II - DESCRIPTION OF PROJECT

2-01 Location. San Antonio Dam is located in the Santa Ana River Watershed on San Antonio Creek approximately 10.5 miles upstream from its confluence with Chino Creek. The Dam is located about 30 miles east of Los Angeles and 22 miles west of San Bernardino. The majority of the Dam is in San Bernardino County. A small portion of the Dam is in Los Angeles County. The Dam is sited at the mouth of the canyon where San Antonio Creek emerges from the San Gabriel Mountains. It is approximately 5 miles north of the communities of Claremont and Upland. Plate 2-01 shows the San Antonio Dam location and local project area.

2-02 Purpose. The purpose of San Antonio Dam and Reservoir is to regulate floodflows and debris on San Antonio Creek. Although water conservation was not formally authorized as a project purpose at San Antonio Dam, it is the policy of the U.S. Army Corps of Engineers to assist local agencies in the conservation of water to the maximum extent possible without interfering with flood-control functions. The project, including the reservoir basin, dam and channel improvements to San Antonio and Chino Creeks, provides protection to a large area of agricultural, residential, commercial, and industrial properties in which are located the communities of Claremont, Upland, Pomona, Ontario, and Chino. Protection is also provided to major federal, state, and county highways as well as several major railways. Channel improvements extend some 15.7 miles downstream to Prado Dam and Reservoir.

2-03 Physical Components. San Antonio Dam is a zoned earth (rolled-fill) embankment with outlet works and detached reinforced concrete ogee spillway. (figs. 2-02 and 2-07). The components of the dam are shown on plate 2-02. They include:

a. Dam. The dam is a zoned earthfill embankment (fig. 2-03). It has a crest length of 3,850 feet and a crest width of 30 feet. The top of the dam (El. 2,260 ft. NGVD) is 160 feet above the original streambed at the centerline of the dam. Both the upstream and downstream slopes of the embankment are 2H:1V between elevations 2,260 NGVD and 2,220 NGVD. Below elevation 2,220 NGVD, the slopes are 2.5H:1V. The dam consists of four zones: an upstream pervious zone; an impervious central zone; a downstream random pervious zone; and a downstream select pervious zone. Both the upstream and downstream faces of the dam are protected by a three foot stone blanket. Details of the embankment sections are shown on plate 2-03.

b. Outlet Works. The outlet works (figs. 2-02 and 2-03) are benched into rock at the toe of the right abutment. They consist of an approach channel, a trash rack, an intake structure, three gates, a conduit transition and an outlet conduit (figs. 2-04 and 2-05). The flow is from north to south. A plan of the outlet works is shown on plate 2-04.

(1) Approach channel. The approach channel is 88.5 feet in length. It is an open reinforced concrete channel with a base width of 27 feet 8 inches. Wall heights vary from 3 feet 6 inches to 47 feet 9 inches.

(2) Trash rack. The trash rack (fig. 2-02) is installed in the approach channel just upstream of the intake structure. It consists of inclined 16 inch iron beams spaced to provide 4-foot clear openings. A clear opening of 3 feet 6 inches is also provided above the approach channel invert which allows passage of small debris during low stages.

(3) Intake structure. The intake structure is 70 feet in length and consists of three 5 foot 8 inch by 10 foot intakes which have bellmouth shape entrances.

(4) Slide gates. Three slide gates, each 5 feet 8 inches wide by 10 feet high, are used to regulate the outflow through the dam. Two 10 hp motors are connected to the gates to provide hydraulic pressure for operating the gates. Southern California Edison supplies 480-volt power to the two motors. A 50-kw diesel generator is maintained operational for emergency use. Gates are operated from a control house on the crest of the dam. The speed at which the gates are operated is approximately one foot per minute. If more than one gate is operated simultaneously, the rate of gate movement is reduced proportionately.

(5) Conduit transition. The conduit provides a smooth transition from the three 5 foot 8 inch by 10 foot rectangular intakes to a single 14 foot 6 inch diameter circular section. The transition length is 86.5 feet.

(6) Outlet conduit. The outlet conduit is circular in section with a diameter of 14 feet 6 inches, a length of 508 feet and a slope of 0.0521 foot/foot. With the gates fully open, the conduit discharges 11,800 cfs when the reservoir pool is at the spillway crest (El. 2,238 NGVD). Under these conditions the velocity of flow is 71 fps. Plate 2-05 shows the outlet discharge as a function of gate opening.

c. Control House. A control house is located on the crest of the dam just to the east of the outlet works. It is a rectangular concrete structure 18 feet wide, 58 feet long and 10 feet high. Within the house there is a generator room and a control room separated by a 10 foot wide enclosed carport which reduces objectionable noise when the generator is operating. The carport currently houses electronic equipment for the FAA. FAA radio and radar antennae are located on the roof of the control house. The control room contains the gate operating equipment, three gate position indicators and recorders, a reservoir stage indicator and recorder with a remote terminal unit (RTU), a radio transmitter and receiver, an electrical control panel, a glass-tube rain gage, and other operating and maintenance equipment.

d. Outlet Access Gallery. The outlet access gallery consists of a 5 foot by 10 foot reinforced concrete box placed on a 2.25H:1V slope in the embankment fill from the outlet gate chamber to its entry point on the downstream face of the embankment (El. 2,247.5). The centerline of the gallery is 13 feet to the west of the control house. The gallery provides the sole access to the outlet gate chamber. A three foot wide stairway with 12 inch wide skids on both sides of the stairway are contained within the gallery. Also, the gallery contains water, telephone, power, gate position indicator, and oil pressure lines that extend from the control house to the gate chamber.

e. Spillway. The spillway is situated to the west of the San Antonio Dam in the hill forming the dam's western abutment. It is about 600 feet west of the outlet works. Plate 2-06 shows the spillway general plan and its relationship to the outlet works. Profile and typical sections of the spillway are shown on plate 2-07.

(1) Approach channel. The trapezoidal approach channel (fig. 2-06) is 200 feet long and is excavated to an elevation of 2,228 feet NGVD. The high bank between the approach channels and the reservoir floor is graded generally on a slope of 1 on 2 with ends warped to meet the dam embankment slope at the left side and the existing bank on the right side.

(2) Control section. The spillway control is formed by a concrete ogee weir, 200 feet in length. The weir crest is at elevation 2,238 feet. The spillway has a design surcharge of 16.4 feet with a corresponding discharge of 51,160 cfs.

(3) Discharge channel. The spillway discharge channel (fig. 2-07) consists of a rectangular side channel with baffle piers and a 825 foot long reinforced concrete rectangular curved section terminating in a 75 foot radius flip bucket with a turnup of 20 degrees. The spillway discharge is directed across and away from the outlet works channel. Plate 2-08 shows the spillway discharge curve.

f. Reservoir. Reservoir boundaries are defined by the extent of land acquired by the Federal Government for the purpose of flood control behind San Antonio Dam. The boundary is shown as the Taking Line on plate 2-09, Real Estate Acquisition Boundary.

A February 1990 survey of the reservoir is the latest source of elevation-storage information. Reservoir area and capacity as a function of elevation, from the survey data, are shown on plate 2-10. The tabular form of the elevation vs. capacity data is contained on plate 2-11. The elevation-area table is shown on plate 2-12. When the reservoir is filled to the spillway crest elevation of 2238.0 feet, the impounded storage is 8,535 acre feet, covering 145 acres.

2-04 Related Control Facilities. There are several small diversion structures upstream of San Antonio Dam which divert water for the San Antonio Land and Water Company, the City of Pomona, and the Southern California Edison Company. Water diverted by these structures flows to the City of Pomona through a conduit located in the west abutment of San Antonio Dam or to the City of Upland through a conduit located in the east abutment of the dam. These small diversions do not affect flood-control operations at San Antonio Dam.

Downstream of San Antonio Dam, the Pomona Valley Protective Association (PVPA) operates three diversion structures. Two structures divert water to the east into the San Antonio Spreading Grounds and one diverts water to the west into the Pomona Spreading Grounds. Just upstream of Baseline Road, the Metropolitan Water District(MWD) has an inlet diversion which allows imported water to enter San Antonio Creek Channel. The Chino Basin Water Conservation

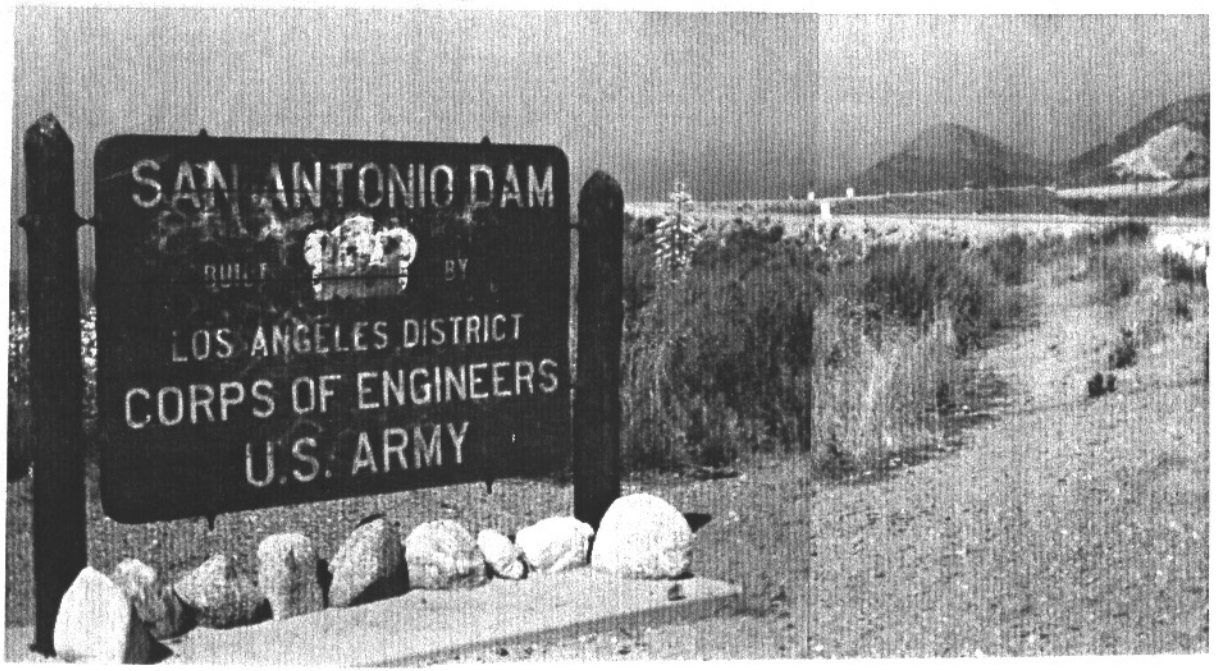
District operates a diversion just downstream of the Atichson Topeka & Santa Fe Railroad Crossing. This diversion diverts water to the east into the Montclair Basin, and may be able to divert between 100 to 300 cfs during flood-control releases from San Antonio Dam. Plate 2-13 shows the locations of Pomona Valley Protective Association spreading basin below San Antonio Dam.

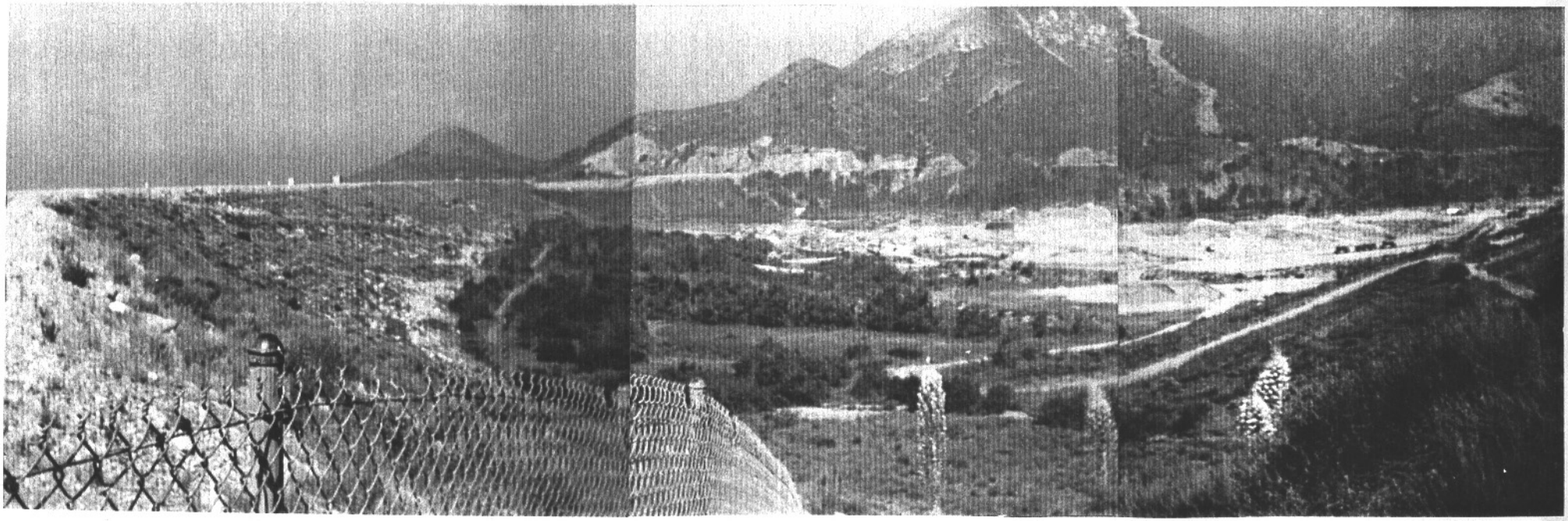
Outflows from San Antonio Dam normally flow down the San Antonio Creek Channel into the Chino Creek Channel and into Prado Reservoir. San Antonio Dam is operated as a component of the Santa Ana River reservoir system.

2-05 Real Estate Acquisition. Acquisition of the lands for the San Antonio Dam and reservoir were completed on or about June 30, 1953. A total of 370 acres were purchased. They included: 90 acres of urban subdivision lots; 90 acres of irrigated citrus groves; 20 acres of hillside pastures; and 170 acres of river channel and gravel land. In 1953, $474,000 had been budgeted for land acquisition for the dam and reservoir. See plate 2-09 for the real estate taking line.

The San Antonio and Chino Creeks improvement project required acquisition of lands, easements and rights-of-way. For the rectangular portion of the channel a width varying from 75 feet to 110 feet was required. The paved trapezoidal section of the channel required widths varying from 200 to 250 feet. Rights-of-way for the unpaved trapezoidal channel was determined to be 750 feet wide. Costs of lands for the channel improvements was estimated at $599,000 in 1954.

2-06 Public Facilities. There are no public use facilities associated with the reservoir lands or the downstream channel improvements. The only activity within reservoir boundaries is an on-going maintenance operation to remove debris (including sand and gravel) which accumulates in the reservoir during storm events.





San Antonio Dam and Flood Control Basin showing gravel removal work within Basin 1990. Looking West

FIGURE 2-01

Figure 2-02 Outlet works at San Antonio Dam. Elevation 2125 ft. NGVD. Control House at top of Dam. Looking South.

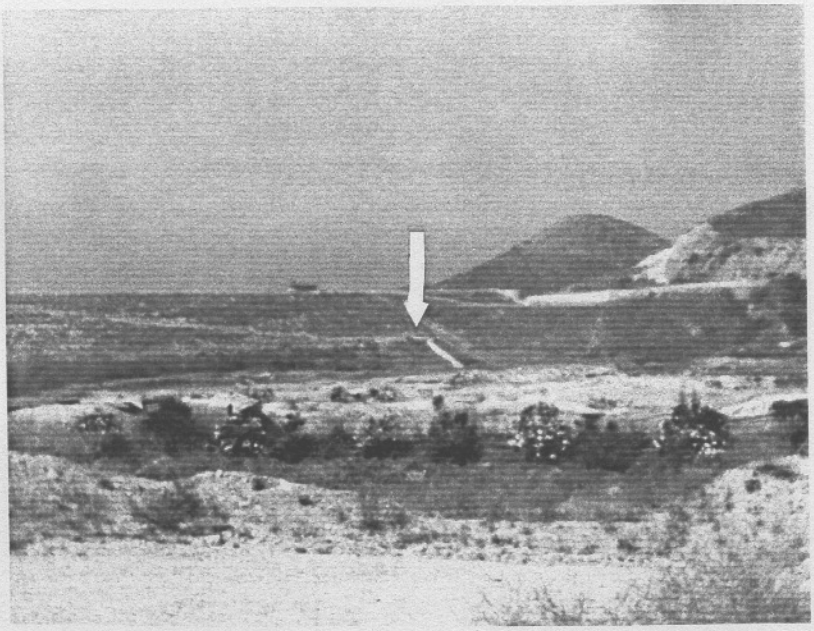


Figure 2-03 San Antonio Dam and Flood Control Basin showing outlet works and spillway. Looking Southwest.

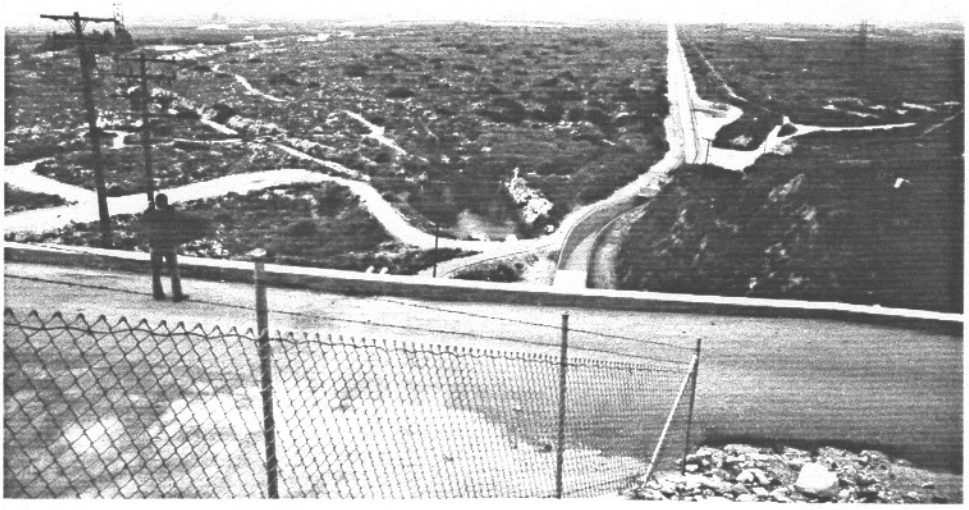


Figure 2-04 Looking South from top of San Antonio Dam at San Antonio and Chino Creeks Channel.

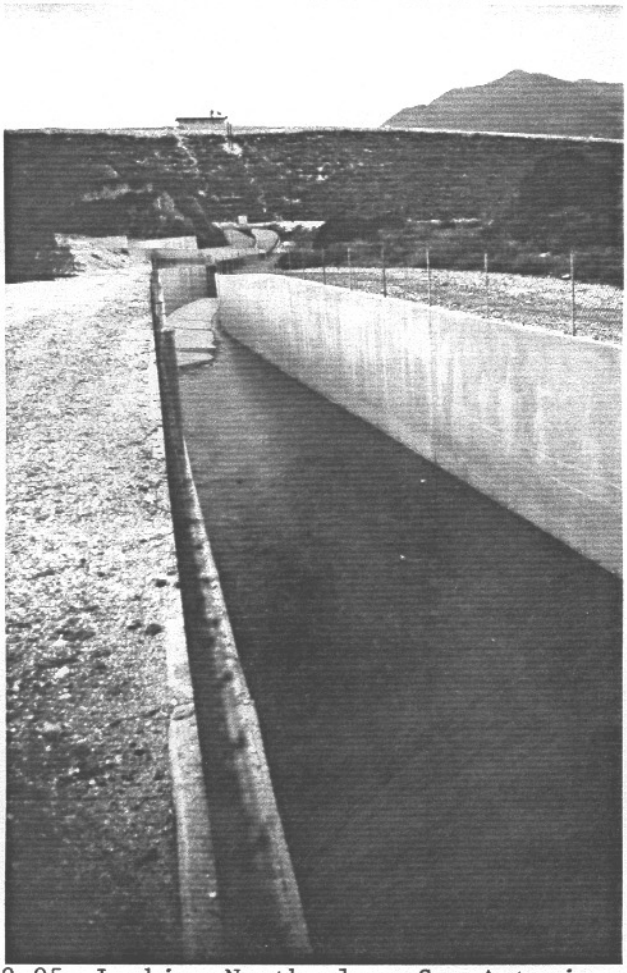


Figure 2-05 Looking North along San Antonio and Chino Creeks Channel at San Antonio Dam, outlet works and Control House.

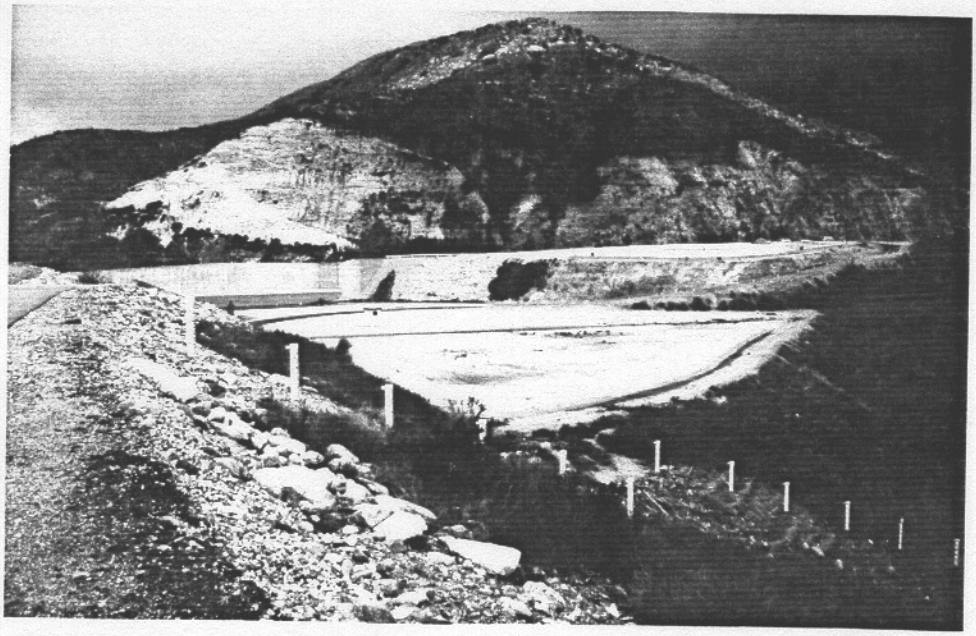


Figure 2-06 San Antonio Dam Spillway Approach Channel with Ogee Spillway and Staff Boards showing. Looking West.

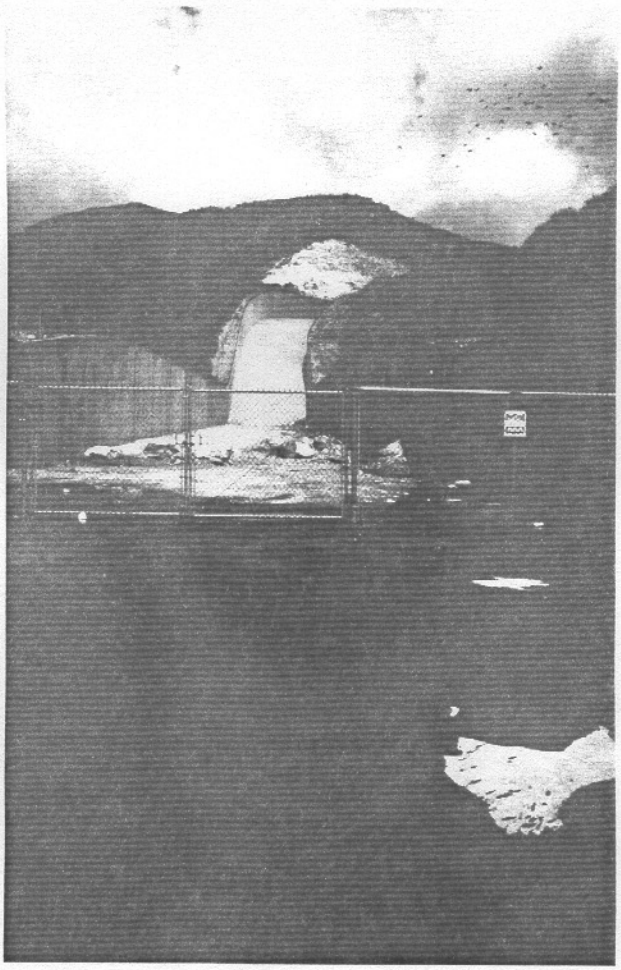


Figure 2-07 Spillway Terminus at San Antonio Dam. Looking Northwest.