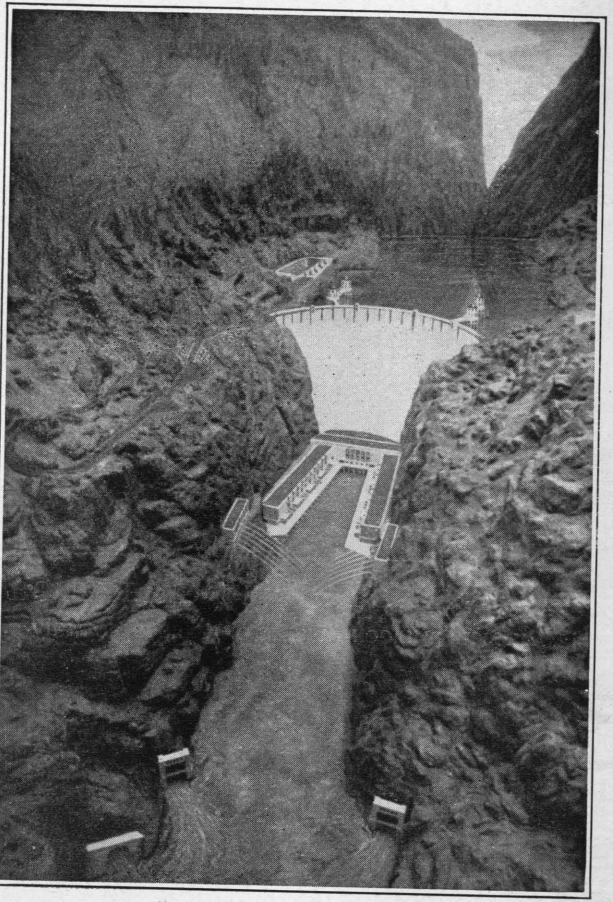
DEPARTMENT OF THE INTERIOR

BUREAU OF RECLAMATION



BOULDER DAM AND POWER PLANT

VIEW OF OPERATING MODEL—LOOKING UPSTREAM

DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
BOULDER CANYON PROJECT

BOULDER DAM AND POWER PLANT

A Century of Progress Exhibit—Chicago, 1933

THE OPERATING MODEL

The views of the operating model shown in this leaflet convey a general idea of Boulder Dam, Power Plant and related structures as they will appear after completion. The model, which is 16'-6" long and 6'-6" wide, is complete in every detail, even to the rugged outline of the cliffs in picturesque Black Canyon. In the distance on the hand-painted panoramic background appear the snow-capped mountains to the north of the damsite; to the right is Fortification Hill, so named on account of its use by early pioneers in protecting a nearby boat-landing on the Colorado River; to the extreme left at the head of Hemenway Wash lies Boulder City, a modern town with a population of over five thousand built to accommodate the construction organization engaged on the project. The central portion of the panorama shows a portion of the reservoir created by the dam. This reservoir will be 115 miles in length and will have a capacity of 30½ million acre-feet or enough water to cover the state of New York to a depth of one foot. In the middle foreground rises the Nevada rim of the canyon which gradually blends into the topography of the model.

The model is constructed to make a complete cycle of operations in nine minutes, demonstrating the various operations made possible by the dam and related structures. During this cycle the reservoir gradually fills, and when the water surface reaches the base of the intake towers, discharge of water through the power plant takes place; as the reservoir water surface rises above the base of the intake towers the outlet valves on the canyon walls begin to discharge and continue until the water surface reaches the spillways, this operation being a part of the scheme for drawing the storage down during the early spring months in preparation for an impending flood; and as the water surface approaches the crests of the spillways, the drum gates on these crests are automatically raised to increase the flood storage. When the water surface overtops the drum gates they are automatically dropped just before the reservoir water surface reaches the top of the dam, releasing a flood corresponding to 200,000 cubic feet per second down each spillway. As nine minutes is too long for many visitors at the exposition to spend at one exhibit this cycle is not being used constantly. When this cycle is not used the model is being operated under full reservoir conditions, controlled only by the drum gates; and all outlets are shown with a steady discharge of water. The designed cycle of operations possible with the model serves to demonstrate the function of each part of the project and to simulate its operation under conditions of maximum capacity. The cycle of operations is representative only and will never actually occur in the sequence described.

A study of the general layout on the back of this leaflet will enable one to understand how the completed works will control the flow of the Colorado River.

THE DAM

Boulder dam, the principal feature of the Boulder Canyon Project, is located in Black Canyon of the Colorado River on the boundary between Arizona and Nevada about 30 miles southeast of Las Vegas, Nevada. It is a concrete arch-gravity dam with a maximum height above foundation rock of 726 feet, a crest length of 1200 feet, and a base thickness of 650 feet. The dam itself will contain approximately 3,400,000 cubic yards of concrete. River diversion during construction is accomplished through four fifty-foot diameter concrete lined diversion tunnels; two on each side of the river. After diversion is completed the tunnels will be plugged near the upstream ends. The spillways will be connected through inclined shafts to the two outer tunnels, and a 30-foot diameter steel power penstock pipe will be installed in each of the inner tunnels. The discharge from the reservoir will be controlled by means of cylinder gates in the four intake towers located on the canyon walls near the upstream face of the dam. From the base of each of the four intake towers water will flow through 30-foot steel penstock pipes, to the power plant for the generation of power, and to the outlet valves for release of flood and irrigation storage when the discharge through the power plant is insufficient for these purposes.

THE POWER PLANT

The power plant, a U-shaped reinforced concrete structure, is located immediately downstream from the dam. Plans provide for the ultimate installation of fifteen 115,000 and two 55,000-horsepower units, making a total installed capacity of 1,835,000 horsepower.

PURPOSE

The purpose of the project is fourfold: (1) flood and silt control for protection of lands along the lower river, (2) storage and regulation of water for irrigation, (3) storage of water for domestic use for Los Angeles and other cities in Southern California, and (4) development of power, to make possible the repayment of the construction cost of the project.

REPAYMENT

The entire cost of the dam, power plant and related structures with interest at 4 per cent per annum will be repaid in less than fifty years from revenues derived from the sale of electrical energy and water. Contracts have been entered into with the City of Los Angeles, the Metropolitan Water District of Southern California, and the Southern California Edison Company, which provide for the disposal of the total amount of power which the project will make available, and these contracts assure adequate revenues to repay the Government's investment. The project is therefore self-liquidating and will impose no burden whatever on the taxpayers of the country. After providing for the cost of operation, maintenance and depreciation, the annual revenues will be applied first to the payment of interest on the unliquidated portion of the investment and second to repayment of the principal. The surplus revenues will be applied 62½ per cent to the repayment of the $25,000,000 allocated to flood control, and 18¾ per cent each to the states of Arizona and Nevada, the payments to the states being in lieu of taxes.

The Boulder Canyon Project Act, approved by the President on December 21, 1928, authorized an appropriation of $165,000,000 for the entire project, of which approximately $110,000,000 will be expended on the dam, power plant and appurtenant works. The initial appropriation was made available on July 3, 1930, and the principal construction contract was awarded in March, 1931. The work is well ahead of the original program and it is expected that construction of the dam and power plant will be completed not later than 1937.

The project is being constructed under the direction of the Department of the Interior, through the Bureau of Reclamation. The model was designed and constructed in the Denver office of the bureau.

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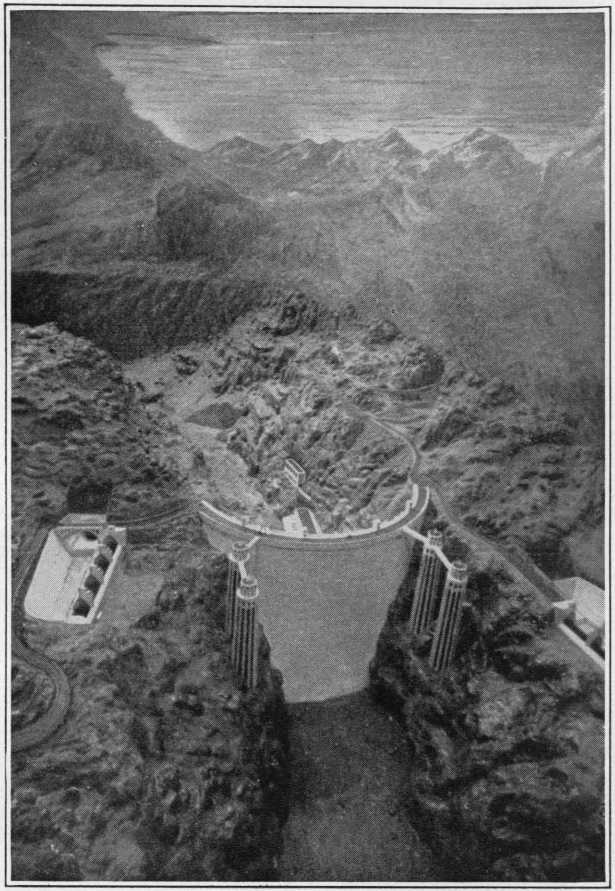

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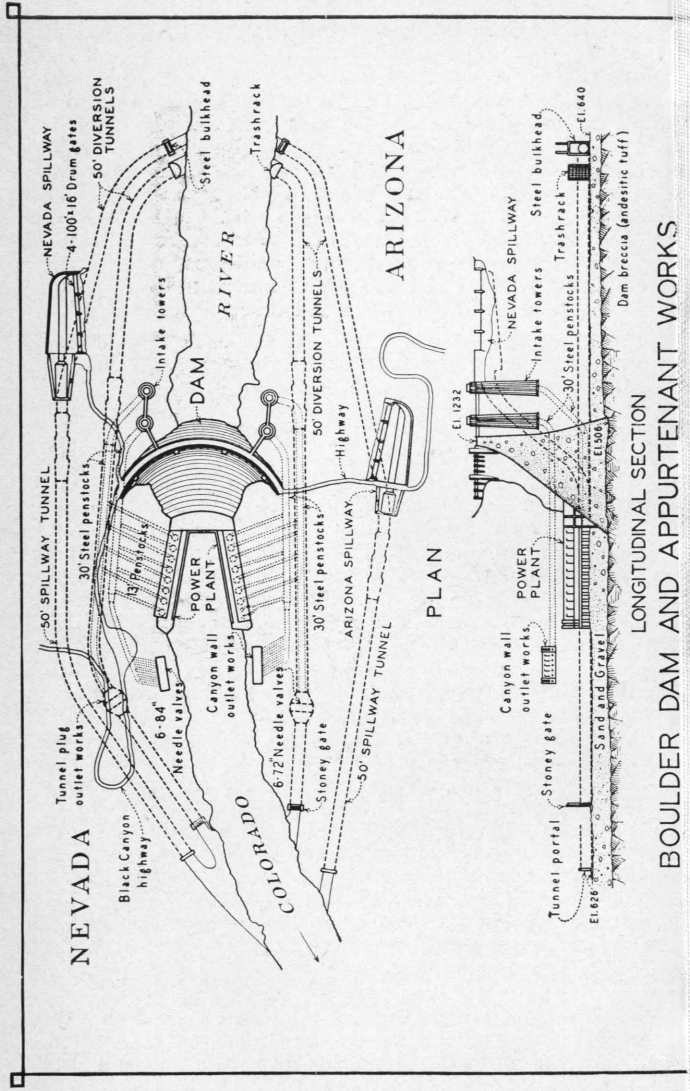
VIEW OF OPERATING MODEL—LOOKING DOWNSTREAM



BOULDER DAM AND APPURTENANT WORKS

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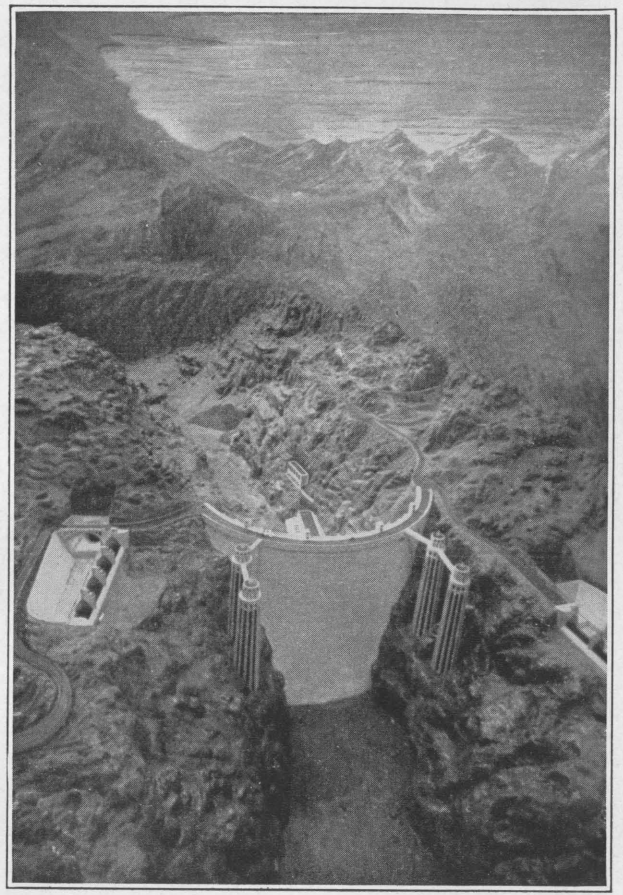

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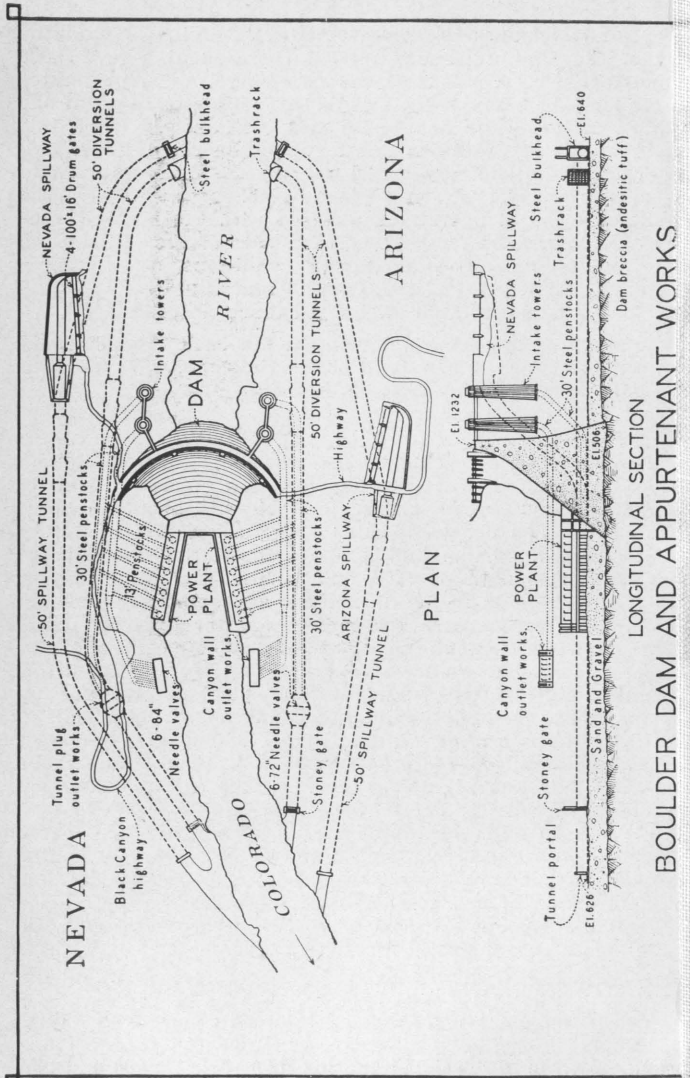

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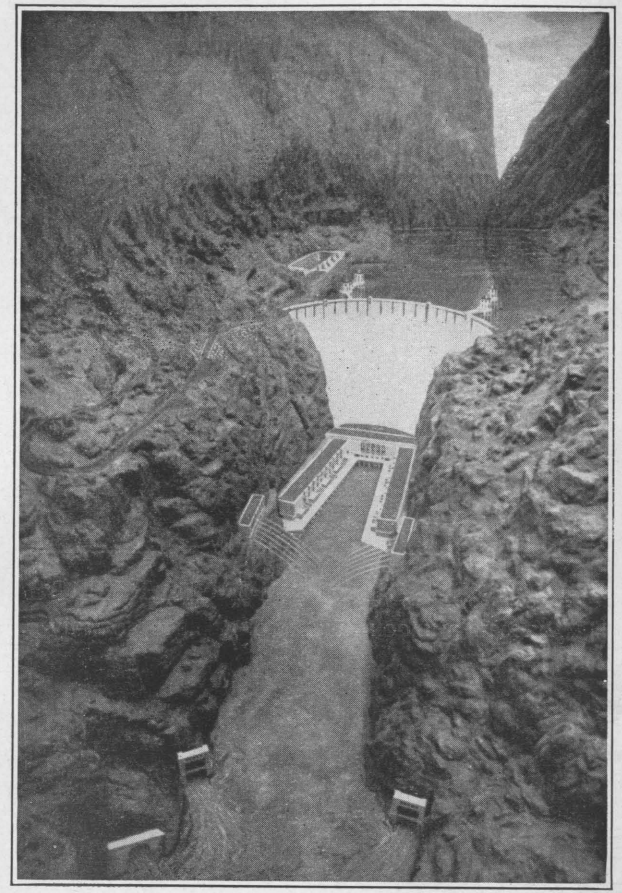

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