

WELCOME TO  
UNION ELECTRIC'S  
**BAGNELL DAM**



## BAGNELL DAM

Construction on the Osage hydroelectric plant (Bagnell Dam) began in August 1929, and it went into operation in October 1931. The dam itself is one-half mile long, rises 148 feet from bedrock and impounds 650 billion gallons of water. Sixty thousand carloads of material were used in its construction—enough to fill a freight train reaching from St. Louis, Missouri to Tulsa, Oklahoma. Originally the project cost \$30,000,000; an additional \$5,000,000 has been invested in new units and a substation.

The plant is used primarily during peak demand periods. The power it generates is sent over four transmission lines to St. Louis where it is interconnected with power from nine other Union Electric plants: seven steam plants, another hydroelectric plant on the Mississippi River at Keokuk, Iowa and the Taum Sauk pumped-storage hydro plant near Lesterville, Missouri. A fifth transmission line goes to Moberly, Missouri and connects with a substation of Missouri Power and Light Company.

(continued on page 6)



Outside view of "main deck" of power station. The circular covers protect the generators from the weather.

20.50  
2129  
048  
A 827

TS. 350 MER 916  
CAN 300 VEN 563  
650  
1479

KEOKUK 118  
OSAGE 215  
333

AGN 75  
MOCK 40  
115  
SIAUX 1050  
LAF 1200  
2250

## CENTRALIZED CONTROL

MOUND  
POWER PLANT

ASHLEY  
POWER PLANT

KEOKUK  
POWER PLANT

CAHOKIA  
POWER PLANT

OSAGE  
POWER PLANT



LABADIE  
POWER PLANT

SIoux  
POWER PLANT

TAUM SAUK  
POWER PLANT

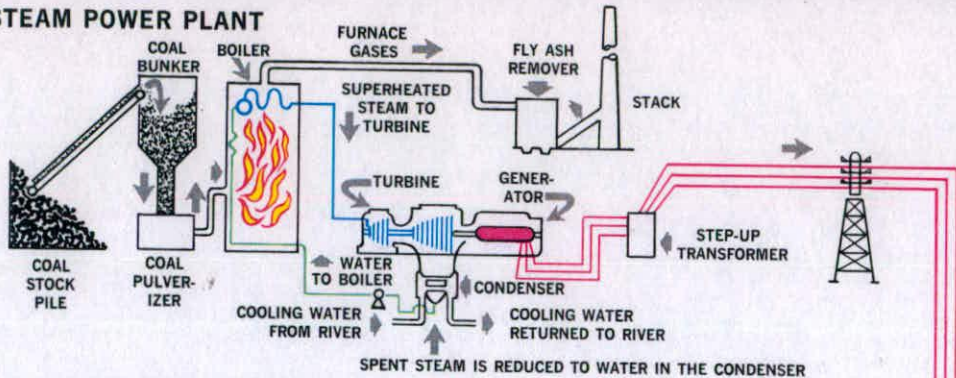
MERAMEC  
POWER PLANT

VENICE  
POWER PLANT

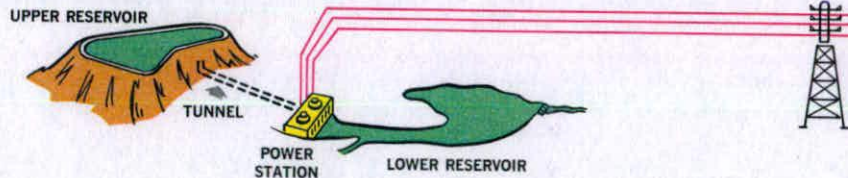
The Load Dispatching Office in St. Louis is the master control center of Union Electric's power operations. Here, by means of the most up-to-date electronic equipment, the amount of power needed by our customers can be determined, the amount generated at each of our ten plants can be controlled, and the route the power will take to reach the customers can be established. Also, the amount of power that can be sold or must be bought, through interconnections (power pools) with neighboring utilities, can be determined.

# HOW ELECTRIC ENERGY IS GENERATED, TRANSMITTED AND DISTRIBUTED

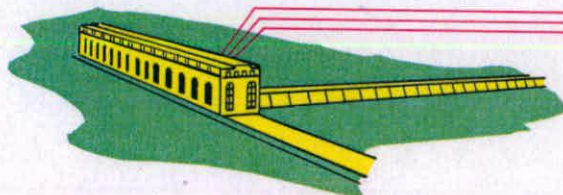
## ● STEAM POWER PLANT



## ● PUMPED-STORAGE PLANT



## ● CONVENTIONAL HYDROELECTRIC PLANT



**GENERATION**

**TRANSMISSION**

**TRANSMISSION  
SUBSTATION**

Electricity is the only product in the world that is ordered, made and delivered in a split second. Here's how it's done:

**1. GENERATION**—Union Electric has three main types of generating plants: hydro, pumped-storage hydro and steam. A hydro plant is powered by falling water from a river or lake. As the water rushes through the dam, the power of the water spins the water wheels which drive the generators where the electricity is produced.

A pumped-storage hydro plant works on the same principle but uses the same water over and over. When demand for electricity is high (peak periods), the water is released from an upper reservoir above the plant;

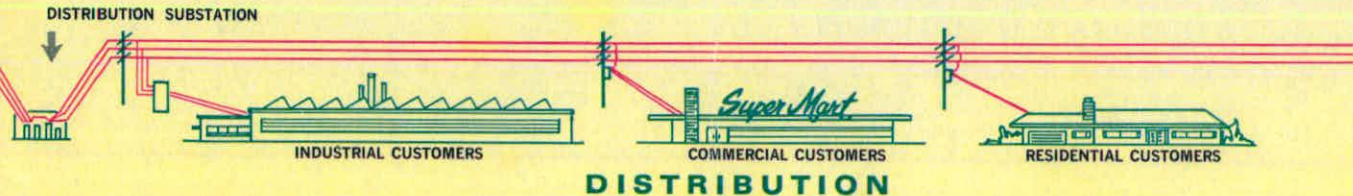
it flows through a tunnel at great speed and drives the generators as it passes through the plant. When demand is low, power from other plants is used to reverse the operation of the generating units to pump the water back uphill.

In a steam plant, crushed coal, sometimes in powder form, is blown into the furnace where it is ignited. Water (contained in tubes lining the boiler) is then turned into steam, which under extreme pressure flows through more tubes leading to the turbine. The high pressure steam spins the turbine which turns the rotors in the generator to produce the electricity.

**2. TRANSMISSION**—Electricity is produced at 10,000 to 20,000 volts

but to be sent long distances efficiently, the voltage must be increased from ten to thirty times. Transformers located at each plant step up the voltage, and the power is then transmitted along high-voltage transmission lines to substations where it is stepped down to 12,000 volts prior to distribution to our customers.

**3. DISTRIBUTION**—From the substation the power travels over distribution lines to the customer. Before he can use it, however, the power is further stepped down to 120 or 240 volts by transformers near his property. Then, with the flick of a switch, electricity is at work in our homes, offices, industries, schools . . .

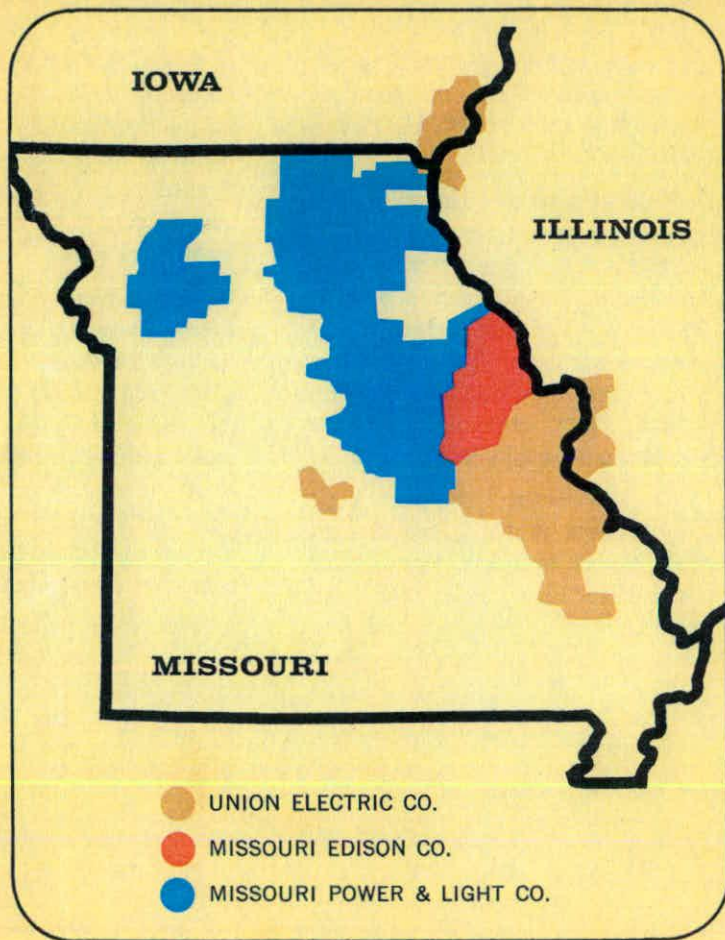


## THE UNION ELECTRIC SYSTEM

The Union Electric System includes Union Electric Company and its two subsidiaries, Missouri Power and Light Company and Missouri Edison Company. In total, this investor-owned power system provides electricity to over 2½ million people in a 19,000-square-mile service area which includes parts of Missouri, Illinois and Iowa.

### SYSTEM STATISTICS

- Annual Revenue—Over \$270 million
- Annual kwhr Sales—16.7 billion kwhr
- Total Investment—Over \$1.5 billion
- New Investments—Averaging \$150 million annually
- Number of Stockholders—94,000
- Number of Electric Customers—800,000
- Number of Employees—6,000
- Investment per Customer—\$1,900
- Investment per Employee—\$255,000
- Average Residential Customer Usage—6,560 kwhr annually



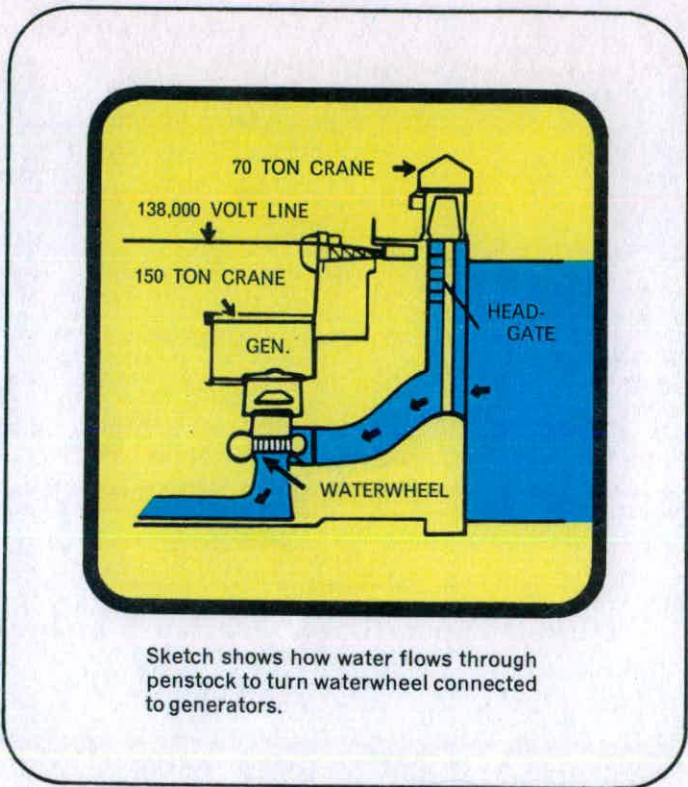
# POWER HOUSE

(continued from page 1)

The average yearly output of the Osage Plant is 440,000,000 kilowatt hours. Each of the plant's eight generators has a nameplate capacity of 21,500 kilowatts. However, on occasion the plant has been able to reach a generation peak of 215,000 kilowatts . . . enough power to meet the household needs of 225,000 people.

The generators spin at a rate of  $112\frac{1}{2}$  revolutions per minute and develop 13,800 volts each. The plant's eight water wheels weigh fifty tons each, and the solid steel shafts extending from the waterwheels to the generators each weigh  $37\frac{1}{2}$  tons. When the plant is operating at full capacity, it takes 240,000 gallons of water a second to drive these eight generators.

The combination guide and thrust bearing which supports the 475,000 pound rotating element holds 30 barrels of lubricating oil . . . 240 barrels for all eight machines.



$$\begin{array}{r} 20 \\ 8 \\ \hline 1,20 \end{array}$$

$$\begin{array}{r} 44 \\ 4 \times 3 \\ \hline 176 \end{array}$$

$$\begin{array}{l} 176 \times 18 \\ 120 \times 28 \end{array}$$

6

$$\begin{array}{r} 176 \\ 176 \\ \hline 1408 \\ 176 \\ \hline 3168 \end{array}$$
$$\begin{array}{r} 28 \\ 1.2 \\ \hline 56 \\ 28 \\ \hline 33.6 \end{array}$$

## LURE OF THE LAKE

The Lake of the Ozarks is one of the largest manmade lakes in the world. It has a shoreline of 1300 miles . . . longer than that of Lake Michigan. It covers an area of 93 square miles, reaches into seven counties and contains 650 billion gallons of water—enough to supply the city of St. Louis with all its water needs for nine years.

The area has become Missouri's largest playground—providing year-around entertainment ranging from boating, swimming and fishing in the summer to skiing in the winter.

