

II - DESCRIPTION OF PROJECT

2-01. Location

Alamo Dam is located on the Bill Williams River, 39 miles (62.8 Km) upstream from its confluence with the Colorado River at Lake Havasu. The dam is on the border of La Paz and Mohave Counties, Arizona, about 2.5 miles (4.0 Km) (downstream from Alamo Crossing, see Plates 2-01 and 2-01a). Main access is from the town of Wenden, on U.S. Highway 60, approximately 36 miles (57.9 Km) south of the dam. The geographic coordinates of the dam are 34° 13' 55" N latitude and 113° 36' 29" W longitude.

2-02. Purpose

Alamo Dam and Lake is a multiple purpose project, which was authorized by Public Law 78-534 (22 December 1944). The various authorized purposes are described in the following paragraphs. The first four purposes were initial authorized purposes.

a. **Flood Control**. The project was authorized to provide flood control for lower Colorado River communities downstream from Parker Dam (Lake Havasu).

b. **Hydropower Generation**. The project was authorized for hydropower. Had a hydroelectric powerplant been constructed, the project would have furnished power to the Phoenix area by interconnecting the powerplant transmission line with the Parker Dam powerplant transmission line to Phoenix. This purpose, however, was not deemed feasible and a powerplant was never constructed.

c. **Water Conservation and Supply**. Water conservation and supply was authorized for usage both within the State of Arizona and within the Colorado River mainstem. The purpose, however, has never been implemented, since no entity has ever contracted with the Corps for a firm supply of water.

d. Recreation. The project was authorized for in-lake recreation by the establishment of a permanent pool below the flood control and water conservation pools.

e. Fish and Wildlife Benefits. Public Law 104-303 (12 October 1996) authorized Alamo Dam to be operated for fish and wildlife benefits both upstream and downstream from the dam. This authorization does not reduce the existing flood control and recreational benefits of the project.

f. Water Quality. The overall water quality management objective for Alamo Lake, formed by Alamo Dam is to maintain the best water quality possible with the framework of the flood control, water supply, recreation, and environmental enhancement purposes of the project. The quality of the water is monitored to ensure compliance with applicable Federal and State water quality standards. The current water control plan requires rapid lowering of the reservoir to the 1125-foot (342.9 m) target elevation after major flood events. With this operation, the reservoir evaporation rate is reduced. The result is prevention of an increase in reservoir salinity when the reservoir is at a higher elevation and storage. This, in turn, helps prevent high salinity loading into the lower Colorado River.

2-03. Physical Components

A general plan of the project is shown on Plate 2-02 and a detailed description of the various features is contained in the following paragraphs. All elevations mentioned are based on the National Geodetic Vertical Datum (NGVD).

a. Dam. The dam is a zoned earthfill structure with a top of dam elevation of 1265 feet (385.6 m), a crest width of 30 feet (9.1 m), and a crest length of 975 feet (297.2 m, see Photos 2-01 and 2-02). The height above the original Bill Williams River streambed is 283 feet (86.3 m). The downstream slope of the embankment is 1 vertical on 2 horizontal (1V:2H) and the upstream slope is 1V:2.5H. Both the upstream and

downstream faces of the dam are protected by a layer of stone. Profiles and sections of the dam embankment are shown on Plate 2-03 (reference Photos 2-01 through 2-02).

b. Spillway. The detached broadcrested spillway, with a crest elevation 1235 feet (376.4 m), is located in the right abutment, as shown on Plate 2-03 (reference photo 2-03). The spillway channel, an unlined trapezoidal section 110 feet (33.5 m) wide by approximately 550 feet (167.6 m) long, cuts through a rock saddle, with the concrete spillway crest block, 3 feet wide (0.9 m), 1 foot (0.3 m) deep and 116 feet (35.4 m) long, entrenched in rock (reference Photo 2-04). The spillway profile and section are shown on Plate 2-03. The spillway discharge curve is shown on Plate 2-04. Spillway flow discharges into a gully separated from the right abutment by a rock ridge (Photo 2-05). Flow rejoins the Bill Williams River about 1500 feet (457.2 m) downstream from the toe of the dam.

c. Outlet Works. The outlet works are located in the left, or southeast abutment. Details of the outlet works are shown on Plates 2-05 through 2-07. The concrete-lined outlet tunnel is 1290 feet (393.2 m) long and is 12 feet (3.7 m) in diameter, except through the gate conduit section. At the entrance, there is a semicircular trashrack enveloping the intake structure, and at the exit, an unlined outlet channel (Photo 2-06). The gate chamber, just upstream from the axis of the dam, is circular in plan, and is 36 feet (10.9 m) in diameter.

Discharge is controlled by three slide gates 5.5 feet (1.7 m) wide by 8.5 feet (2.6 m) high. Upstream from each of these (service) gates is an emergency gate of the same type and dimensions. Both service and emergency gates are hydraulically operated, open or close at the rate of about one-half foot (0.15 m) per minute, and may be locked in any position. Discharge curves for the service gates are shown on Plate 2-08. A butterfly valve controls outflow through an 18-inch (45.7 cm) low-flow pipe that bypasses Service Gate No. 3. The pipe is used for releases of up to approximately 112 cfs (3.2 cms), which is the maximum discharge capacity of the butterfly valve.

During the course of regulating the lake according to the prescribed Water Control Plan, the lake level may recede to elevation 1100 feet (335.3 m) or lower. At this point, the bulkhead gate can be installed so that the outlet tunnel can be dewatered for inspection and maintenance of the outlet gates and the tunnel lining. The bulkhead gate can be installed over the intake portal by a hoist mechanism situated on a paved bench area, only if the lake level has receded to elevation 1070 feet (326.1 m), or lower. Between elevations 1070 and 1100 feet (326.1 and 335.3 m), the bulkhead gate must be installed from a barge or other floatation means from the lake surface. The bulkhead gate was designed to withstand a maximum hydrostatic loading of up to elevation 1110 feet (338.3 m) exerted by the reservoir, however, inspection and maintenance of the outlet gates and tunnel do not occur unless the lake elevation is at, or below, 1100 feet (335.3 m).

The outlet works control house is located on top of the dam approximately at the midpoint of the outlet conduit (reference Photo 5-02). The control house contains a hydraulic pump unit and control valve station, water surface recorder, selsyn gate-position indicators and recorders, radio transceiver, telephone and electric power installations, and sanitary facilities.

d. Reservoir. Reservoir boundaries are defined by the extent of the land acquired by the Federal government for flood control behind Alamo Dam. A map of the reservoir area is shown on Plate 2-09. Aerial surveys made in 1946 were used in the preparation of an uncontrolled aerial mosaic of the reservoir area. Aerial surveys were made for use in the preparation of a topographic map of the reservoir area in 1963. Area and capacity curves for Alamo Lake, generated from the topographic map, are shown on Plate 2-10. These curves are presented in tabular form in Table 2-01. Photo 2-07 is an aerial view of the reservoir area, with a water surface elevation of 1183.76 feet (360.8 m).

2-04. Related Control Facilities

There are no other significant water control facilities, such as dams or diversions, within the Bill Williams River system. Section 3-04 summarizes the operational coordination of Alamo Dam with related projects on the lower Colorado River system.

2-05. Real Estate Acquisition

The boundaries of real estate that the U.S. Army Corps of Engineers acquired for Alamo Dam and Lake are shown on Plate 2-11. A total of 22,931.74 acres (9,280.1 ha) was acquired for project operation up to the spillway crest, of which 18,377.74 acres (7,437.2 ha) were Federal lands (U.S. Bureau of Land Management) and 4,554 acres (1,842.9 ha) were State and private lands, acquired in fee.

2-06. Public Facilities

Public recreational facilities within the Alamo Lake area are jointly managed by the Arizona Game and Fish Department and the Arizona State Parks. Existing recreational facilities include five campgrounds equipped with bathroom and shower facilities, and 250 camp sites for individual use (RV hook-ups), and one campground set aside to accommodate group camping of 50 to 100 campers. There are also three boat launch areas, a fish cleaning station, a group and individual picnic areas, and privately operated concession/general store. All facilities are floodable. In addition, the Arizona State Parks Department monitors overflow camping areas, which do not have any of the aforementioned amenities. Plate 2-12 shows the recreational facilities in the reservoir area.



Photo 2-01. Downstream face of Alamo Dam. Outlet works tunnel is in lower right hand corner.



Photo 2-02. Upstream face of Alamo Dam. Water surface elevation 1130.56 feet (20 November 1985)



Photo 2-03. Aerial view of spillway adjacent to right abutment of dam.



Photo 2-04. Spillway channel looking downstream.



Photo 2-05. Gully (arrow) through which spillway flows discharge before rejoining Bill Williams River channel.



Photo 2-06. Bill Williams River channel immediately downstream from Alamo Dam.

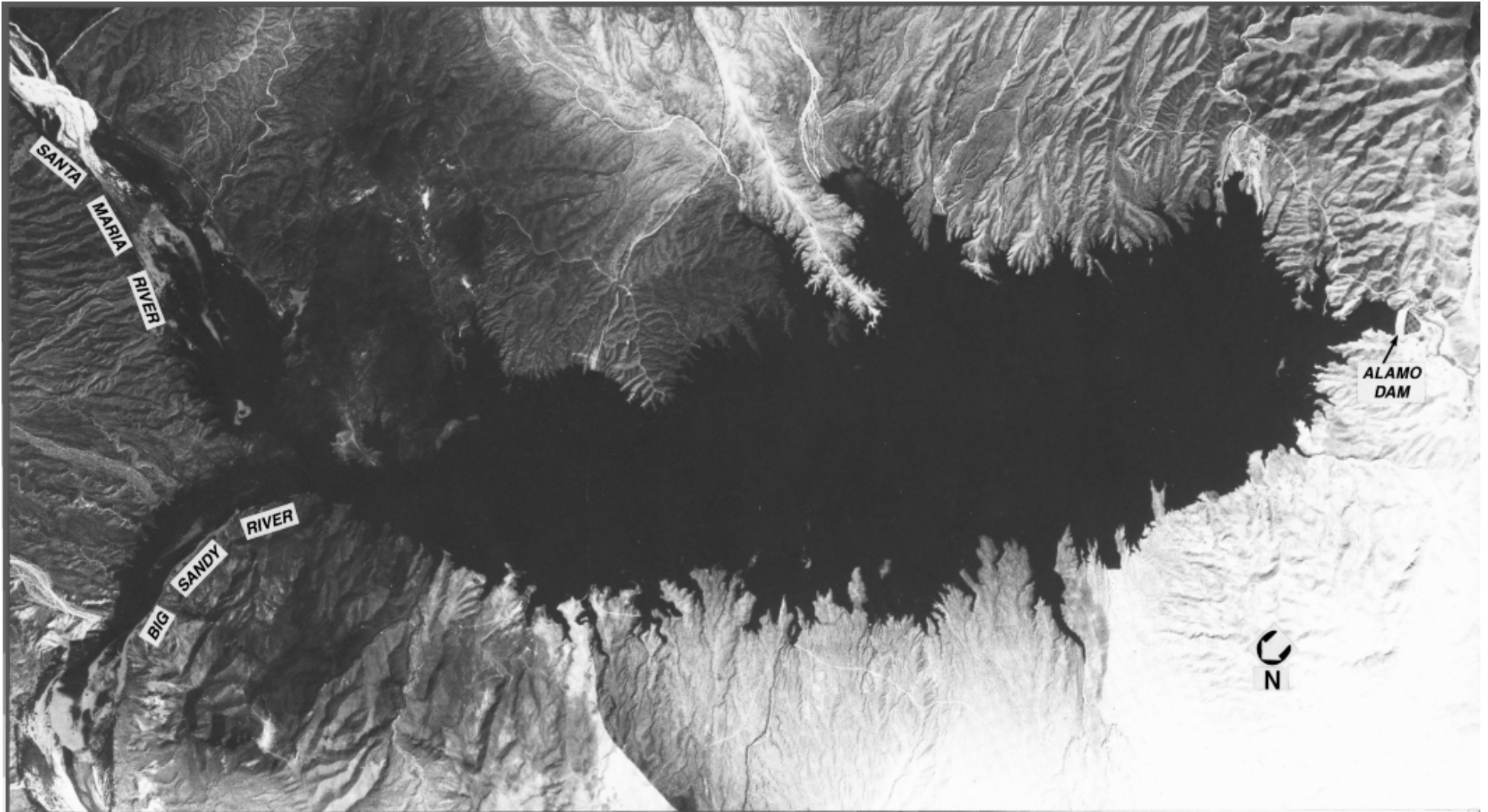


Photo 2-07. Aerial View of Alamo Lake.
Water surface elevation 1183.96 feet (4 May 1979)