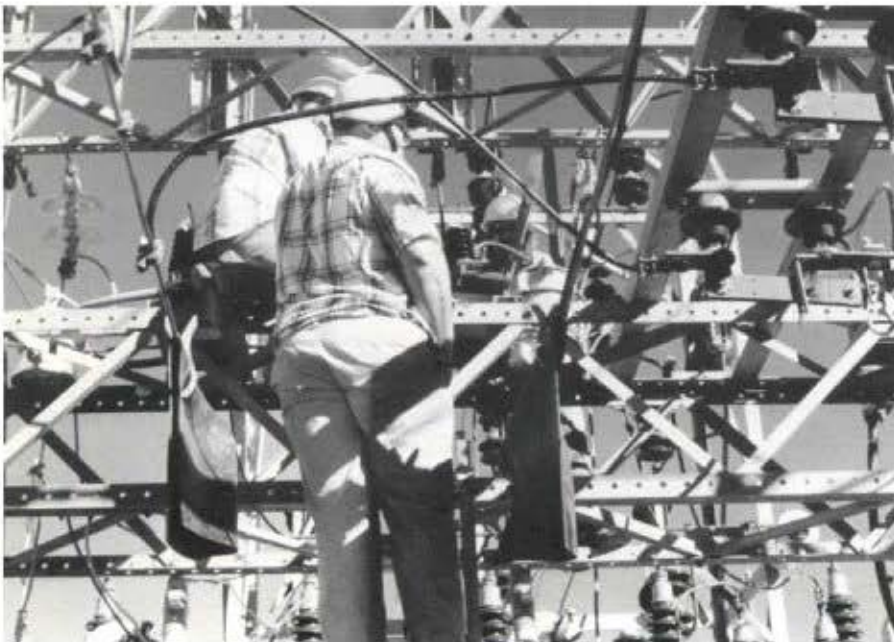
In early 1988, Tommy Bolack was made electrical director, virtually donating his time, to draft and carry out a complete overhaul of the aging distribution system, along with Commissioners Ray Richardson, Billie Ferrell, Gary Ryan, Bob Shumway, Bill English and Manager Tweeti Blancett. Soon after Mike Belt and Manager Shirley Willis came on board. A thirteen per cent rate increase was implemented to provide funds for meeting increased energy costs from Farmington and to rebuild the system. The two generators installed in 1953 were found not to be economically repairable and were subsequently sold in 1989.

The two-and-one-half year rebuilding project would involve replacement of many miles of conductors, hundreds of poles, many of the system's transformers and a looping system within electric feeders. In late 1989, the system underwent a voltage change from 2,400





*Look at part of the '1940 style' system in Aztec prior to major rebuilding project in 1988.*



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*Electric Director Tommy Bolack and Superintendent Robert Medina work on temporary 2,400 volt bus in substation prior to conversion to 7,200 volts.*

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volts to 7,200 volts, the most radical since the change to alternating current some 77 years prior. A long neglected substation was repaired as many cracked insulators were found along with improper lightning arresters on the incoming 69,000 volt feed, which were all quickly corrected. The city's 2,000 plus customers were very understanding and cheerfully bore the necessary outages (they were used to them from before) which was soon to bring much improved service.

A long term supplemental power contract in 1989 and a willingness to cooperate has brought Farmington and Aztec closer in purpose as they together face challenges awaiting the electric industry.

Things did get better with a drastic increase in service quality, a reduction of losses by 13 percent and a system prepared for growth as we near the 21st century. This allowed a roll back of electric rates to one of the lowest in the region. A continuing maintenance and upgrade program is in place helping to keep the system up to date. The system has and continues to implement cost effective programs to reduce waste, properly account for all energy and improve efficiency. To show its appreciation the City of Aztec named its electric substation and made an honorary citizen of Tommy Bolack for contributions and Bolack remains electric utility director today.



***The Aztec (Tommy Bolack) substation today with a combined capacity of 12 megawatts will prove sufficient well into the 21st century.***



In 1992, the Aztec Electric Utility System, particularly for one its size, is as nearly up-to-date as is possible. The healthy numbers are as good as can be expected on any distribution system nationwide. The utility is also interested in promoting customer awareness in electrical safety. In 1990, a safety program: "*Electricity the Silent One*" was put together and offered free to the general public. This, along with the City Commission proclaiming May 20-25 as Electrical Safety Week in Aztec and providing written material has hopefully made progress towards achieving this goal.

Environmental concerns, which prompted the increased use of hydro-power in the 1960's, would begin to 'gnaw' away at the availability of this resource. The concern for natural flows and the aquatic life in the rivers may have a profound effect on reducing the amount of available energy, thus encouraging conservation. This, along with additional power requirements for many new federal projects, will begin to place an additional burden upon this resource. The efficiency and conservation projects put in place during the late 1980s by the Aztec System have given it a headstart as many of these are now being mandated of all federal power users. The 1990's will probably go down in history as the 'conservation decade' seeing that we as a whole have been wasteful of this 'taken for granted' servant. The City of Aztec Electric Utility System has entered into a Conservation and Renewable Energy Program through Western Area Power Administration by which it will continue to cut waste and use the resource more efficiently.

Tribute must be given those whom, despite the difficulties, continued to "hold on to the electric system" so that it may today be a benefit to all its' citizens. Our healthy numbers, especially for a system its size, are phenomenal with efficiency approaching 97%, power factors of .999, voltage drop near zero and outage factor less than one 1/1,000th of a percent! Few citizens realize in how many ways profits generated by their system contribute to programs within the city operation.

This story is but one tiny part of 'evolution' an industry took throughout the nation. However it remains quite representative as a whole. The 'art' has transformed an item of luxury to one of necessity, as that kilowatt hour of electricity, which sold for 15 cents in 1909, should sell for ten times that today, not the seven cents that it does. This fact certainly stands as testimony to the refinement an 'art' can achieve. Those light switches in our homes are inadequate tribute to the complexities that precede them. From the 30,000 volt generator to million volt transmission line, thousands of miles in length, through 12,000 volt distribution to our 120 volt housewire; these steps may number as many as 20.

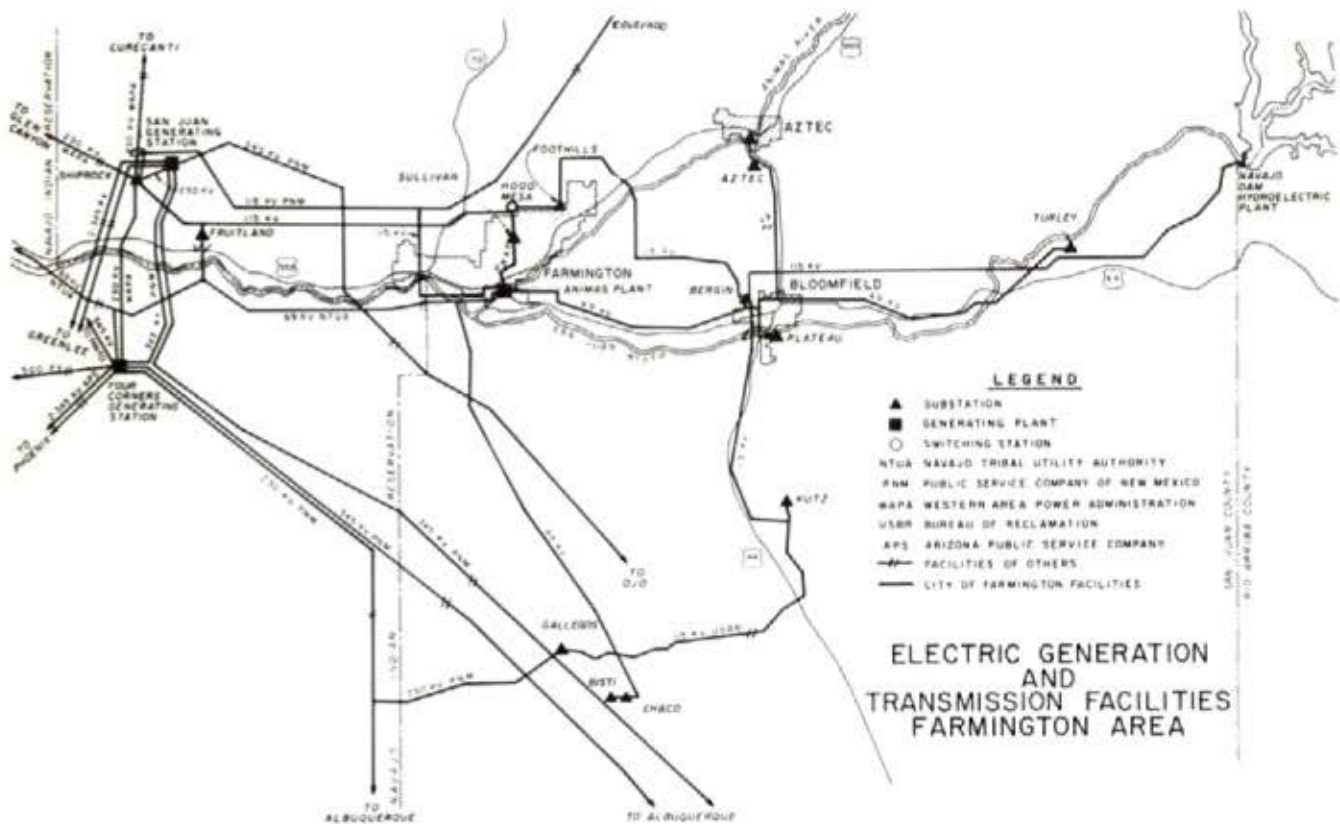
Have we achieved perfection, or are we merely approaching another milestone, as we enter the next century striving to keep this servant our best energy buy?

It certainly has been worth fighting for, so that electricity may continue to contribute to the growth and prosperity of the City of Aztec and the Basin as a whole. City Commissioners now serving: Mike Belt, Mike Padilla, Randy Kirkpatrick, John Sullivan, Pat O'Hearn and Manager Debi Lee look forward to the benefits that will be realized for many years to come.

The City of Bloomfield, being nearly the same size as Aztec, is presently looking into diversifying its resource base. Bloomfield is considering the purchase of the electric system within its corporate limits, which could provide much needed income.

# CONCLUSION

As we work our way through the last decade of the 20th century we often have little time to reflect: On South Lightplant Road the waterwheel is gone, the engines are silent, the concrete structure and a memory are all that's left. At this riverside site the faint distant buzz of energy coming from hundreds of miles away is all that's now heard. . . . One can't help but think of the many dedicated men, who at any hour, would travel that little Light Plant Road to keep those currents aflow – a voice, an echo: "Pick her up slow, turn her off fast, we did it." Listen and we may all know.

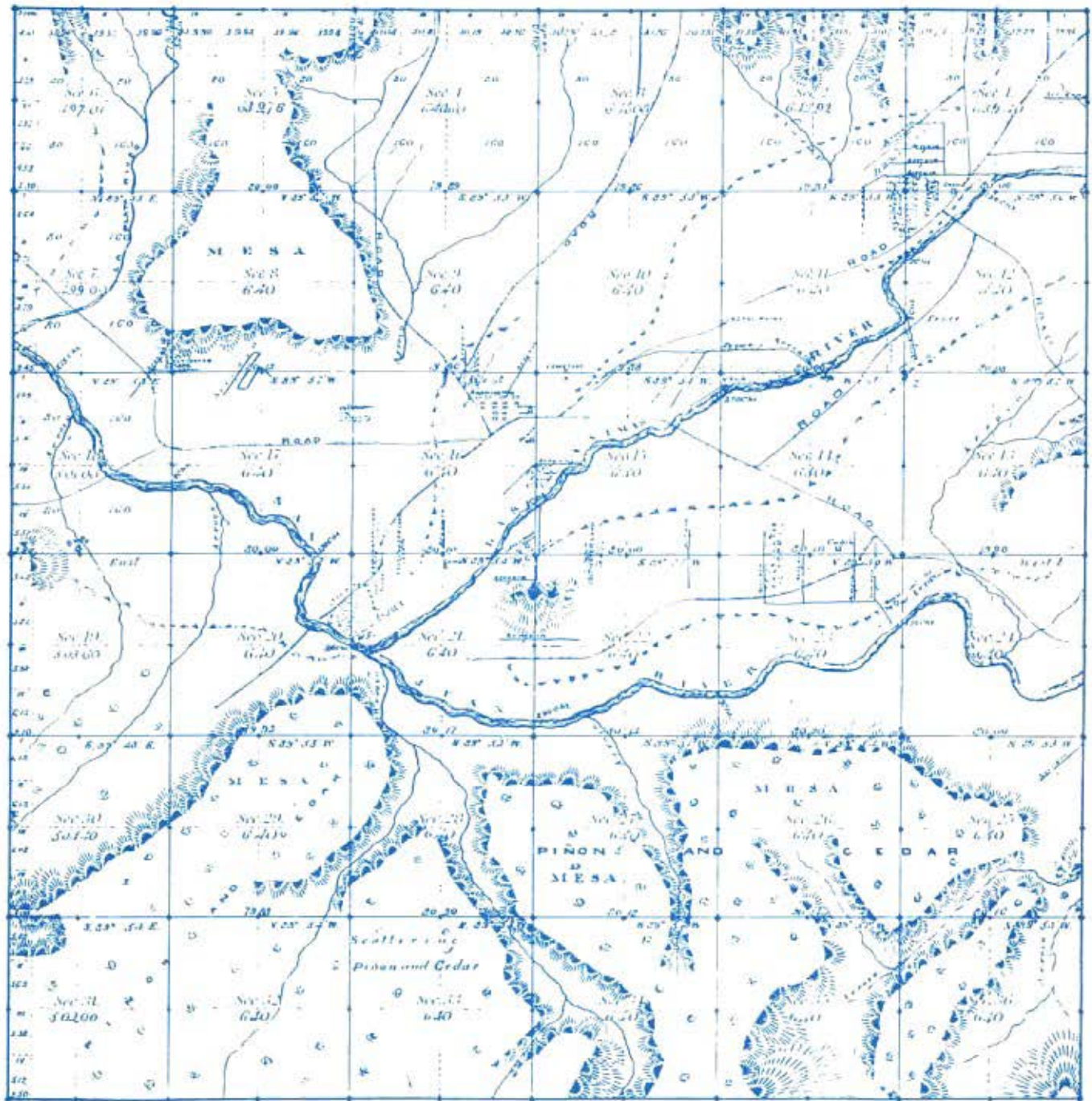






***Black Bear Cub coming into contact with a 7,200 volt power line demonstrates this energy's deadly possibilities.***

(Photo courtesy Greg Sorber – *Albuquerque Journal*)



**Original 1877 (Farmington) Township (T29N, R13W) Survey filed in the U.S. Land Office in 1881.**

(Courtesy Bureau of Land Management – Santa Fe)