

MP-1411



United States Department of the Interior
National Park Service

National Register of Historic Places Registration Form

This form is for use in nominating or requesting determinations for individual properties and districts. See instructions in National Register Bulletin, *How to Complete the National Register of Historic Places Registration Form*. If any item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, architectural classification, materials, and areas of significance, enter only categories and subcategories from the instructions. Place additional certification comments, entries, and narrative items on continuation sheets (NPS Form 10-900a).

1. Name of Property

Historic name Stewart Mountain Dam

Other names/site number _____

2. Location

street & number On the Salt River, 40 miles east-northeast of Phoenix, AZ not for publication

city or town Phoenix vicinity

State Arizona code AZ county Maricopa code 013 zip code _____

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act, as amended,
 I hereby certify that this nomination ___ request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60.
 In my opinion, the property meets ___ does not meet the National Register Criteria. I recommend that this property be considered significant at the following level(s) of significance:
 ___ national statewide ___ local

Signature of certifying official *Marye J. Helzer* Date 11/22/2016
 Title Federal Preservation Officer State or Federal agency and bureau BOR, DOI

In my opinion, the property ___ meets ___ does not meet the National Register criteria.

Signature of commenting official _____ Date _____
 Title _____ State or Federal agency and bureau _____

4. National Park Service Certification

I, hereby, certify that this property is:	Signature of the Keeper	Date of Action
___ entered in the National Register	_____	_____
___ determined eligible for the National Register	_____	_____
___ determined not eligible for the National Register	_____	_____
___ removed from the National Register	_____	_____
___ other (explain:)	_____	_____

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In my opinion, the property meets does not meet the National Register Criteria. I recommend that this property be considered significant at the following level(s) of significance:
 national statewide local

Signature of certifying official *Marion A. Hodson* Date 11/24/2016
Title Federal Preservation Officer, Bureau of Reclamation, DOI State or Federal agency and bureau

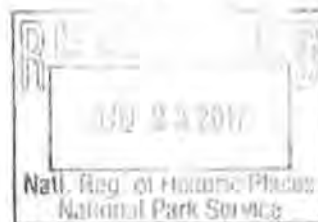
In my opinion, the property meets does not meet the National Register criteria.
Signature of commenting official *Karen Reed* Date 17 Feb 2017
Title STPO Arizona State Parks State or Federal agency and bureau

4. National Park Service Certification

I, hereby, certify that this property is:	Signature of the Keeper	Date of Action
<input type="checkbox"/> entered in the National Register	_____	_____
<input type="checkbox"/> determined eligible for the National Register	_____	_____
<input type="checkbox"/> determined not eligible for the National Register	_____	_____
<input type="checkbox"/> removed from the National Register	_____	_____
<input type="checkbox"/> other (explain:)	_____	_____

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In my opinion, the property meets ___ does not meet the National Register Criteria. I recommend that this property be considered significant at the following level(s) of significance:

national statewide local

Merrill J. Helms
Signature of certifying official

11/22/2016
Date

Federal Preservation Officer
Title

BOR, DOI
State or Federal agency and bureau

In my opinion, the property ___ meets ___ does not meet the National Register criteria.

Signature of commenting official

Date

Title State or Federal agency and bureau

4. National Park Service Certification

I, hereby, certify that this property is:

entered in the National Register

determined eligible for the National Register

determined not eligible for the National Register

removed from the National Register

other (explain:)

Signature of the Keeper
[Signature]

Date of Action

3/7/2017

5. Classification

Ownership of Property
(Check as many boxes as apply)

Category of Property
(Check only **one** box)

Number of Resources within Property
(Do not include previously listed resources in the count.)

<input type="checkbox"/>	public - Local
<input type="checkbox"/>	public - State
<input checked="" type="checkbox"/>	public - Federal
<input type="checkbox"/>	private

<input type="checkbox"/>	district
<input type="checkbox"/>	site
<input checked="" type="checkbox"/>	structure
<input type="checkbox"/>	building(s)
<input type="checkbox"/>	object

Contributing	Noncontributing	
		sites
1	1 (new spillway)	structures
		objects
1		buildings
2	1	Total

Name of related multiple property listing

Number of contributing resources previously listed in the National Register

Salt River Project, Arizona

0

6. Function or Use

Historic Functions

(Enter categories from instructions)

Industry, Waterworks

Industry, energy facility (power plant)

Government/Public Works

Current Functions

(Enter categories from instructions)

Industry, Waterworks

Industry, energy facility (power plant)

Government/Public Works

7. Description

Architectural Classification

(Enter categories from instructions)

Other, Early 20th Century

Other/concrete thin-arch dam

Materials

(Enter categories from instructions)

foundation: Concrete

walls: Sandstone, limestone, stucco

roof: Concrete, sheet metal

other:

Narrative Description

Summary Paragraph

Stewart Mountain Dam is associated with the history and evolution of the Salt River Project's aggressive hydroelectric expansion program during the 1920s and the growth of the Phoenix metropolitan area in the 20th century. The contributing structure consists of the dam and the older left abutment spillway. The contributing building is the power house. The right (west) abutment spillway, constructed from 1988 to 1992, is non-contributing, as is an older generator house that has been completely modernized in and out. The facility is named after the nearby old Stewart Ranch, and is located in on the Salt River approximately 40 miles east-northeast of Phoenix, about 10 miles above the Salt and Verde River confluence. Stewart Mountain Dam meets the Registration Requirements set forth in the Salt River Project MPS for Property Type I: Storage-Regulation Dams.

Narrative Description

Stewart Mountain Dam is a 207-foot-high, reinforced concrete radius thin-arch dam consisting of a single arch flanked on both sides by gravity buttresses or abutments, with a gravity overflow spillway on the left (east) side. The main arch stretches 480 feet from buttress to buttress and varies in thickness from eight feet at the crest to 33 feet at the deepest foundation. Stewart Mountain Dam is thus best described as a variable-radius, multiple-curve design. On the right (west) end of the dam is a 115-foot-long, straight concrete wall with a gravity section that extends from the buttress into the side of the canyon. On the dam's left (east) end, a gravity-section wall extends perpendicularly from the buttress for 90 feet; beyond that is a 270-foot wide, concrete-lined spillway topped by nine Taintor gates, each 23 feet high and 27 feet long. The original concrete balustrade atop the dam and spillway were replaced with a new concrete parapet wall using the original cantilevered/overhanging base. Stretching beyond the spillway is a 225-foot, gravity-section wall that joins the main structure with the canyon wall at the left (eastern) end.

Like the other Salt River hydroelectric dams, Stewart Mountain Dam has been modified over the last 70 years, mostly to address flooding and safety issues. Reclamation modified the original spillway in 1936. The work consisted of building a concrete-lined spillway discharge channel, 450 feet long by 265 feet wide, below the existing ogee spillway; reconditioning the hoisting equipment for the radial gates; and installing individual gate operating motors. From 1988 to 1992, Reclamation again modified the dam to address concerns about its stability in a probable maximum flood (PMF) or maximum credible earthquake. To address the PMF issue, a new spillway (non-contributing) was constructed on the dam's right (west) abutment to increase its ability to safely release flood waters. It was placed next to the small gravity section of the dam and a portion of the adjacent rock wall was removed. As part of earthquake protection measures, a new concrete overlay was placed on both abutments to help stabilize the facility. The existing power penstock and river outlet works were also replaced, the road atop the dam was raised and widened, and the existing east spillway was modified. The powerhouse access roadway at the base of the dam runs beneath the west spillway. In addition, drainage holes were drilled at selected locations in the dam's foundation to help relieve hydraulic uplift pressures, and some areas of the foundation were grouted to help reduce seepage. Finally, 84 steel cables were installed through the dam and its foundation to provide additional strength.

The two-story, reinforced concrete power house is a pivotal part of the Stewart Mountain complex. The original concrete powerhouse is a small, square building with a flat roof, undecorated cornice, and a series of arched windows on the downriver (south) and eastern facades. A modern steel stair runs from the base of the dam near the powerhouse to the top of the dam parapet. The power penstock attaches directly to a 17,500 horsepower Francis reaction turbine with scroll casing manufactured by the S. Morgan Smith Company of York, Pennsylvania. Water flows into the turbine chamber under an average head (or pressure) of 100 feet and rotates the horizontal turbine runner at an average speed of 150 revolutions per minute (rpm). The blade runner is connected directly to the main generator by a vertical shaft extending upward to the ground floor level of the powerhouse. Rated at 13,000 kilowatts, the General Electric three-phase generator produces current at a potential of 11,000 volts. In 1962, the generators were converted from 25 to 60 Hz cycles.

When filled to capacity, the dam's backwater, Saguaro Lake, contains 70,000 acre-feet of water and meanders through the Salt River Canyon for a distance of ten miles above the dam. Water from Saguaro Lake is released downstream through four penstocks that extend through the western end of the dam at elevations averaging about 100 feet below the dam's crest. Closest to the centerline of the structure is an 8-foot-diameter penstock, a reserve outlet that has never been used. West of this is a 7-foot-diameter penstock regulated by a single butterfly valve. Adjacent to this is another 7-foot-diameter opening, which bifurcates into two separate penstocks, each regulated by a 54-inch needle valve. Furthest west is the most important opening in the dam, a 13-foot-diameter penstock that passes directly into the powerhouse located adjacent to the dam's downstream face.

8. Statement of Significance

Applicable National Register Criteria

(Mark "x" in one or more boxes for the criteria qualifying the property for National Register listing)

- A Property is associated with events that have made a significant contribution to the broad patterns of our history.
- B Property is associated with the lives of persons significant in our past.
- C Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.
- D Property has yielded, or is likely to yield, information important in prehistory or history.

Criteria Considerations

(Mark "x" in all the boxes that apply)

Property is:

- A owned by a religious institution or used for religious purposes.
- B removed from its original location.
- C a birthplace or grave.
- D a cemetery.
- E a reconstructed building, object, or structure.
- F a commemorative property.
- G less than 50 years old or achieving significance within the past 50 years.

Areas of Significance

(Enter categories from instructions)

- Politics/Government
- Engineering
- Community Planning and Development

Period of Significance

1928–1936

Significant Dates

- 1928–1930 – Facility built
- 1936 – Concrete spillway lining built

Significant Person

(Complete only if Criterion B is marked above)

Cultural Affiliation

Architect/Builder

- Charles Cragin
- Salt River Valley Water Users' Association
- Bureau of Reclamation

Period of Significance (justification)

The period of significance of 1928–1936 reflects the dam's construction and modification period.

Statement of Significance Summary Paragraph

Stewart Mountain Dam qualifies for the National Register of Historic Places under Criterion A. It is associated with the evolution of the Salt River Project (Project), one of the first five federally-sponsored western water projects authorized under the National Reclamation (Newlands) Act of 1902. This act created the United States Reclamation Service (Reclamation), whose purpose was to design and construct storage and irrigation projects to aid in the settlement and economic development of western America's arid lands. Previous efforts by individuals and private irrigation concerns were inadequate and often unsuccessful. With the Reclamation Service's creation, the federal government assumed a

lead role in developing large-scale western water projects. Along with the Roosevelt, Horse Mesa, and Mormon Flat facilities that lie upstream, Stewart Mountain Dam impounds water on the Salt River for use in generating power and regulating flow for irrigation, domestic, and municipal use within the Salt River Valley.

Narrative Statement of Significance

Under Politics and Government and Community Planning and Development, Stewart Mountain Dam is significant in that it was the third dam constructed as part of SRP's aggressive 1920's hydroelectric expansion program, one that further contributed to the economic growth and expansion of the Phoenix metropolitan area. Furthermore, Stewart Mountain Dam, along with Horse Mesa and Mormon Flat facilities, reflected the increased influence and power of the Salt River Valley Water Users' Association (Association) as they attempted to privately build hydroelectric facilities to meet this increased demand and consumption, especially in the 1930s and 1940s when the valley experienced its first major growth, and post-World War II era when the valley witnessed further growth due to the perfection and resultant widespread use of air conditioning technology powered by Project hydropower.

Under Engineering, the Stewart Mountain Dam is a good example of a radius arch dam design that departed from the more traditional, massive, and expensive curved gravity design incorporated in Roosevelt Dam. In principal, the structural characteristics of this dam represent a radical approach to engineering in which the shape of the dam is more important than the mass (or weight) of material in the structure. In contrast to Roosevelt Dam, a curved gravity dam where its sheer mass holds back the horizontal forces of stored water, a thinner, less massive radius arch dam relies on the tremendous downward, vertical force of its mass to withstand the horizontal force created by the impounded water. Usually termed as arch dams to distinguish them from curved gravity designs, these materially conservative structures derive their strength from the structural characteristics of their shape, which is basically a bowed wall with the outside curve facing upstream. Thus, radius arch dams represent the structural tradition of dam design, in which the dam's shape, rather than the amount of materials used, is the critical factor in its structural strength. As a result, radius arch dams are less expensive to construct than a massive curved gravity facility like Roosevelt Dam. The radius arch dam was preferred by the Association because it allowed them to simultaneously expand their hydropower program and save money in material and construction costs.

Developmental history/additional historic context information

The 1920s were a favorable time for the Salt River Valley Water Association to expand its hydropower generation capability. During the decade's economic boom, the Association's success in finding lucrative, long-term markets for its electrical energy prompted its Superintendent, Charles Cragin to look at the power potential along the Salt River's lower stretch between Mormon Flat Dam and the Granite Reef Diversion Dam. He soon developed plans for what would become Stewart Mountain Dam. By the end of 1927, nearly 1,000 orders for farm electric service were waiting to be filled by the Association. Central Arizona Light and Power Company (CALAPCO) had been slow in extending the transmission lines out from its Phoenix service territory. On February 28, 1928, Cragin presented a proposal to the Association's Board of Governors that outlined plans and cost estimates for a concrete arch dam at the Stewart Mountain site, a powerhouse with a generating capacity of 8600 kw, and a 45,000 volt transmission line that would connect the facility with the Association's power grid— at an estimated cost of \$2.3 million. To finance this, the Association entered into a 50-year contract with CALAPCO, which would purchase a minimum of 7,000 kW of electricity on a continuous basis for a minimal annual payment of \$240,000. As part of this contract, the two organizations signed a territorial agreement which reserved the city limits and areas immediately adjacent to the towns for CALAPCO while the rest of the Project area was reserved for service by the Association. Additionally, Reclamation Commissioner Elwood Mead gave his stamp of approval, noting that the construction of the Stewart Mountain Dam would be an asset for the Project, due to its ability to increase power revenues and provide additional storage.

>See Section 8 Continuation Sheet<

9. Major Bibliographical References

Bibliography

Please refer to the SRP MPL cover document, Section I, for a comprehensive bibliography.

Previous documentation on file (NPS):

- preliminary determination of individual listing (36 CFR 67 has been requested
- previously listed in the National Register
- previously determined eligible by the National Register
- designated a National Historic Landmark
- recorded by Historic American Buildings Survey # _____
- recorded by Historic American Engineering Record # AZ-12

Primary location of additional data:

- State Historic Preservation Office
- Other State agency
- Federal agency
- Local government
- University
- Other
- Name of repository: Library of Congress on line catalog

Historic Resources Survey Number (if assigned): _____

10. Geographical Data

Acreage of Property 7.53 acres

UTM References (See Section 11 Continuation Sheet)

1	<u>12</u>	<u>450242</u>	<u>3714232</u>
	Zone	Easting	Northing

Verbal Boundary Description

The boundary for Stewart Mountain Dam is comprised of the dam structure, original east spillway powerhouse and the west spillway, built between 1988 and 1992. Although it is non-contributing, it is part of the dam structure.

Boundary Justification

The boundary is defined by the limits of the eligible structure consisting of the dam, the original east spillway powerhouse, and the west spillway (non-contributing) built between 1988 and 1992. This is consistent with the boundary delineated for this cultural feature on attached map (Section 11, Page 2, Map 2).

11. Form Prepared By

name/title Jim Bailey, Ph.D., Historian

organization Bureau of Reclamation date October 1, 2010

street & number 6150 West Thunderbird Road telephone (623) 773-6263

city or town Glendale state AZ zip code 85306

email ljelinek@usbr.govⁱ

ⁱ All contact information is for the Phoenix Area Office Archaeologist.

Additional Documentation

Submit the following items with the completed form:

- **Maps:** An aerial map indicating the property's location.
- **Continuation Sheets:** 8 (context, photos), 11 (site map with UTM's and picture references)
- **Additional items:** None

Photographs:

Photo Log (See Section 8 Continuation Sheet)**Current Photographs**

Name of Property: Stewart Mountain Dam

City or Vicinity: Mesa

County: Maricopa

State: AZ

Photographer: Jim Bailey, Bureau of Reclamation; Salt River Project

Date Photographed: March 2010; May 2009

Location of Original Digital Files: Bureau of Reclamation, Denver, CO; Salt River Project, Phoenix, AZ

Number of Photographs: 9

Photo 1 of 9 (AZ_Maricopa County_Salt River ProjectMPS_Stewart Mountain Dam_0001)
Stewart Mountain Dam aerial looking north, courtesy of the SRP.

Photo 2 of 9 (AZ_Maricopa County_Salt River ProjectMPS_Stewart Mountain Dam_0002)
Stewart Mountain Dam looking northeast from the right abutment.

Photo 3 of 9 (AZ_Maricopa County_Salt River ProjectMPS_Stewart Mountain Dam_0003)
Stewart Mountain Dam arch section and powerhouse looking northeast.

Photo 4 of 9 (AZ_Maricopa County_Salt River ProjectMPS_Stewart Mountain Dam_0004)
Stewart Mountain Dam powerhouse looking north-northeast.

Photo 5 of 9 (AZ_Maricopa County_Salt River ProjectMPS_Stewart Mountain Dam_0005)
Stewart Mountain Dam looking west from the left abutment.

Photo 6 of 9 (AZ_Maricopa County_Salt River ProjectMPS_Stewart Mountain Dam_0006)
Stewart Mountain Dam powerhouse and river outlet looking west from the left abutment.

Photo 7 of 9 (AZ_Maricopa County_Salt River ProjectMPS_Stewart Mountain Dam_0007)
Stewart Mountain Dam historic spillway looking west from the left abutment.

Photo 8 of 9 (AZ_Maricopa County_Salt River ProjectMPS_Stewart Mountain Dam_0008)
Stewart Mountain Dam spillway training wall looking south.

Photo 9 of 9 (AZ_Maricopa County_Salt River ProjectMPS_Stewart Mountain Dam_0009)
Stewart Mountain Dam spillway gate detail.

Historic Photographs

Name of Property: Stewart Mountain Dam

City or Vicinity: Mesa

County: Maricopa

State: AZ

Photographer: Unknown; Salt River Project

Date Photographed: unknown, 1928, 1929

Location of Original Digital Files: Salt River Project, Phoenix, AZ

Number of Photographs: 11

Historic Photo 1 of 11

Upstream view of the natural setting of the Salt River Valley prior to the construction of Stewart Mountain Dam. Photo taken circa 1928.

Historic Photo 2 of 11

Hydraulic rock blasting early during the construction of Stewart Mountain Dam. Photo taken on February 11, 1929.

Historic Photo 3 of 11

View to the west showing the pouring of concrete during the early stage of the construction of Stewart Mountain Dam. Photo taken on April 19, 1929.

Historic Photo 4 of 11

View to the west showing the construction of the gravity section of Stewart Mountain Dam. Photo taken on June 13, 1929.

Historic Photo 5 of 11

View to the east showing the construction of the left and right buttresses of Stewart Mountain Dam. Photo taken on July 9, 1929.

Historic Photo 6 of 11

View to the east of the construction of Stewart Mountain Dam. Photo taken on September 5, 1929.

Historic Photo 7 of 11

A truck transporting a section of the penstock to Stewart Mountain Dam construction site. Photo taken at an unknown location on September 14, 1929.

Historic Photo 8 of 11

View to the west from the east (left) abutment showing the powerhouse on the downstream side of Stewart Mountain Dam and river outlet. Photo taken circa November 1929.

Historic Photo 9 of 11

View to the west showing the construction of Stewart Mountain Dam spillway. Date of photo unknown.

Historic Photo 10 of 11

View to the east showing Stewart Mountain Dam. Date of photo unknown.

Historic Photo 11 of 11

View upstream showing the downstream side of Stewart Mountain Dam and powerhouse. Date of photo unknown.

Paperwork Reduction Act Statement: This information is being collected for applications to the National Register of Historic Places to nominate properties for listing or determine eligibility for listing, to list properties, and to amend existing listings. Response to this request is required to obtain a benefit in accordance with the National Historic Preservation Act, as amended (16 U.S.C.460 et seq.).

Estimated Burden Statement: Public reporting burden for this form is estimated to average 18 hours per response including time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding this burden estimate or any aspect of this form to the Chief, Administrative Services Division, National Park Service, PO Box 37127, Washington, DC 20013-7127; and the Office of Management and Budget, Paperwork Reductions Project (1024-0018), Washington, DC 20503.

**United States Department of the Interior
National Park Service**

**National Register of Historic Places
Continuation Sheet**

Stewart Mountain Dam
Name of Property
Maricopa, AZ
County and State
Salt River Project
Name of multiple property listing

Section number 8 Page 1

Context continued

With these endorsements, the Association’s Board of Governors asked members to ratify six propositions that would empower the board to issue construction bonds to construct the Stewart Mountain facility and the transmission line. The 2,300 members overwhelmingly endorsed five of the six propositions on March 20. However, the 4th proposition, which would have authorized the \$4.1 million bond needed for construction, was not endorsed. Those who voted “nay,” a small group of landowners, wanted to limit the size of the Association’s debt. Rather than default on the CALAPCO agreement, the Association held another election using the same six propositions. This time, they published pamphlets that detailed the advantages of having the Stewart Mountain facility’s increased hydropower output and storage capabilities, included Commissioner Mead’s endorsement, and encouraged the entire membership to vote. On May 8, 1928, 20 percent more Association members voted, and all six propositions passed with the legally-mandated three-quarter majority. The Stewart Mountain Dam project was approved and ready to move forward.

Less than two months later, the Board of Governors authorized a bid call requesting offers for the purchase of \$5.1 million in bonds at five percent interest to cover the \$4.1 million approved for the construction of the Stewart Mountain Dam, in addition to \$1 million to refinance existing debt at a lower interest rate. Bids were received from five different investment groups, with a syndicate led by the Detroit Trust Company emerging as the winner. In accepting the Detroit syndicate’s offer, the Association agreed to deliver the bonds by July 15, 1928. However, those Association members who opposed the construction of the dam continued to press for the project’s abandonment and blocked the mortgaging of valley lands. Although their efforts failed, it created uncertainty in the minds of financiers responsible for sale of the bonds. The financial consequences of this delay proved dramatic.

In the following month the legal obstacles were resolved, and the Association was prepared to sell bonds. During this time, however, the bond market plummeted during the frenzied trading that preceded the Great Crash of 1929. The Detroit syndicate pulled out of the deal after the bond market’s six point drop. A new sales agreement for the bonds was made with a syndicate led by the First Securities Company of Los Angeles for \$4.1 million to cover the construction of the facility and transmission lines. Despite Stewart Mountain’s funding being approved and secured, Cragin blasted the one percent of shareholders that opposed the sale, estimating that their delay cost the Association nearly half a million dollars. With funding secured, the construction of the Stewart Mountain Dam could move forward.

As the third of the three similar reinforced concrete arch structures built by the Association on the Salt River from 1924 to 1930, Stewart Mountain Dam is a direct outgrowth of the earlier work undertaken on Mormon Flat and Horse Mesa Dams. All three sites that Cragin selected for the hydropower expansion program were characterized by solid bedrock foundations capable of absorbing the relatively high stress that would be exerted on them by the arch dams. When it came time to prepare design plans for the dam, the Association took the lead in developing an arch design based on the relatively new trial load method, similar to the design of the Horse Mesa Dam. In the trial load method of analysis, the deflections of the arch elements and the cantilever elements are calculated using the elastic theory and, through a series of reiterations, the dimensions of the design are refined so that the deflections for the arch and cantilever elements coincide with one another.

Cragin used the trial load method to develop a variable-radius structure. As with Horse Mesa Dam, in early 1929 he submitted the proposal to Reclamation’s engineers hoping for quick approval, while preparing the site for construction. Cragin’s initial design of Stewart Mountain Dam consisted of a single, large concrete arch that closed off the deepest parts of the site, with two large concrete abutments that help absorb the thrust of the arch, two short gravity sections to connect the abutments to the edge of the canyon walls, and a lengthy spillway with movable gates at the structure’s east end. Reclamation accepted the overall concept, suggesting changes only to details regarding the massive concrete abutments and the arch itself. The design that was approved by Reclamation involved widening of the upstream face of both abutments by two feet and adding reinforced steel to the abutments such that steel would comprise at least three-tenths of one percent of each abutment’s volume.

United States Department of the Interior
National Park Service

National Register of Historic Places
Continuation Sheet

Stewart Mountain Dam
Name of Property
Maricopa, AZ
County and State
Salt River Project
Name of multiple property listing

Section number 8 Page 2

These changes helped assure that the abutments would be massive enough to absorb the arch's thrust, and that they would resist shrinkage cracks while the concrete was curing. Additionally, Reclamation determined that the upstream face of the variable radius arch should be constructed so that its upper elevations did not overhang its lower sections. This meant that more concrete would be used to build the dam, nearly 50,000 cubic yards more than originally estimated.

With funding in place and the design approved, the Association began full-scale construction. Much like the other two hydropower dams, they used their own force account laborers rather than bid out for contractors. Logistics were easier to negotiate on this project. With the other three dams upstream, construction could proceed relatively unimpeded because the river's flow was already regulated. Additionally, the site's close proximity to Mesa meant that communications and transportation could be undertaken expeditiously. Construction of a dirt access road to the site began in the fall of 1928 and a bridge over the Salt River was completed one month later. A worker's camp was built a few hundred yards downstream from the dam site. The site's broad, expansive topography was well-suited for this camp. Additionally, the concrete mixing plant was erected on the east bank of the river immediately downstream of the dam.

Although the other Salt River dams provided some regulation, water users in the valley still depended on regular water releases, meaning the water flow could not cease to accommodate the dam's construction. To allow flows to continue during construction, the Association built a 30 foot high and 40 foot long timber and stone diversion dam about 250 feet upstream from the dam site. Water then flowed into a 450 foot long wooden diversion flume that passed directly through the center of the dam site and did not release its flow until a point well downstream of construction activities. An opening was left in the dam's arch to allow the flume to remain in service as long as possible. This opening was the last part of the arch to be blocked off, and it was not filled with concrete until the dam was ready to impound water. This flume remained in service until the dam was completed.

As work progressed, crews removed debris from the dam's foundation using four dragline excavators. While most of the foundation preparation went smoothly, crews built a coffer dam around the arch's east end in order to reach bedrock. As with almost every dam built for the Project, underground water flow, or seepage, passed through the excavation site, necessitating the use of pumps to remove the water. Once the foundation was cleared, the bedrock foundation of the dam was cement grouted to prevent foundation seepage. The excavation and construction took place at the same time. Excavation for the dam started in early January 1929 and, with the exception of the work at the eastern end of the arch, continued through late October of that year. During most of this time, concrete pouring proceeded at a brisk pace within parts of the dam site where excavation had been completed. The lessons learned from the construction of Mormon Flat Dam and Horse Mesa Dam helped the construction of Stewart Mountain Dam proceed more smoothly.

The Association employed the same Insley concrete chuting and placement system used to build Mormon Flat Dam and Horse Mesa Dam. The first concrete for Stewart Mountain Dam was poured on March 13, 1929, forming a base for the wooden diversion flume through the center of the arch. Workers placed the first concrete for the east abutment on April 17, 1929, while the west abutment's first concrete was placed on June 5, 1929. Both abutments were completed by early October. Construction of the arch's western section began in early August and the construction of the east arch commenced early October. The spillway and gravity sections adjacent to the east abutment were finished by the end of December 1929. The final work on the arch continued into early 1930, and the entire structure was declared complete on March 8 of that year, when the final concrete blocking off the space where the wooden diversion flume intersected the arch was put into place. Construction of the concrete powerhouse began in October 1929, with the building's exterior completed two months later. In early 1930, the turbine generator and other electrical equipment were installed. The power plant was put on-line the same day the last concrete plug in the arch was placed. Remarkably, over a period of 18 months, the Stewart Mountain Dam went from drawings on the Association's drafting tables to a fully functional, water storage structure. In an effort to provide hydroelectric generated power to the rural areas of the valley, the Association installed poles and power lines running to the scattered farms. This encompassed an area larger than all the cities of the Valley combined. Because of this effort, the Association began providing power to rural areas in central Arizona half a

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decade before the enactment of the New Deal Rural Electrification Act of 1935.

As with the other Salt River hydropower dams, Reclamation, armed with New Deal public works funds, altered the spillway system of the dam for increased efficiency in the event of a major flood. The modifications were conducted in January 1936 and consisted of building a concrete-lined spillway discharge channel, 450 feet long by 265 feet wide, below the existing ogee spillway, reconditioning the hoisting equipment for the spillway's radial gates, and installing individual gate motors and two 10 kilovolt-ampere gasoline engine driven generators. Also, in the late 1930s workers noticed that the power plant's roof had separated from the dam's downstream face, meaning that the arch was expanding and slowly inching upstream at a rate of a half-inch a year. Although the movement was calibrated in inches, it was still cause for concern. After analyzing concrete samples, Reclamation re-grouted the dam's construction joints and concrete from 1948 to 1952, which increased the dam's overall stability.

During its seven decades of operation, the Stewart Mountain Dam power plant has undergone no major expansion and, aside from the rewinding of its generator from 25 cycles to 60 cycle output in 1962, little has changed in operation and design. As has been the case since first brought on-line, power generation at Stewart Mountain Dam has been controlled completely by the need to release water for irrigation purposes in the Salt River Valley. The release of water through the powerhouses at Roosevelt Dam, Horse Mesa Dam, and Mormon Flat Dam is often undertaken without regard to irrigation needs. As the last storage structure above Granite Reef Dam, Stewart Mountain Dam is operated in direct response to the valley's irrigation and domestic water supply demands. Because power generation at Stewart Mountain Dam will always be secondary to water demands, there is little incentive to invest in expensive new equipment.¹ The only major alteration to the dam occurred from 1988 to 1992, when a new, gated concrete spillway was designed and built adjacent to the west abutment. It is considered a non-contributing element to the dam.

¹ Text (and photos) excerpted from Donald C. Jackson, *Stewart Mountain Dam, HAER No. AZ-12* (Loveland, CO: FRASERdesign, 1992). This document does not cover the west spillway's recent construction. See cover document, Section I, for a listing of other sources consulted.

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Current Photographs

Name of Property: Stewart Mountain Dam

City or Vicinity: Mesa

County: Maricopa

State: AZ

Photographer: Jim Bailey, Bureau of Reclamation; Salt River Project

Date Photographed: March 2010; May 2009

Location of Original Digital Files: Bureau of Reclamation, Denver, CO; Salt River Project, Phoenix, AZ

Number of Photographs: 9

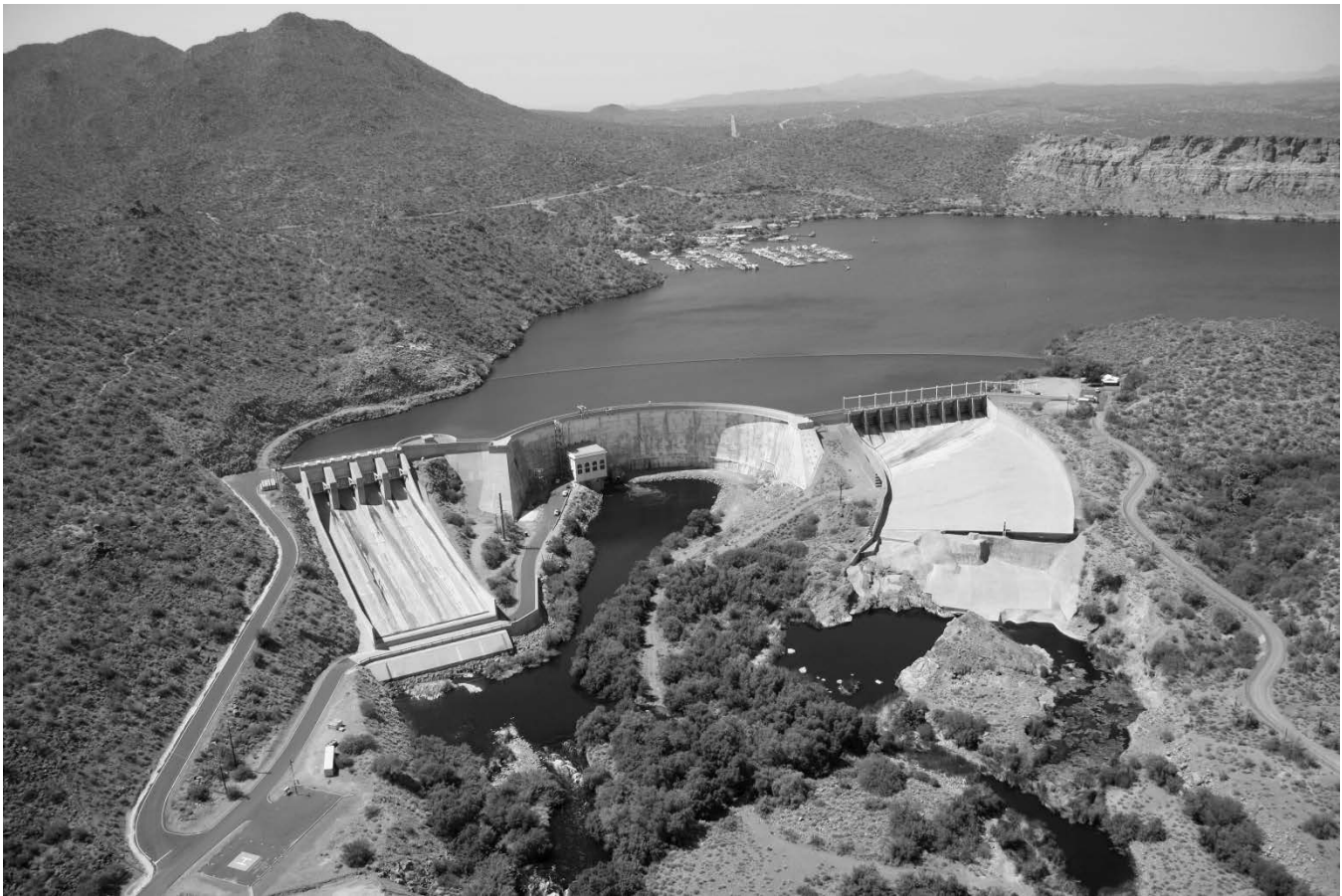


Photo 1. Stewart Mountain Dam aerial looking north, courtesy of the SRP.

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Photo 2. Stewart Mountain Dam looking northeast from the right abutment.

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Photo 3. Stewart Mountain Dam arch section and powerhouse looking northeast.

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Photo 4. Stewart Mountain Dam powerhouse looking north-northeast.

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Photo 5. Stewart Mountain Dam looking west from the left abutment.

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Photo 6. Stewart Mountain Dam powerhouse and river outlet looking west from the left abutment.

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Photo 7. Stewart Mountain Dam historic spillway looking west from the left abutment.

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Photo 8. Stewart Mountain Dam spillway training wall looking south.

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Photo 9. Stewart Mountain Dam spillway gate detail.

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Historic Photographs

Name of Property: Stewart Mountain Dam
City or Vicinity: Mesa
County: Maricopa
State: AZ

Photographer: Unknown; Salt River Project
Date Photographed: unknown, 1928, 1929

Location of Original Digital Files: Salt River Project, Phoenix, AZ
Number of Photographs: 11

OVERALL VIEW OF STEWART MOUNTAIN DAMSITE BEFORE THE DAM. circa 1928.



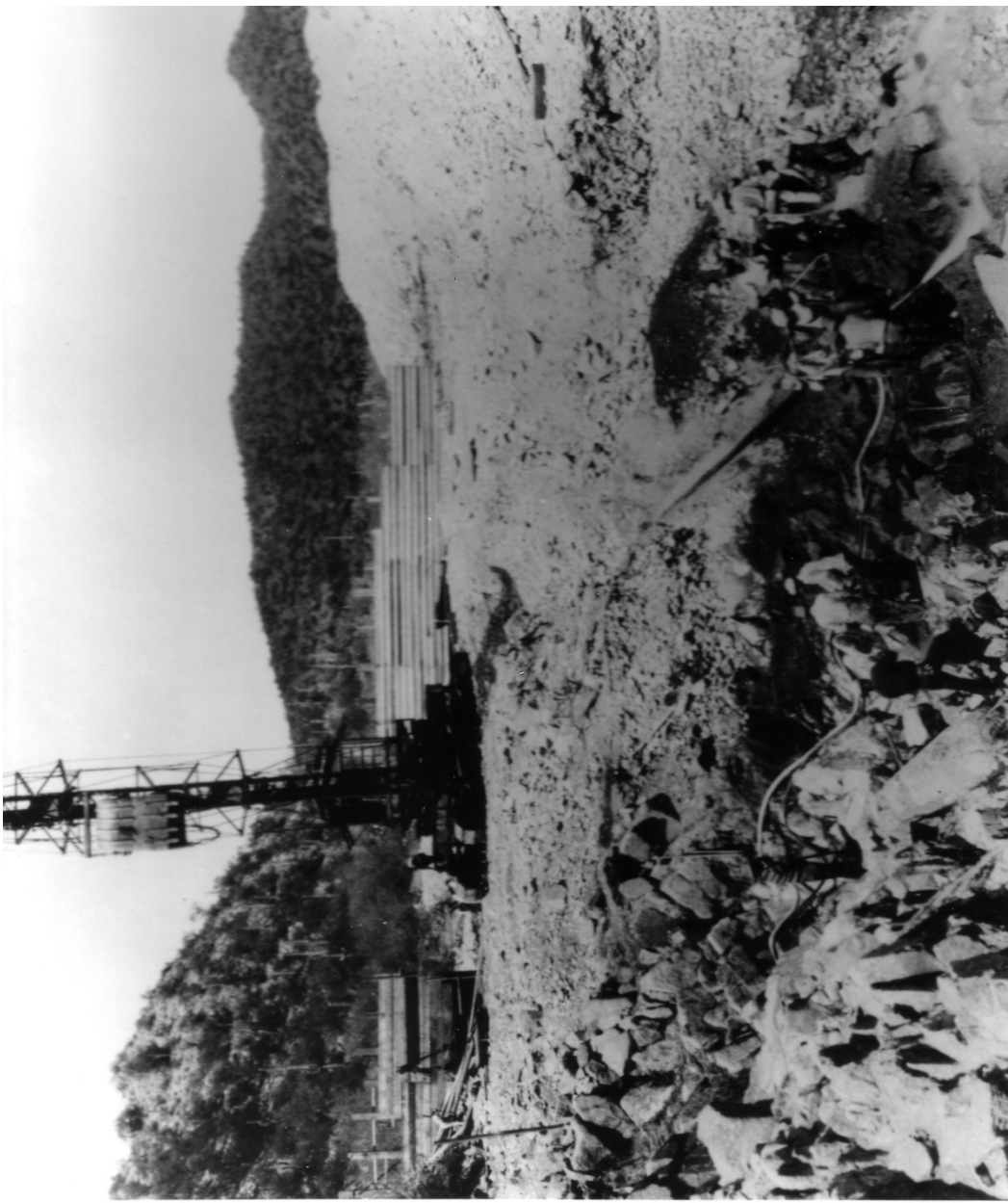
Historic Photo 1. Upstream view of the natural setting of the Salt River Valley prior to the construction of Stewart Mountain Dam. Photo taken circa 1928.

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HYDRAULIC ROCK BLASTING. 11 February 1929.

Historic Photo 2. Hydraulic rock blasting early during the construction of Stewart Mountain Dam. Photo taken on February 11, 1929.

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POURING CONCRETE. 19 April 1929.

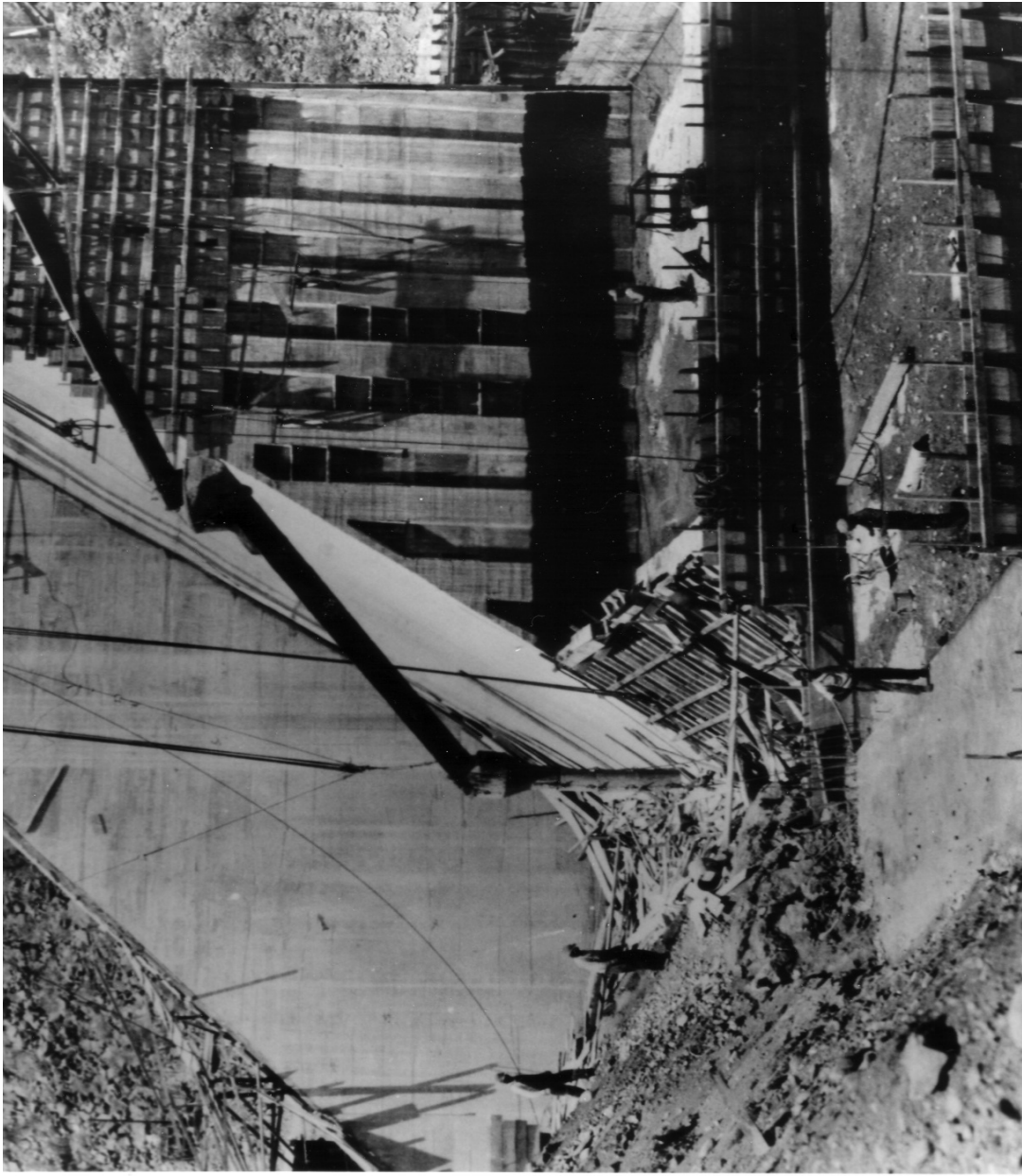
Historic Photo 3. View to the west showing the pouring of concrete during the early stage of the construction of Stewart Mountain Dam. Photo taken on April 19, 1929.

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CONCRETE POURING, GRAVITY SECTION. 13 June 1929.

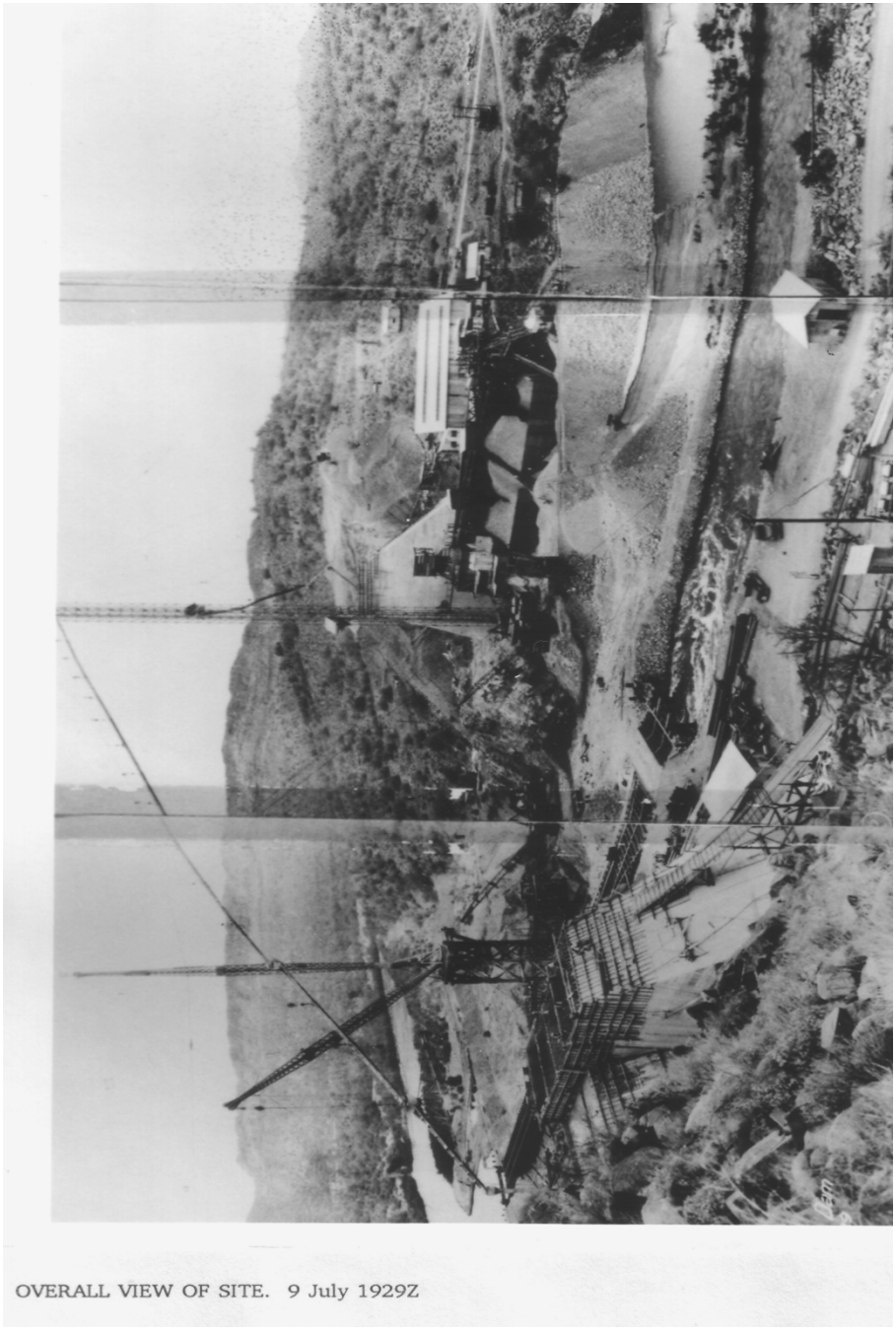
Historic Photo 4. View to the west showing the construction of the gravity section of Stewart Mountain Dam. Photo taken on June 13, 1929.

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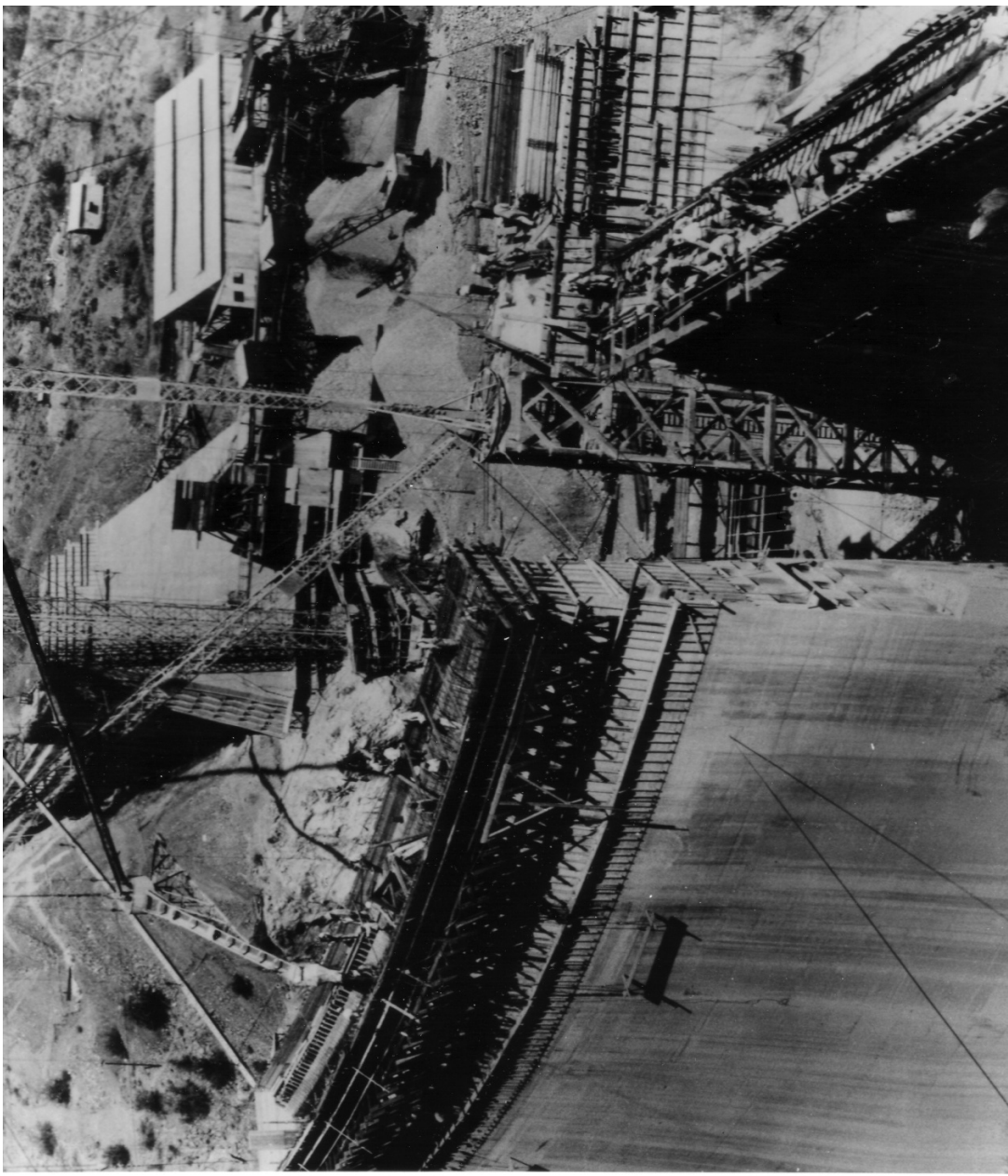
Historic Photo 5. View to the east showing the construction of the left and right buttresses of Stewart Mountain Dam. Photo taken on July 9, 1929.

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OVERALL VIEW OF SITE. 5 September 1929.

Historic Photo 6. View to the east of the construction of Stewart Mountain Dam. Photo taken on September 5, 1929.

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PENSTOCK SECTION ON TRUCK. 14 September 1929.

Historic Photo 7. A truck transporting a section of the penstock to Stewart Mountain Dam construction site. Photo taken at an unknown location on September 14, 1929.

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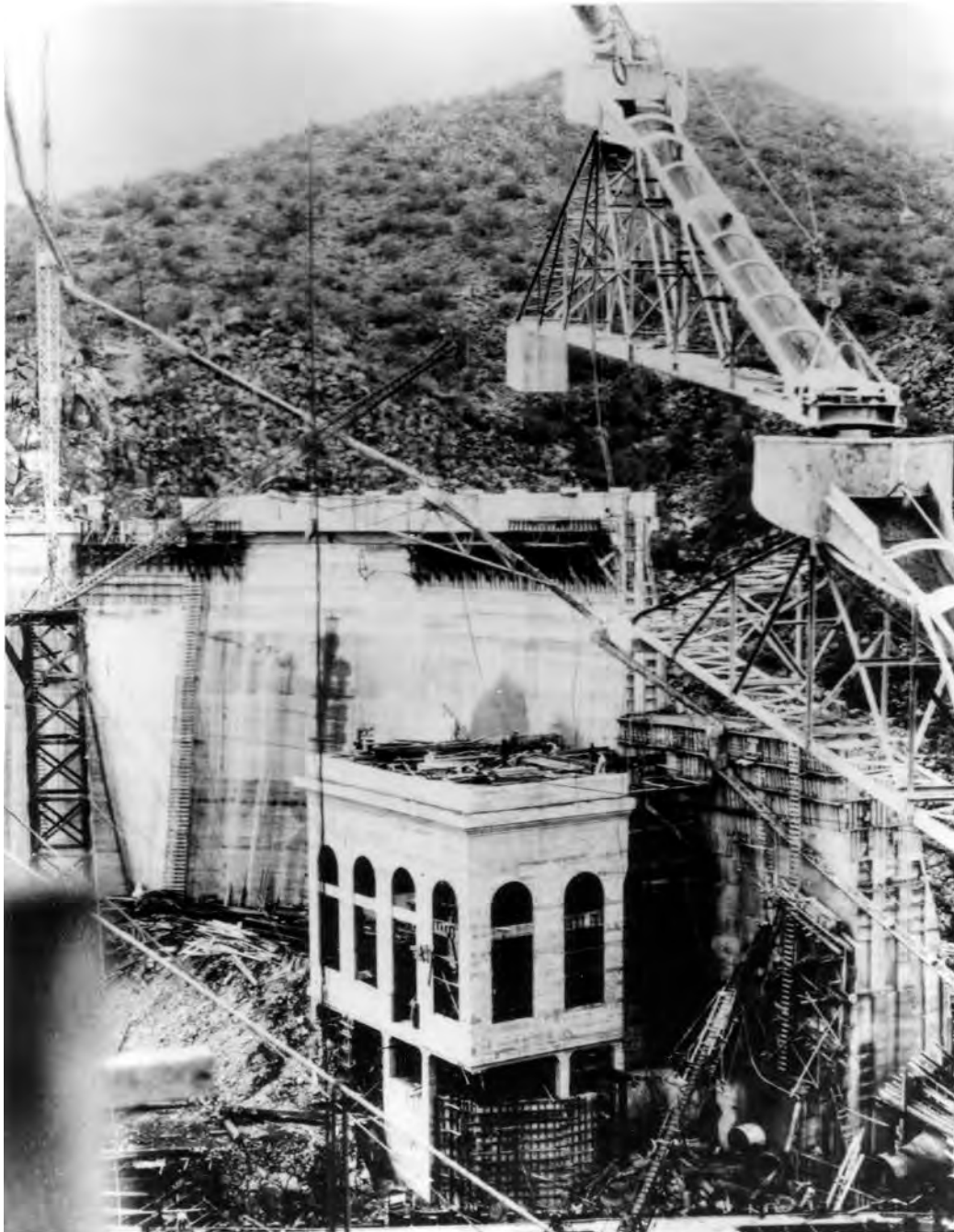
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OVERALL VIEW OF SITE. circa November 1929.

Historic Photo 8. View to the west from the east (left) abutment showing the powerhouse on the downstream side of Stewart Mountain Dam and river outlet. Photo taken circa November 1929.

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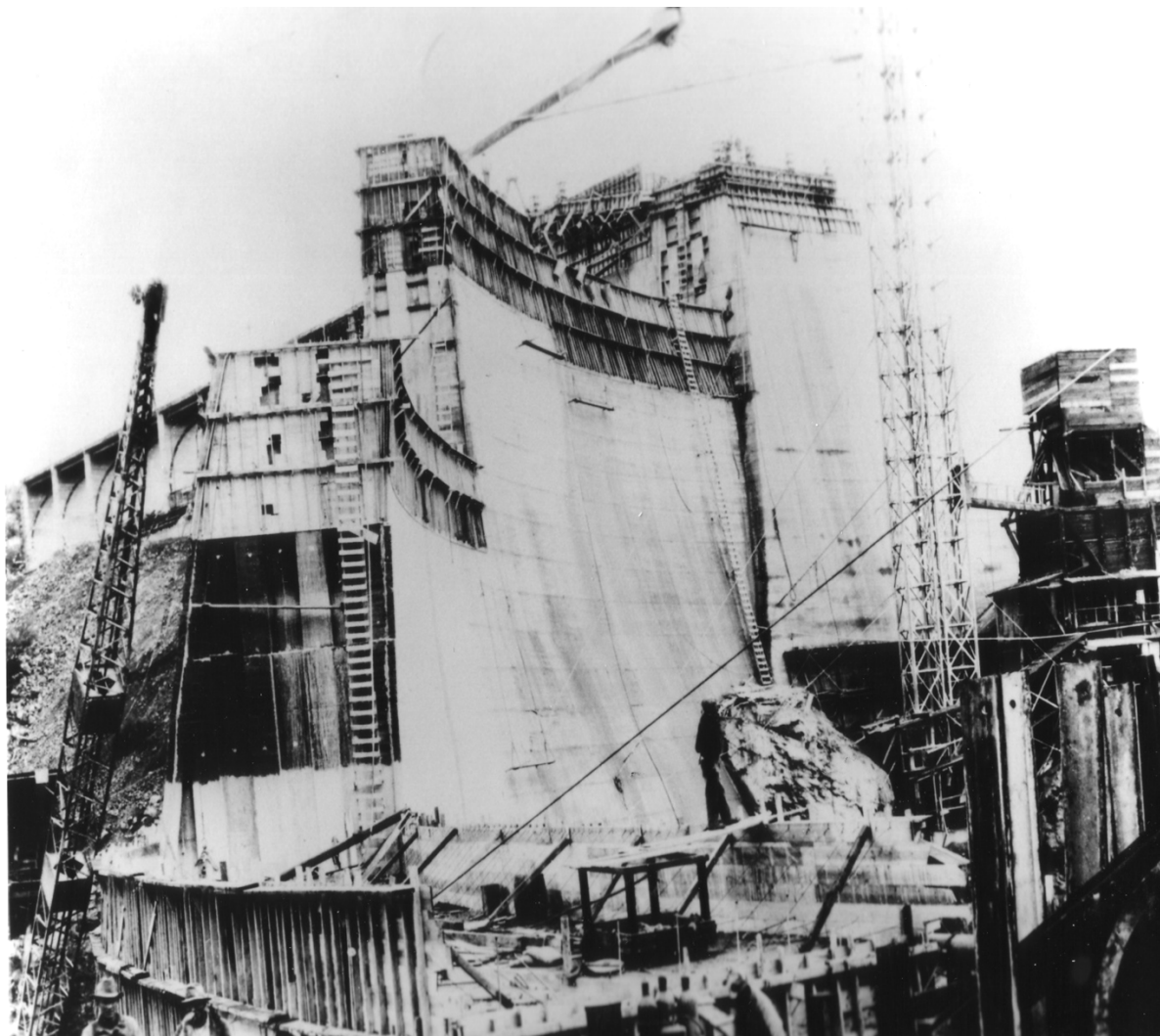
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OVERALL VIEW OF SITE. 14 January 1930.



Historic Photo 9. View to the west showing the construction of Stewart Mountain Dam spillway. Date of photo unknown.

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PHOTO No. 8 STEWART MOUNTAIN DAM, CONTEMPORARY VIEW OF DAM CREST.

Historic Photo 10. View to the east showing Stewart Mountain Dam. Date of photo unknown.

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PHOTO No. 9 STEWART MOUNTAIN DAM, CONTEMPORARY VIEW OF DOWNSTREAM FACE.

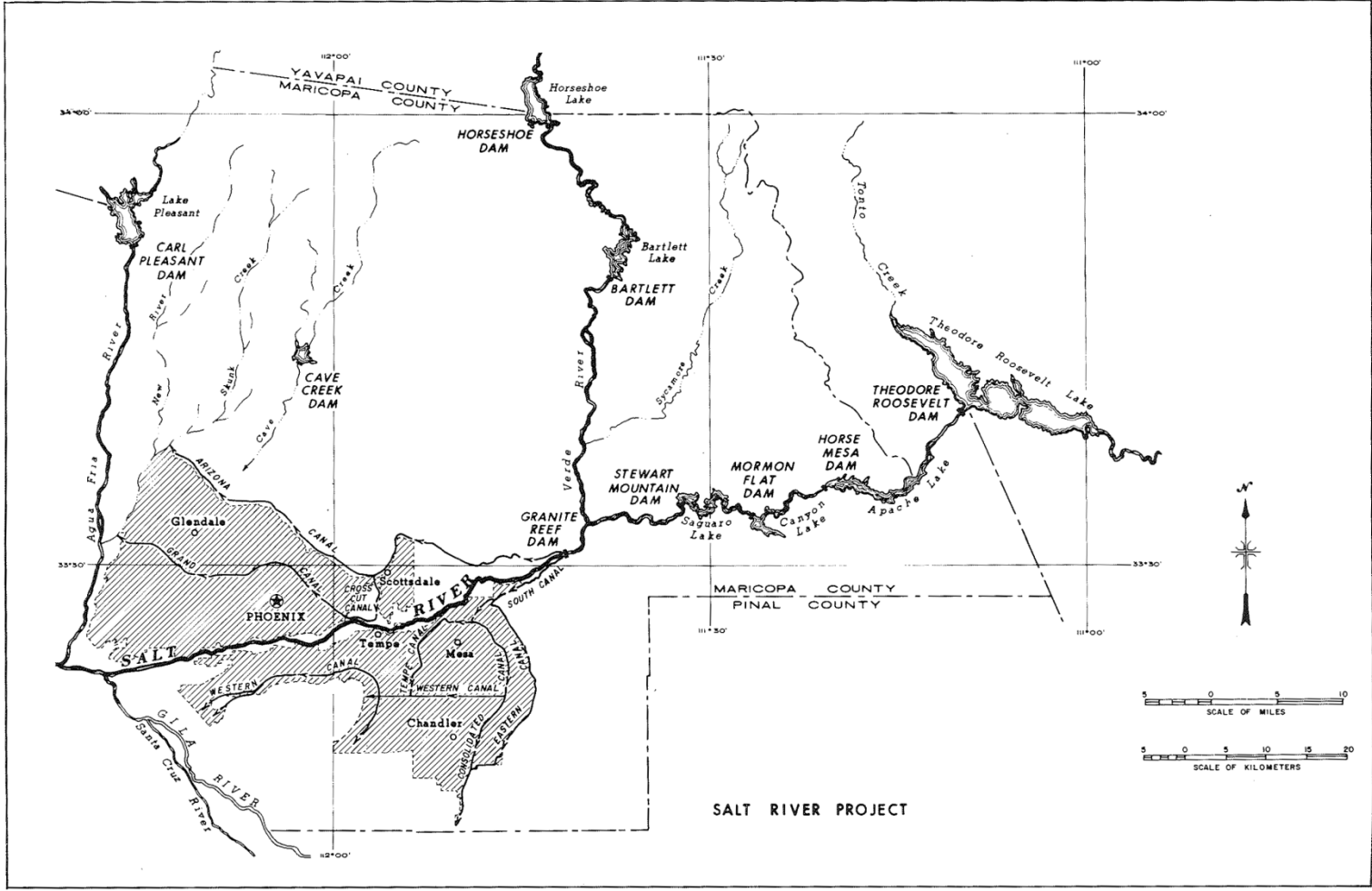
Historic Photo 11. View upstream showing the downstream side of Stewart Mountain Dam and powerhouse.
Date of photo unknown.

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Map 1. Location of dams in the Salt River Project.

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Map 2. Boundaries of contributing and non-contributing structures at Stewart Mountain Dam.

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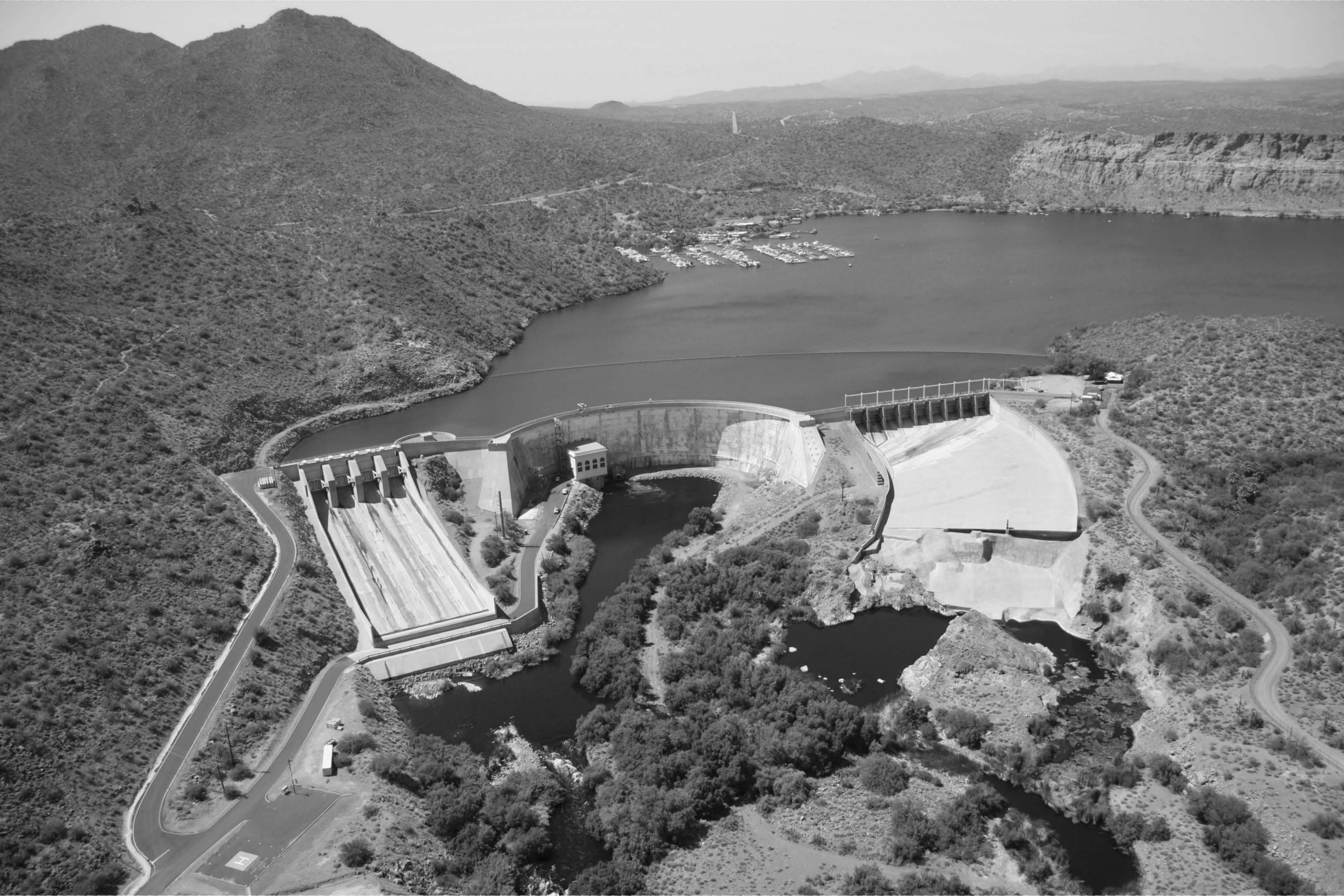
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Map 3. Stewart Mountain Dam showing the orientation of photographs taken by Jim Bailey in 2009 and 2010.









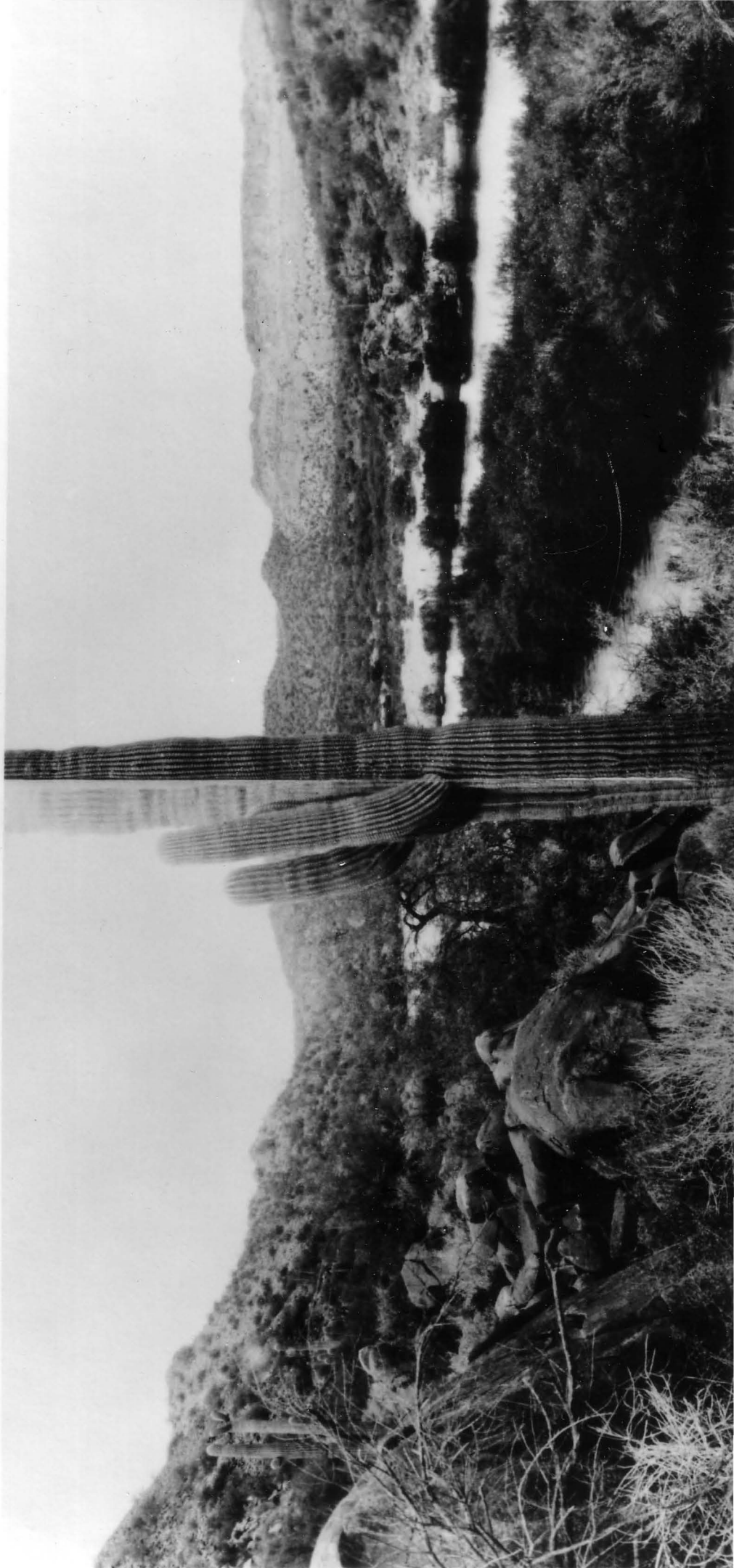




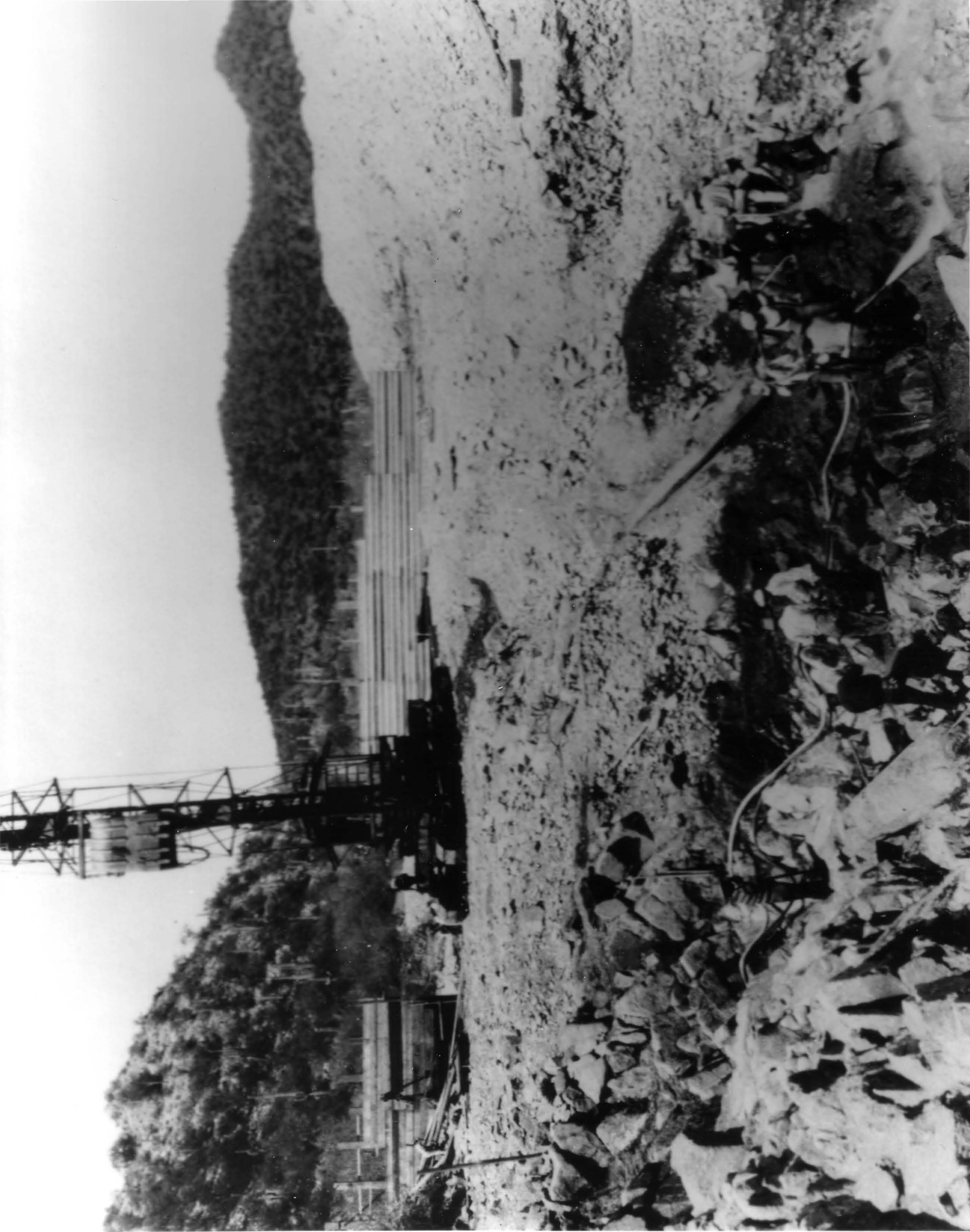








OVERALL VIEW OF STEWART MOUNTAIN DAMSITE BEFORE THE DAM. circa 1928.

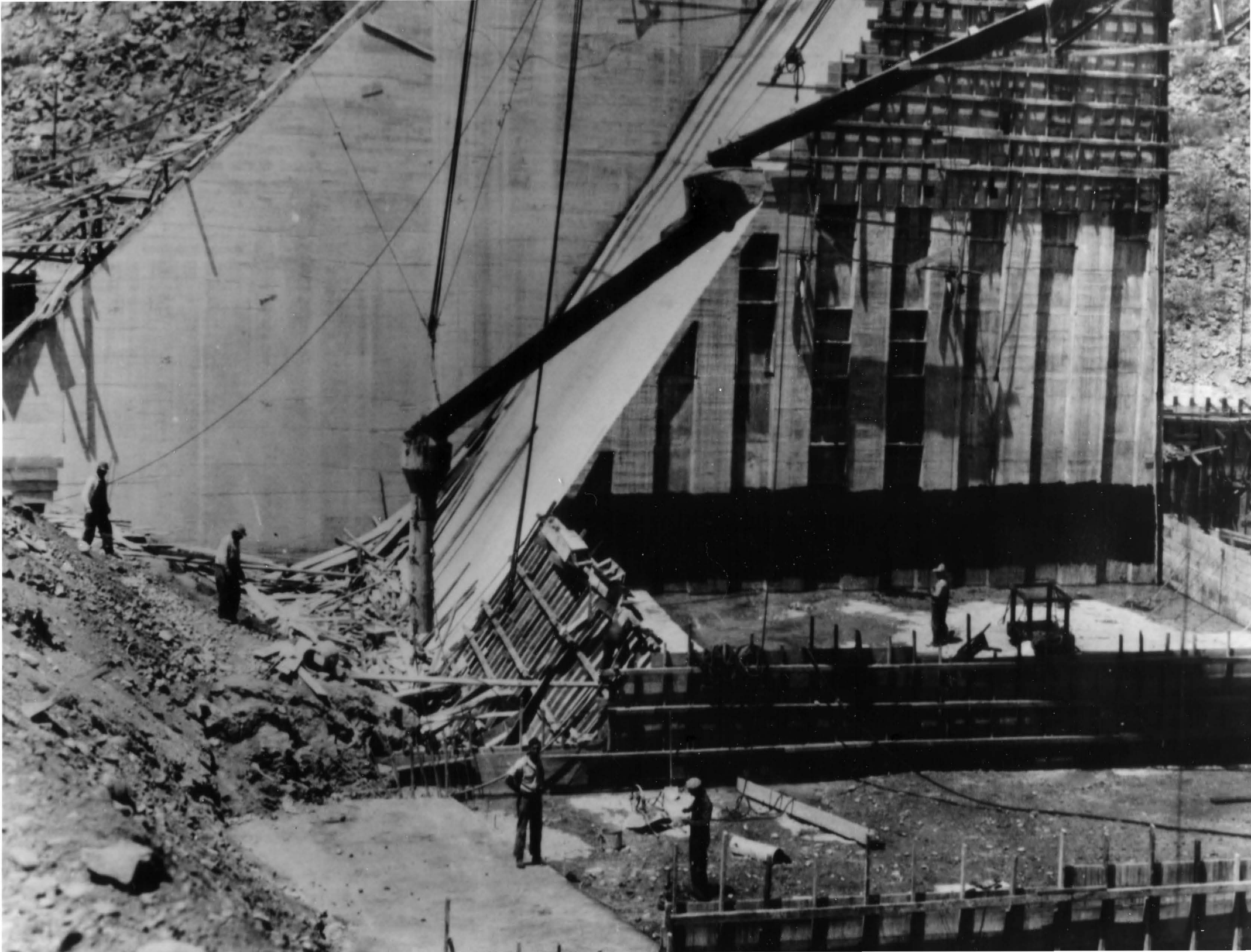


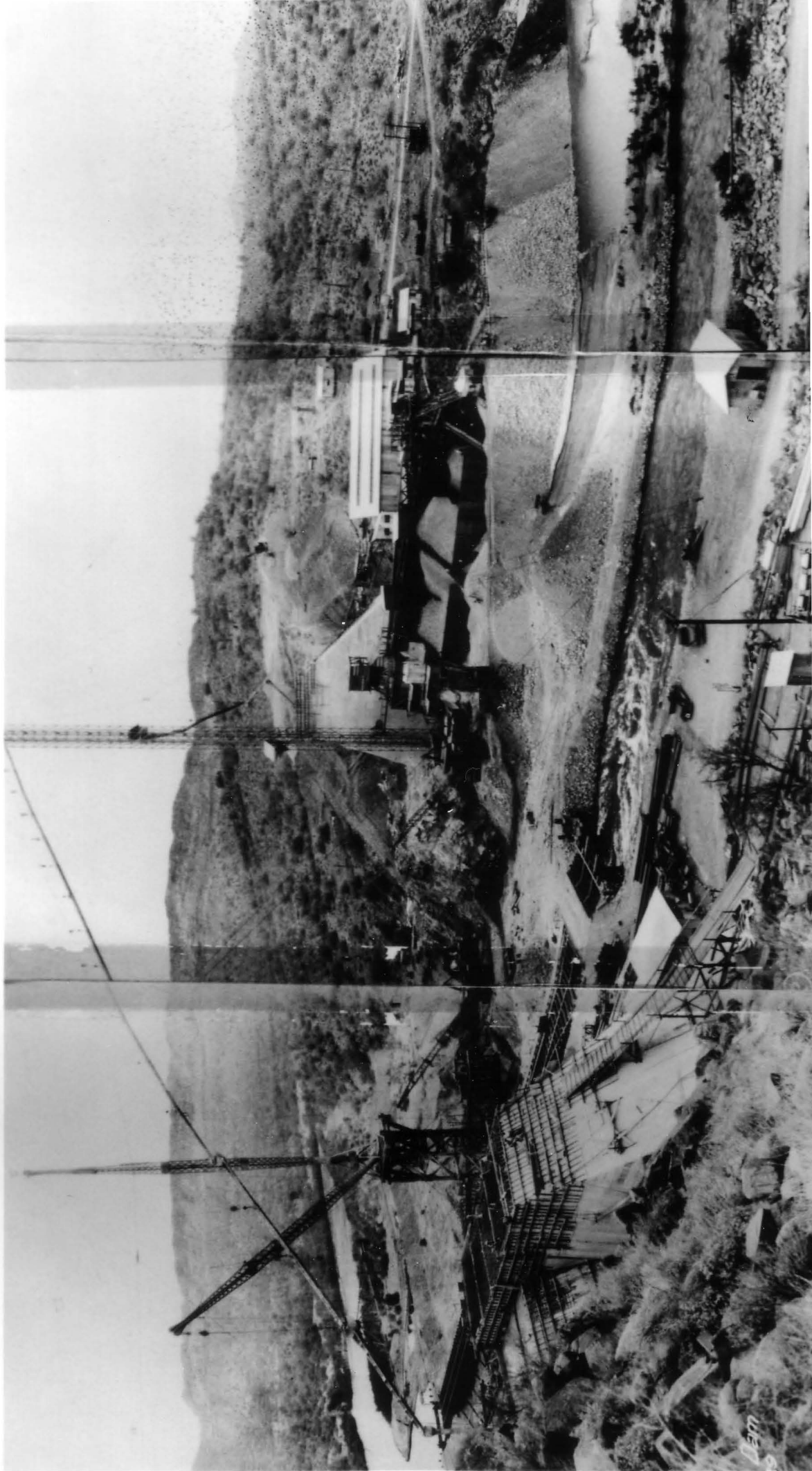
HYDRAULIC ROCK BLASTING. 11 February 1929.



POURING CONCRETE. 19 April 1929.

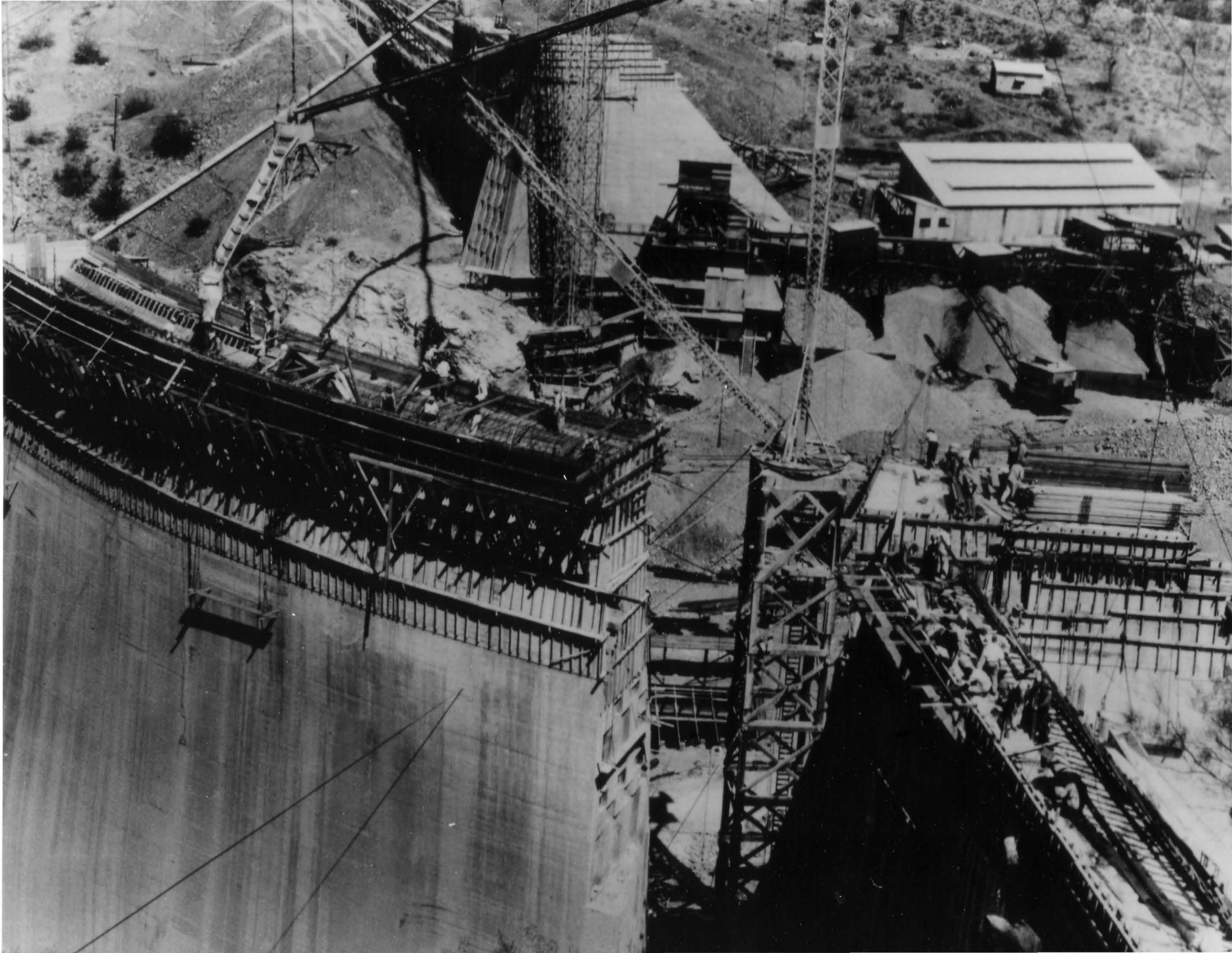
CONCRETE POURING, GRAVITY SECTION. 13 June 1929.

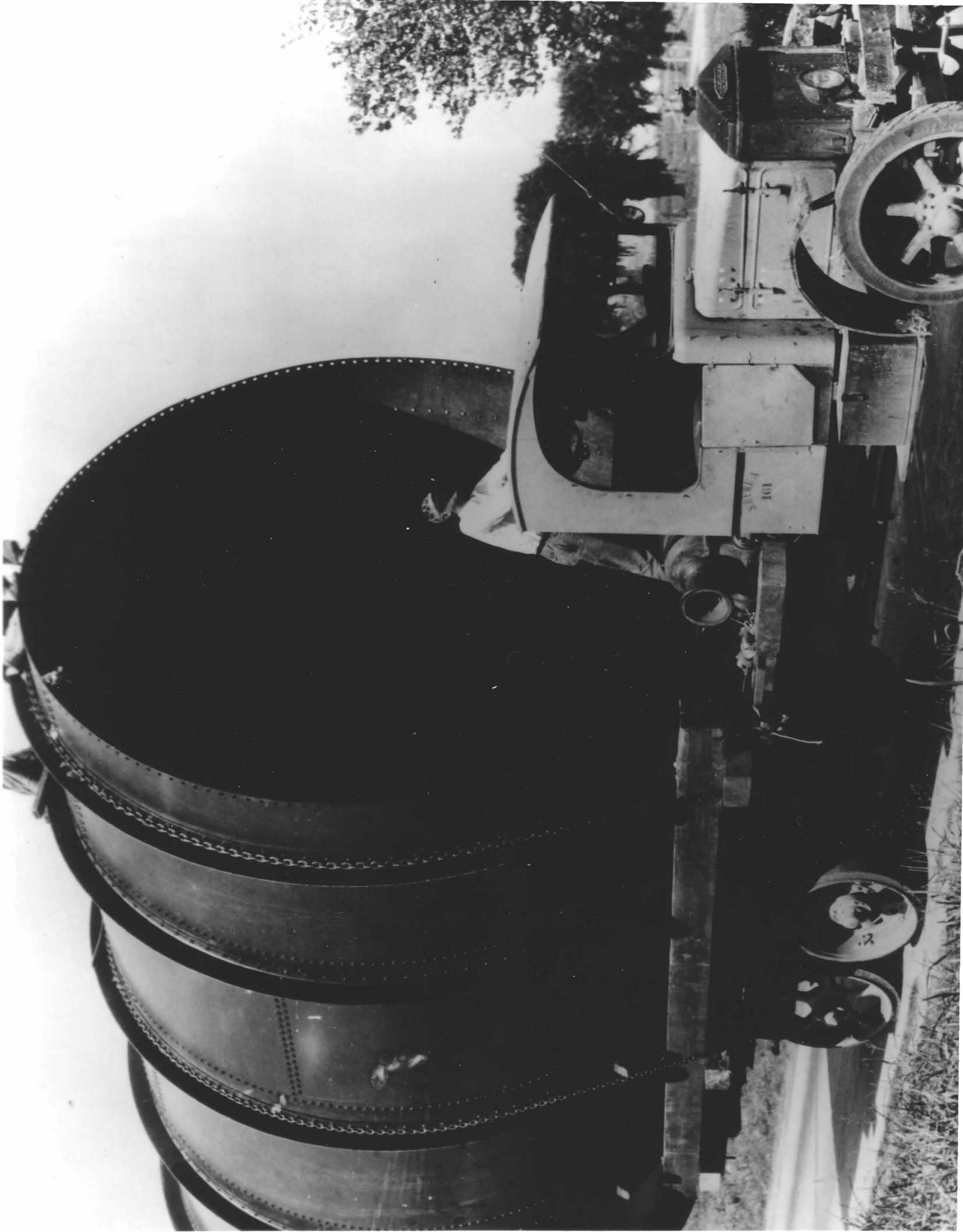




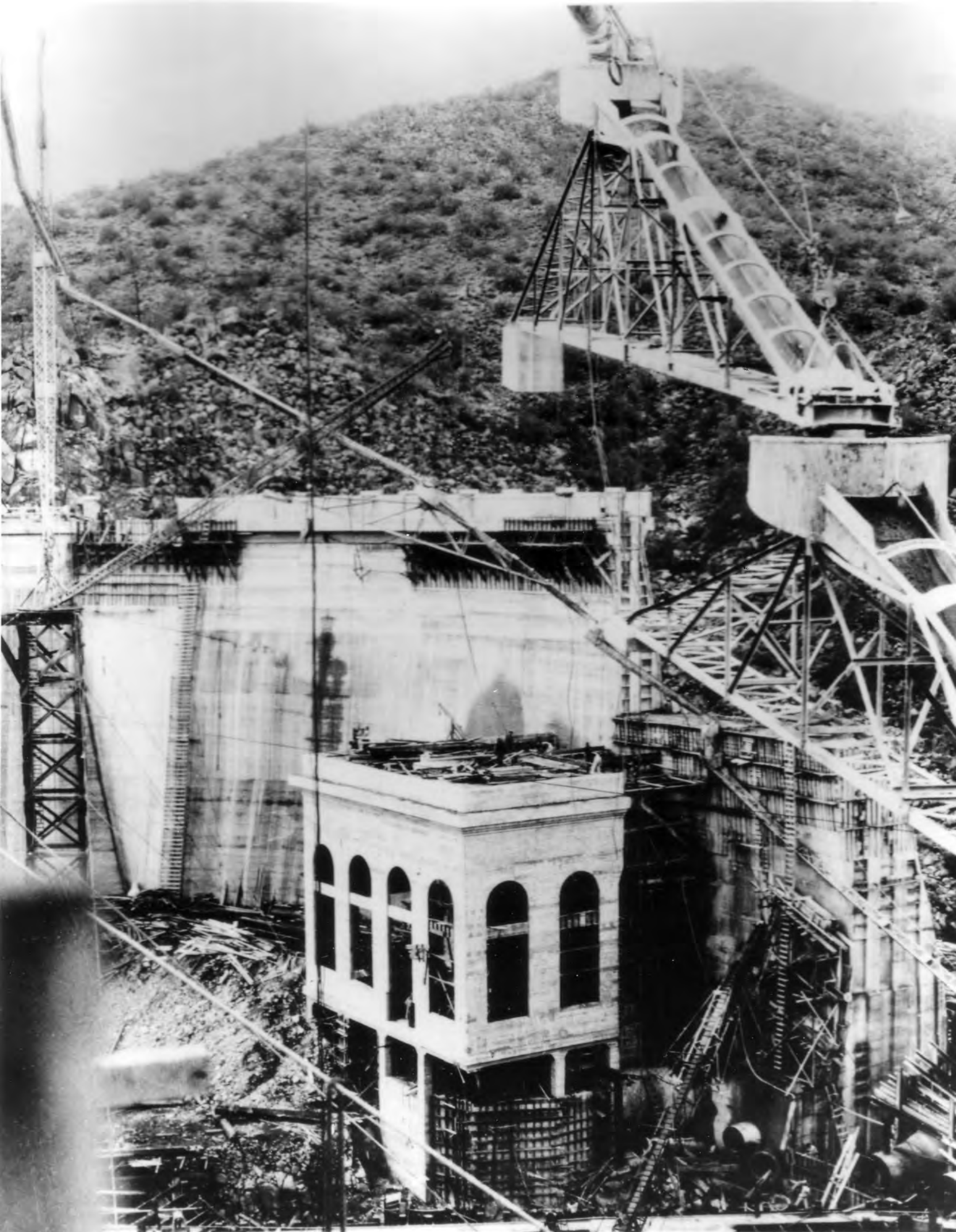
OVERALL VIEW OF SITE. 9 July 1929Z

OVERALL VIEW OF SITE. 5 September 1929.

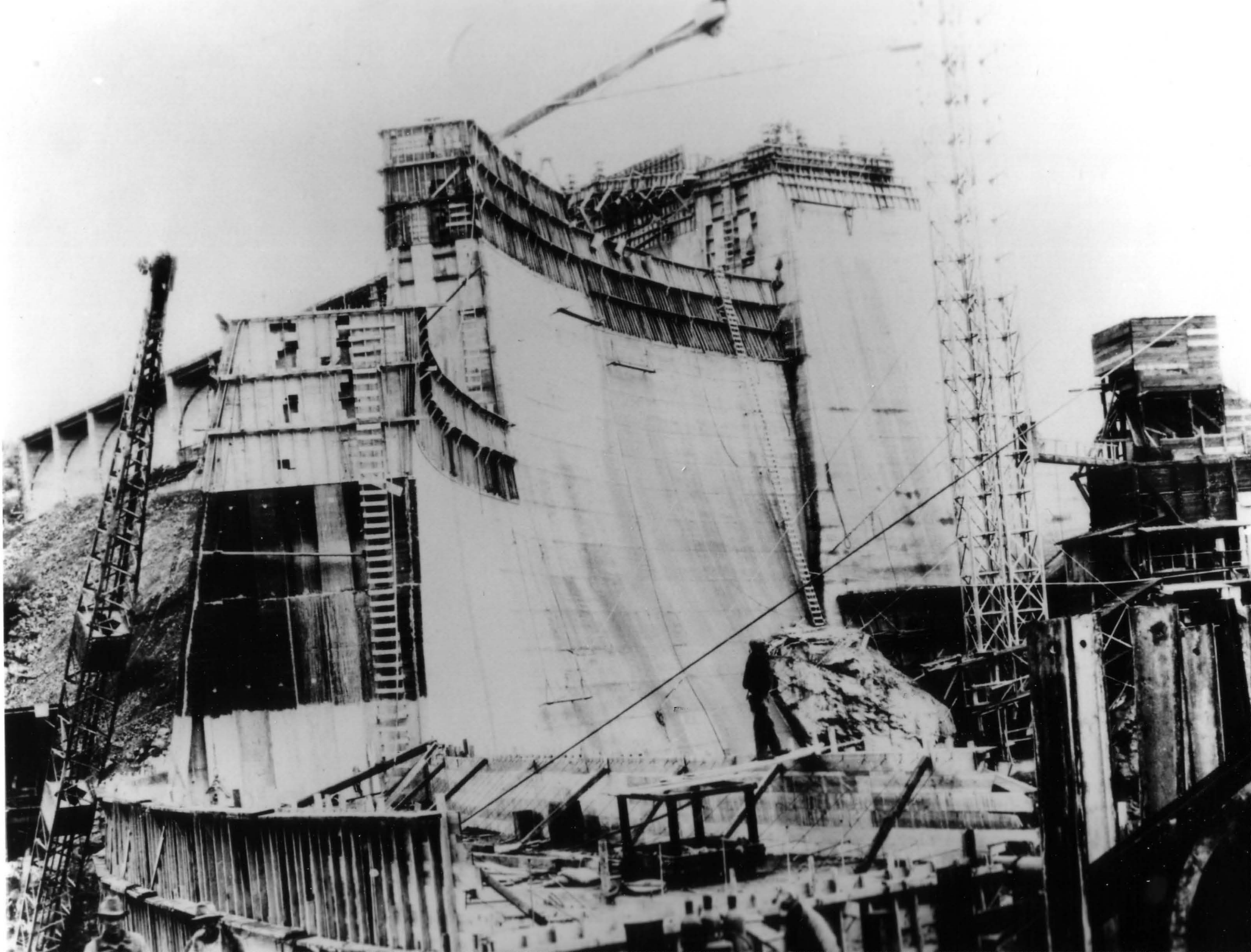




PENSTOCK SECTION ON TRUCK. 14 September 1929.



OVERALL VIEW OF SITE. circa November 1929.



OVERALL VIEW OF SITE. 14 January 1930.

PHOTO No. 8 STEWART MOUNTAIN DAM, CONTEMPORARY VIEW OF DAM CREST.

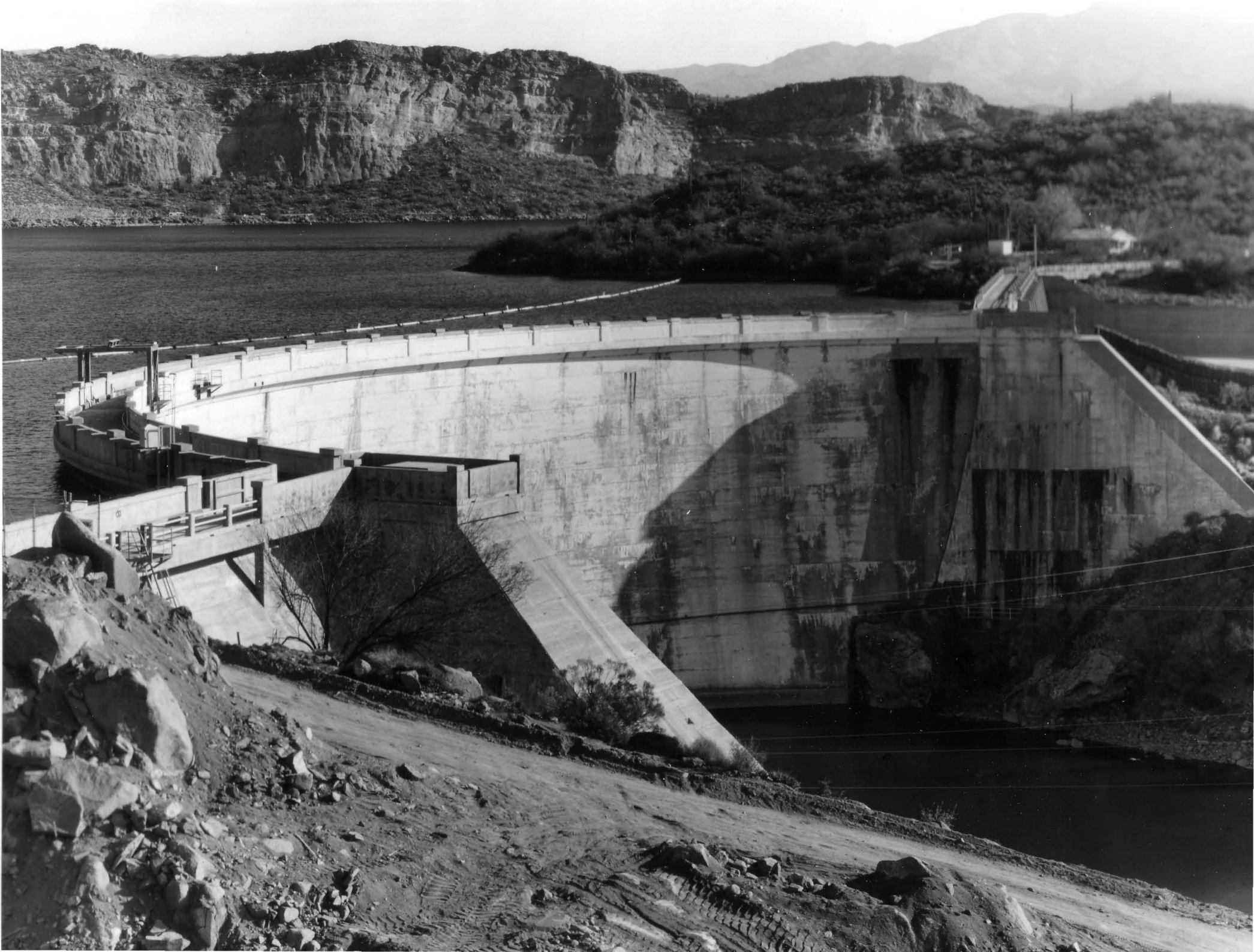


PHOTO No. 9 STEWART MOUNTAIN DAM, CONTEMPORARY VIEW OF DOWNSTREAM FACE.



UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES
EVALUATION/RETURN SHEET

Requested Action: Nomination

Property Name: Stewart Mountain Dam

Multiple Name: Salt River Project MPS

State & County: ARIZONA, Maricopa

Date Received: 6/23/2017 Date of Pending List: 7/18/2017 Date of 16th Day: 8/2/2017 Date of 45th Day: 8/7/2017 Date of Weekly List:

Reference number: MP100001411

Nominator: State

Reason For Review:

Accept Return Reject 8/7/2017 Date

Abstract/Summary Comments: The Stewart Mountain Dam is of statewide significance under National Register Criterion A in the areas of Politics/Government, Community Planning and Development, and Engineering. Constructed in 1928-1930, with historic modifications to the spillways in 1936, the variable radius, reinforced concrete, thin-arch dam is an excellent illustration of the innovative irrigation and municipal water storage infrastructure resources built under the supervision of the Bureau of Reclamation as part of the Salt River Project (SRP)--one of the first five federally sponsored western water projects. Directly commissioned by the Salt River Valley Water Users' Association, the dam represents the Salt River Project's aggressive hydroelectric expansion programs of the post-WWI era in service of hydro-power, irrigation, and municipal supply operations. The resources reflect the Association's design and engineering expertise and growing proficiency in managing the engineering aspects of the SRP. The resource meets the Registration Requirements of the SRP MPS. [While the nomination highlights the resources as good examples of period dam design, Reclamation has determined not to nominate this property under Criterion C at this time.]

Recommendation/ Criteria Accept NR Criterion A.

Reviewer Paul Lusignan

Discipline Historian

Telephone (202)354-2229

Date 8/7/2017

DOCUMENTATION: see attached comments : No see attached SLR : No

If a nomination is returned to the nomination authority, the nomination is no longer under consideration by the National Park Service.



United States Department of the Interior

BUREAU OF RECLAMATION
P.O. Box 25007
Denver, CO 80225-0007
JUN 20 2017



IN REPLY REFER TO:

84-53000
ENV-3.00

MEMORANDUM

To: J. Paul Loether, Chief, National Register of Historic Places Program, National Park Service, 1201 Eye Street, NW (2280), Washington, DC 20005
Attn: Mr. Paul Lusignan

From: Roseann Gonzales *Roseann Gonzales*
Director, Policy and Administration

Subject: Nomination of the Salt River Project (Project), Maricopa County, Arizona, as a Multiple Property Listing (MPL) in the National Register of Historic Places (National Register), and Nominations of Associated Properties under the MPL

The Bureau of Reclamation is pleased to nominate the Salt River Project as an MPL on the National Register. We are concurrently individually nominating five associated Project dams, and nominating the Project's diversion and conveyance system as a historic district. The multiple property documentation (MPD) form and associated property registration forms, with supporting information, are attached. All forms are submitted in electronic format on the two enclosed compact disks, with the required hard copy of the original signature sheet for each of the six property nomination forms. In order to provide an original signature for both the Federal Preservation Officer (FPO) and the State Historic Preservation Officer (SHPO), two copies of each signature page is attached. As is also required, I confirm that the enclosed compact disks contain the true and correct nomination forms for the Salt River Project MPD; for the Salt River Project Diversion and Conveyance System Historic District; and for Bartlett Dam, Horse Mesa Dam, Horseshoe Dam, Mormon Flat Dam, and Stewart Mountain Dam.

The nomination forms were submitted for review to the Arizona SHPO and the SHPO signed the forms without comment. In Arizona, the State Review Board does not review Federal nominations. Reclamation provided all seven forms to Maricopa County for review by their Board of Supervisors, who are the chief local elected officials. The 45-day comment period closed on May 25 without Reclamation receiving comment from the County. Although not required for Federal nominations, Reclamation also provided the MPD and historic district forms to the six Certified Local Governments (CLG) established within the greater Phoenix metropolitan area; they were not provided with the dam nomination forms because the Project dams lie outside of the jurisdictional boundary of a GLG. The comment period closed with only the City of Glendale responding to say they had no comment at this time, and that they found the "materials were very well put together."

The Project and the associated properties are important pieces of Western reclamation history. Although some modifications have occurred to keep the structures operational, in large part the nominated properties retain levels of design, materials, workmanship, feeling, and overall integrity sufficient to convey their historic character and function. They demonstrate the historic importance of this irrigation and hydropower system that was instrumental in the transformation of the Phoenix basin into one of the great regional centers of the West.

If you have any questions, please contact Mr. George Herbst, FPO, at 303-445-3311, or g Herbst@usbr.gov, or Ms. Lynne MacDonald, cultural resources specialist, at 303-445-3206, or lmacdonald@usbr.gov.

Attachments - 14

cc: Archeologist, Bureau of Reclamation, 500 Fir Street, Boulder City, NV 89006-1470, Attn LC-2633 M. Slaughter

Archeologist, Bureau of Reclamation, 6150 W Thunderbird Road, Glendale AZ 85306-4001
Attn: PXAO-1500 D. Gifford

Supervisory Environmental Protection Specialist, Bureau of Reclamation 6150 W Thunderbird Road, Glendale AZ 85306-4001 Attn: PXAO-1500 S. Heath

Archeologist, Bureau of Reclamation, 6150 W Thunderbird Road, Glendale AZ 85306-4001
Attn: PXAO-1500 L Jelinek,

(all w/o att)