

History

FROM ITS DISCOVERY IN 1540 until it was harnessed by Boulder Dam almost four centuries later, the Colorado River was America's most dangerous stream. Friendly rivers in other sections provided safe highways to lead the pioneers into the wilderness, but the surly Colorado, sulking in its canyons, could not be used. On the other hand, it could be crossed only at widely separated places along its 1,700-mile course from the Rocky Mountains to the Gulf of California.

Like other western desert streams, this giant fluctuated each year through a cycle which ran from a roaring, flood-swollen torrent when snows were melting, to a sandy-bottomed, sluggish creek during the long, dry summers and autumns.

Man's crying need for water in this thirsty West, however, caused him early to turn calculatingly upon the Colorado in an effort to devise some means to make a servant of this untamed stream.

Before Boulder Dam, whenever he tampered with the river he brought disaster upon himself. Farmers, tempted by dry, fertile desert soil in the Imperial Valley of California and near Yuma, Ariz., tapped the river for irrigation water to create vast and rich gardens. But the unregulated Colorado took its vengeance upon them. Annually it sent destructive floods and annually it cut off by fading to a trickle the water supply upon which their crops and their lives depended.

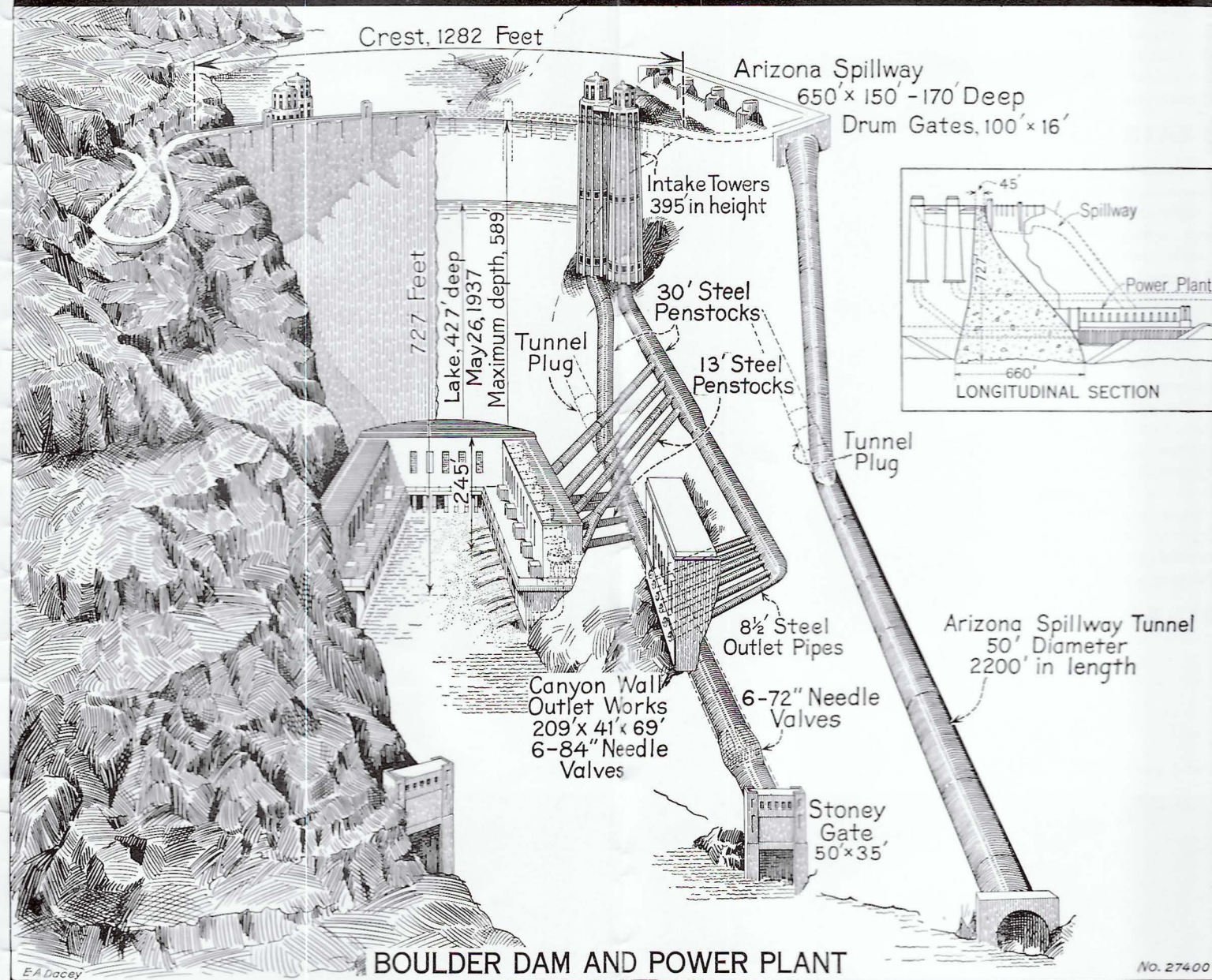
A great cry arose for control and conservation of the waters of this river, the waters which were the most valuable natural resource of a vast desert empire.

Agitation for action increased, and in 1922 representatives of the Federal Government and of the seven States in the Colorado River Basin met in Albuquerque to draft a compact for the division of the waters of the Colorado River.

In 1928 the Congress passed the Boulder Canyon Project Act; by 1930 it had been ratified by the required six of the seven States, and construction was begun by the Bureau of Reclamation in 1931. In 4 years and 354 days Boulder Dam was complete, and man had won his victory.

The Colorado River now is a useful and reliable friend to the people of the Southwest. Floods cannot pass the dam, which saves the flood waters and uses them by generation of electricity to turn factory wheels 250 miles away, and to provide an unvarying supply of domestic and irrigation water for rural and urban communities from Los Angeles, Calif., to Yuma, Ariz.

How Boulder Dam Works . . .



THIS DRAWING shows how Boulder Dam works. The Nevada wall of Black Canyon of the Colorado River is shown solid, but the Arizona wall has been cut away to reveal the intake towers, the spillway, the penstock pipes, and outlet works. Inside the Nevada wall of the canyon a similar set of diversion works has been placed. Principal dimensions are shown.

The power-house, here shown dwarfed in the

bottom of the canyon, is a city block long and as high as a 20-story building. In it ultimately will be installed 15 generators of 82,500 kilovolt-ampere capacity and 2 of 40,000 kilovolt-ampere capacity. An idea of the comparative capacities of the 15 big generators may be obtained from the fact that the small ones are about as large as any others in the world.

The tunnels originally used to divert the

Colorado River around the dam site during the period when Boulder Dam was under construction, now are used in the penstock and outlet system for the greater part of their lengths. They have been plugged upstream from the points at which the continuously useful outlets enter them, as can be seen in the drawing.

Achievements

THE ACHIEVEMENTS OF BOULDER DAM run the scale in the field of water conservation from flood control to provision of a valuable wild waterfowl refuge. In regulating the treacherous Colorado River, Boulder Dam has changed its character entirely for 565 miles from the lower end of Grand Canyon to its mouth at the northern tip of the Gulf of California.

The farmers in the Imperial and Yuma Valleys and elsewhere along this stretch of the river now are provided with a steady and trustworthy supply for the irrigation upon which they rely. The domestic water supply of 13 cities, 250 miles west of the Colorado River on the Southern California coastal plain in the vicinity of Los Angeles, is being augmented through the Metropolitan Water District's aqueduct as a result of construction of Boulder Dam. The floods which once raged through Black Canyon, pouring a destructive force against the communities far downstream, now are halted here by Boulder Dam and the water saved for use. Navigation is possible through the magnificent canyons 115 miles above Boulder Dam, and navigation has been improved on the lower river. A new recreational area of major importance has been created with Lake Mead by Boulder Dam in an area which formerly was forbidding and unvisited. The dam and the lake now are visited by almost half a million people a year. The lake is being stocked with fish. Already it rivals the most popular national park as a tourist and sportsman's attraction. As a wild-fowl refuge the lake assumes new importance, since it is on one of the major migration fly ways and offers a haven for waterfowl in a vast area where none previously existed.

Boulder Dam traps the muddy silt-laden waters which pour through Grand Canyon and releases them settled and clear.

And, in addition, Boulder Dam has made possible the generation of 1,835,000 horsepower of electric energy, which is being sold under contracts which will return its entire cost and create a great surplus in 50 years.

With the initial installation in the power-house complete and four big generators in operation, by the summer of 1937 Boulder Dam was producing more than 80,000,000 kilowatt-hours of energy a month and returning in excess of \$125,000 to the U. S. Treasury each month.

While power is a by-product of the dam, the fact that Boulder Dam has made available much cheap energy is important to the future welfare of the whole Southwest.



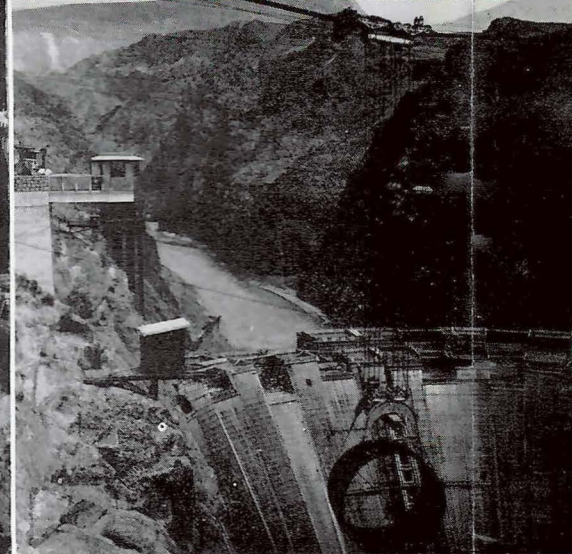
Black Canyon in 1930



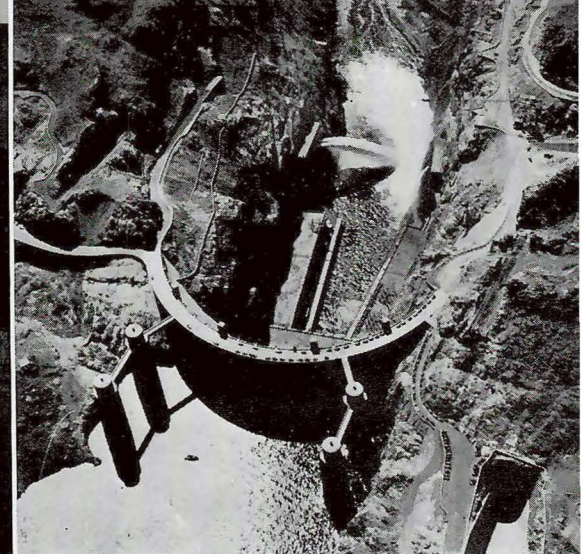
Shovel in the canyon, 1933



Boulder Dam grows, 1934

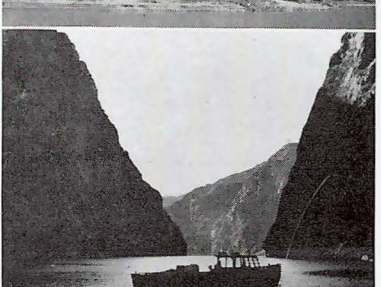
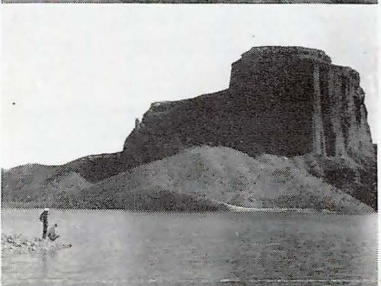
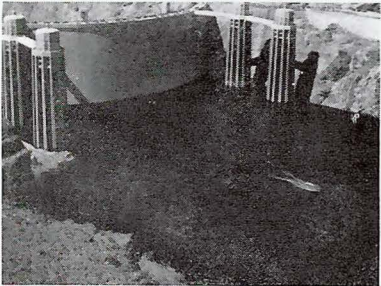


Lowering 150 tons of penstock pipe, 1935



Air view of Boulder Dam, 1936

SNAPSHOTS OF LAKE MEAD



LAKE MEAD

Named for the late Dr. Elwood Mead, Commissioner of Reclamation from 1924 to 1936, Lake Mead is the tremendous reservoir created by Boulder Dam in the canyons of the Colorado River. It provides an avenue of easy access to stretches of the river which had been visited by only half a dozen daring expeditions before the dam was built. It opens to all magnificent vistas of some of the world's most amazing canyons—Boulder Canyon, Travertine Canyon, Iceberg Canyon, and the lower and previously unvisited end of Grand Canyon. Colorful and impressive, at points along the lake, cliffs rise overhead nearly a mile.

Lake Mead is a popular boating and bathing resort. It is being stocked with fish. It is used also, from time to time, by miners who freight their ore in barges from isolated mines far up the river to rail and highway connections at Boulder Dam.

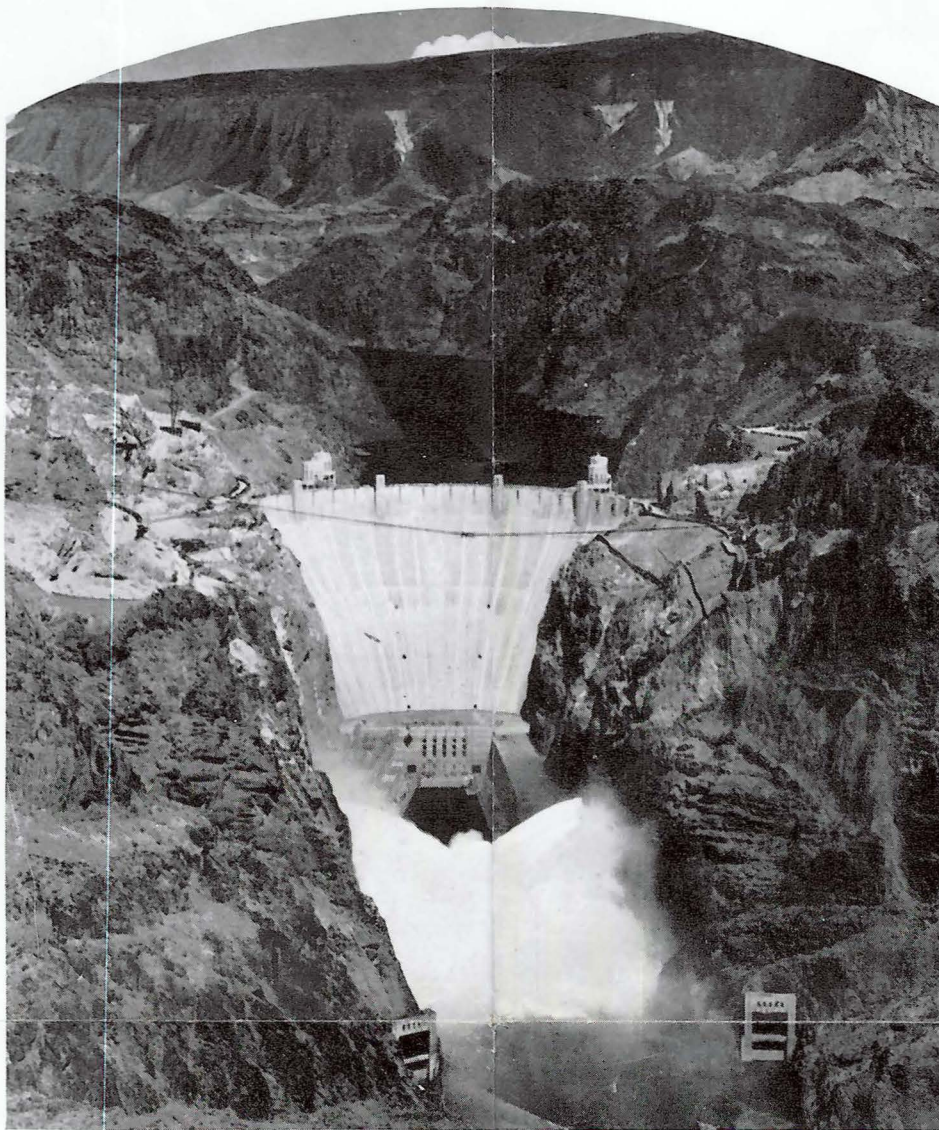
DOMESTIC WATER

On the coastal plain of California are a cluster of cities at Los Angeles sorely in need of additional domestic water. Thirteen of these have organized a Metropolitan Water District and are constructing an aqueduct 250 miles long which will tap the Colorado River at Parker Dam, 150 miles downstream. Water diverted through this \$220,000,000 aqueduct will be available and useful only because Boulder Dam has regulated and harnessed the Colorado River.

The aqueduct will assure Southern California of a safe water supply for almost double its present population.

CONSTRUCTION

Boulder Dam, an unequalled engineering achievement, was completed in 11 days less than 5 years. It employed more than 4,000 men at the site during construction, and fabrication and transportation of materials gave work to several times that many from Maine to California.



BOULDER DAM, majestic in its clean, graceful lines, stands with one shoulder against the Arizona wall and the other against the Nevada wall of Black Canyon, forever to control the wild Colorado River

IRRIGATION

The West is arid and semi-arid. Agriculture in the West is dependent upon irrigation. Below Boulder Dam lie some of the world's most forbidding desert areas, drier than Sahara, recipients of 3 inches or less of rain in a year. Without the artificial application of water these areas would be totally useless. With irrigation, their rich soil and warm frost-free climates make them gardens of almost unmatched productivity.

There are, below Boulder Dam and capable of being served by it, approximately 1,900,000 acres of such lands. At present about half of this area is irrigated and in production. Large, successful irrigation projects are in operation in the Palo Verde Valley in California, about 200 miles downstream, and in the Imperial Valley in California, and the Yuma-Gila Valleys in Arizona, 300 miles downstream. Eventually this irrigated area will be expanded. At present, however, there are no homesteads available.

RIVER FLOW

The greatest recorded flow of the Colorado River was 240,000 cubic feet of water per second, but there are evidences that floods as great as 300,000 second-feet have been experienced. The floods come each spring with the melting of snows in the mountains. In the late summer the flow may be reduced to little more than a trickle.

Records disclose, however, that the annual average run-off of the river at Boulder Dam exceeds 15,000,000 acre-feet of water, an acre-foot being sufficient to cover an acre 1 foot deep. Lake Mead, therefore, will impound the entire average flow of the river for about 2 years, since its capacity is 30,500,000 acre-feet.

INFORMATION

For additional or detailed information concerning the Boulder Canyon Project you may write to John C. Page, Commissioner, Bureau of Reclamation, Department of Interior, Washington, D. C. The project was constructed by the Bureau of Reclamation, and is under its general supervision.

T H E P L A N F O R R E P A Y M E N T

BUILT at a cost of \$108,800,000, Boulder Dam is an investment which will be repaid with interest in 50 years to the Federal Government under contracts now in force for the sale of power. When the repayment has been completed, the dam, the power plant, and machinery and all appurtenant works still remain Government property.

The firm power, of which there will be about 4,330,000,000 kilowatt-hours a year, is sold as falling water measured in voltage delivered at the switchyard at 1.63 mills per kilowatt-hour. In selling the power as falling water, the cost of operating and maintaining the generating machinery is placed upon the power purchasers.

Contracts for the sale of all the Boulder Dam power were completed in 1930, before construction of Boulder Dam began. Principal contractors are the city of Los Angeles, the Metropolitan Water District of Southern California, the California-Nevada Power Co., and the Southern California Edison Co. Arizona and Nevada each have the right to buy and dispose of 18 percent of the power.

Power generation was begun September 11, 1936, when President Franklin D. Roosevelt in Washington pushed a golden key starting the first generator. The initial installation of four 82,500 kilovolt-ampere generators was completed in March 1937, and all power purchase contracts became operative June 1, 1937, when

Secretary of Interior Harold L. Ickes notified Los Angeles that the Bureau of Reclamation was prepared to furnish firm energy henceforth.

Approximately \$1,500,000 was expected to be received by the Government in 1937 from the sale of Boulder Dam power.

The original power purchase contracts not only contemplated complete amortization of the investment in the dam and power plant with interest in 50 years, but also the payment of a certain percentage of revenues to Arizona and Nevada in lieu of taxation and the accumulation of a surplus which would be used in further development of the Colorado River.

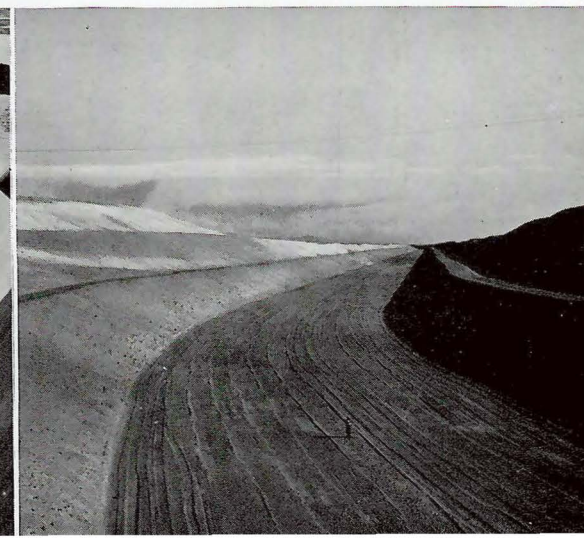
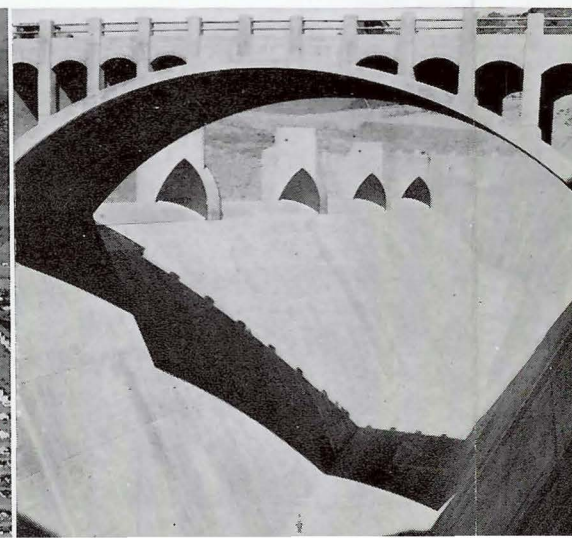
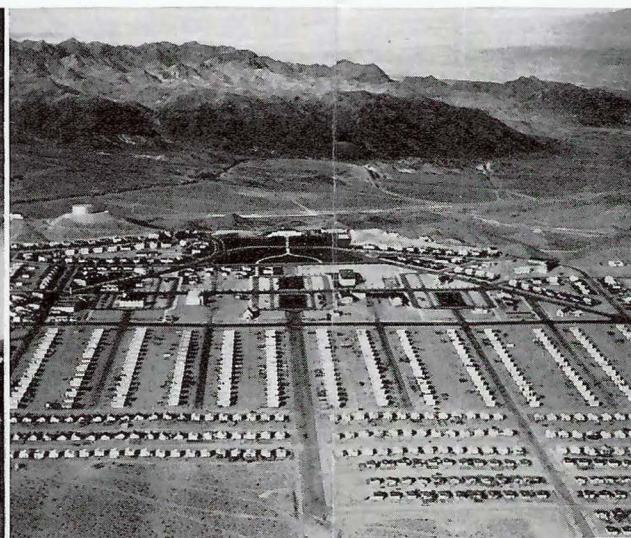
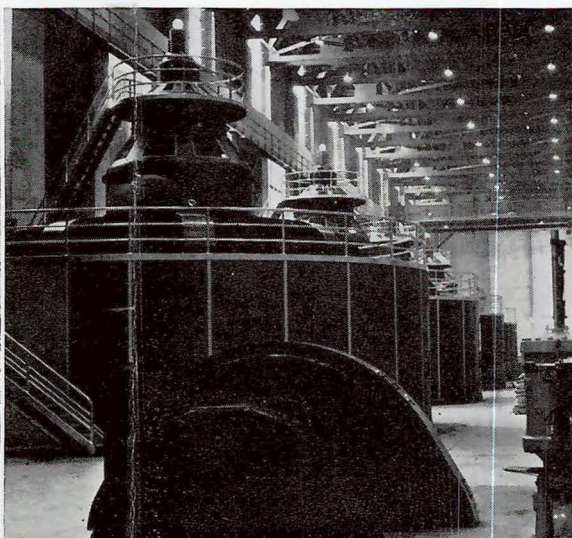
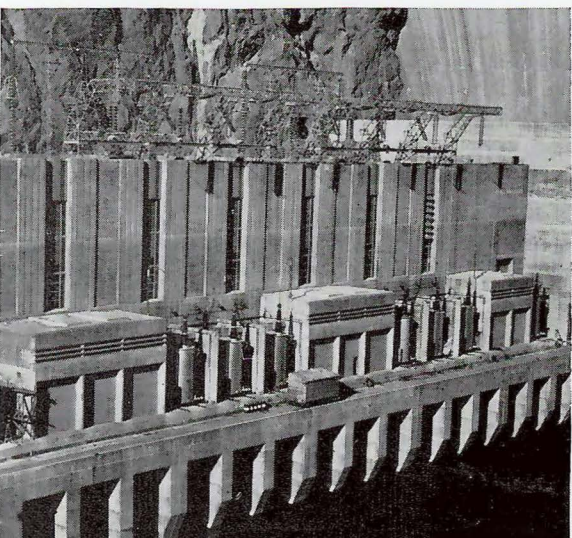
The power-house at the toe of Boulder Dam is a U-shaped structure, each wing 650 feet long and as tall as a 20-story building. The Nevada wing, the first to go into operation, is seen here from across the tailrace.

The initial installation of generating equipment at Boulder Dam is made up of 4 units, each composed of a 115,000-horsepower turbine and a generator of 82,500 kilovolt-ampere capacity, which serve the line of the city of Los Angeles.

To house the workmen during construction and the operators of Boulder Dam and power plant, the Government built Boulder City, a model town. In 1930 a desert waste, the site of Boulder City was quickly transformed. It now teems with activity. Tourists can find comfortable quarters at Boulder City.

Every dam has its spillway which operates as a safety valve to prevent the reservoir from overflowing the dam in emergencies. This is the Arizona spillway at Boulder Dam. An identical spillway also was constructed on the Nevada side of the dam. Either could dock the biggest ship.

The All-American Canal, a part of the Boulder Canyon project, as adopted by Congress in 1928, extends from the Colorado River near Yuma, Ariz., about 300 miles below Boulder Dam, along the International Boundary 80 miles west. It will serve the great Imperial Valley in Southern California with an adequate, reliable water supply.



CONSTRUCTION SNAPSHOTS

