

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

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RECEIVED NOV 17 1975
DATE ENTERED JUL 30 1976

NATIONAL REGISTER OF HISTORIC PLACES INVENTORY -- NOMINATION FORM

SEE INSTRUCTIONS IN HOW TO COMPLETE NATIONAL REGISTER FORMS
TYPE ALL ENTRIES -- COMPLETE APPLICABLE SECTIONS

1 NAME

HISTORIC

****** Ash Fork Steel Dam

AND/OR COMMON

2 LOCATION

STREET & NUMBER

E of Ash Fork off U.S. 66/89
T 21 N, R 1 W, Sec. 5 SW4SE4 & SE4 SW4

NOT FOR PUBLICATION

CITY, TOWN

CONGRESSIONAL DISTRICT

VICINITY OF Ash Fork

3

STATE

CODE

COUNTY

CODE

Arizona

Coconino

005

3 CLASSIFICATION

CATEGORY

OWNERSHIP

STATUS

PRESENT USE

DISTRICT

PUBLIC

OCCUPIED

AGRICULTURE

MUSEUM

BUILDING(S)

PRIVATE

UNOCCUPIED

COMMERCIAL

PARK

STRUCTURE

BOTH

WORK IN PROGRESS

EDUCATIONAL

PRIVATE RESIDENCE

SITE

PUBLIC ACQUISITION

ACCESSIBLE

ENTERTAINMENT

RELIGIOUS

OBJECT

IN PROCESS

YES: RESTRICTED

GOVERNMENT

SCIENTIFIC

BEING CONSIDERED

YES: UNRESTRICTED

INDUSTRIAL

TRANSPORTATION

NO

MILITARY

OTHER:

4 OWNER OF PROPERTY

NAME

Atchison, Topeka & Santa Fe Rwy Co.

STREET & NUMBER

80 E. Jackson Blvd.

CITY, TOWN

STATE

Chicago

VICINITY OF

Illinois 60604

5 LOCATION OF LEGAL DESCRIPTION

COURTHOUSE,
REGISTRY OF DEEDS, ETC.

Coconino County Courthouse

STREET & NUMBER

CITY, TOWN

Flagstaff

STATE

Arizona

3

6 REPRESENTATION IN EXISTING SURVEYS

TITLE

NPS Historic American Engineering Record

only inventory

DATE

National Park Service

FEDERAL STATE COUNTY LOCAL

DEPOSITORY FOR
SURVEY RECORDS

CITY, TOWN

Washington

STATE

D.C.

7 DESCRIPTION

CONDITION		CHECK ONE	CHECK ONE
<input checked="" type="checkbox"/> EXCELLENT	<input type="checkbox"/> DETERIORATED	<input checked="" type="checkbox"/> UNALTERED	<input checked="" type="checkbox"/> ORIGINAL SITE
<input type="checkbox"/> GOOD	<input type="checkbox"/> RUINS	<input type="checkbox"/> ALTERED	<input type="checkbox"/> MOVED DATE _____
<input type="checkbox"/> FAIR	<input type="checkbox"/> UNEXPOSED		

DESCRIBE THE PRESENT AND ORIGINAL (IF KNOWN) PHYSICAL APPEARANCE

The stream in Johnson's Canyon flows only from February to May and in July and August. The drainage area is 26 sq. mi.

Most of the dam site is hard igneous rock, but the west side of the canyon had a soil cover varying in depth from a few inches to 3 feet. Construction was somewhat complicated by several natural cinder pockets.

The dam consists of 24 right triangle bents with the inclined side facing upstream. The height of the end bents (#s 1 through 7 and #24) varies from 12 to 21 feet. The height of bents 8,9,22, and 23 is about 33 ft. Bents 10-12 and 19-21 are from 33 ft. to 41 ft. 10 inches. Bents 13 through 18 are from 36 ft. to 41 ft. 10 inches in height. These 4 styles of bents are shown in the accompanying diagram. The face of each bent is a 20 inch 65 lb. I-beam which has been reinforced by a $\frac{1}{2}$ inch plate 18 inches wide. Transverse diagonal braces connect the bents.

The face of the dam is composed of curved steel plates, dished at the bottom. There are 7 expansion joints.

The trench at the toe of the dam is about 2 ft. deep. This was filled with concrete to cover the ends of the beams and face plates. There is a masonry abutment at either end of the dam. The top of the dam has curved crest plates. The dam, which is 46 feet high and 184 ft. long (300 ft. if abutments are included), creates a reservoir with a capacity of 36 million gallons. The dam has no spillway, since it was designed to allow a 6 ft. overflow.

The dam is still in excellent condition.

8 SIGNIFICANCE

PERIOD	AREAS OF SIGNIFICANCE -- CHECK AND JUSTIFY BELOW			
<input type="checkbox"/> PREHISTORIC	<input type="checkbox"/> ARCHEOLOGY-PREHISTORIC	<input type="checkbox"/> COMMUNITY PLANNING	<input type="checkbox"/> LANDSCAPE ARCHITECTURE	<input type="checkbox"/> RELIGION
<input type="checkbox"/> 1400-1499	<input type="checkbox"/> ARCHEOLOGY-HISTORIC	<input type="checkbox"/> CONSERVATION	<input type="checkbox"/> LAW	<input type="checkbox"/> SCIENCE
<input type="checkbox"/> 1500-1599	<input type="checkbox"/> AGRICULTURE	<input type="checkbox"/> ECONOMICS	<input type="checkbox"/> LITERATURE	<input type="checkbox"/> SCULPTURE
<input type="checkbox"/> 1600-1699	<input type="checkbox"/> ARCHITECTURE	<input type="checkbox"/> EDUCATION	<input type="checkbox"/> MILITARY	<input type="checkbox"/> SOCIAL/HUMANITARIAN
<input type="checkbox"/> 1700-1799	<input type="checkbox"/> ART	<input checked="" type="checkbox"/> ENGINEERING	<input type="checkbox"/> MUSIC	<input type="checkbox"/> THEATER
<input checked="" type="checkbox"/> 1800-1899	<input type="checkbox"/> COMMERCE	<input type="checkbox"/> EXPLORATION/SETTLEMENT	<input type="checkbox"/> PHILOSOPHY	<input type="checkbox"/> TRANSPORTATION
<input checked="" type="checkbox"/> 1900-	<input type="checkbox"/> COMMUNICATIONS	<input type="checkbox"/> INDUSTRY	<input type="checkbox"/> POLITICS/GOVERNMENT	<input type="checkbox"/> OTHER (SPECIFY)
		<input type="checkbox"/> INVENTION		

SPECIFIC DATES

1898

BUILDER/ARCHITECT

STATEMENT OF SIGNIFICANCE

The Ash Fork Steel Dam was the first large all steel dam in the world. Constructed in 1897-1898, it is still in use and in good condition. It was the first dam in which the steel framework was designed to directly resist all of the strains and pressures.

The town of Ash Fork was a watering place for the AT&SF Rwy's E-W line and a terminus for the Santa Fe, Prescott, and Phoenix Rwy. The natural water supply was insufficient for these demands, and the company added the Ash Fork Dam to the series of reservoirs it was creating in Arizona. Until the dam was built, the railroad would be forced to haul water from Williams, a distance of 23 mi. or even from Bellemont, 45 mi. away. Since the need was for 90,000 gallons a day, the advantage of a nearby reservoir was obvious.

Some construction problems arose because of the numerous seams and cinder pockets in the igneous rock. The foundations for the steel bents were a mix of one part Alpha Portland cement, 3 parts sand, and 5 parts broken stone from the site.

"The structure is composed of alternate rigid and loose panels. The crest or apron plates which fit the braced panels between the bents are riveted to a curved angle which is riveted to the upper end of the curved plate, while in the unbraced panels this curved angle merely bears on the apron plate. Longitudinal expansion would be fatal to a structure of this character and the means provided...to avoid this form one of the original features of the design." Engineering News.

For protection, the steelwork was given two coats of Detroit Sulphite Paint (dry red lead and boiled linseed oil). Approximately every 10 years the dam received a coating of Dixon graphite and showed no corrosion except a little on the lower plates which were covered with mud from the reservoir. Repainting is easily accomplished, as the dam is the lowest in a series of 4, and the water main is connected with an intake in the dam just above so that the steel dam can be bypassed when necessary.

The steel portion of the dam was from the beginning completely water

9 MAJOR BIBLIOGRAPHICAL REFERENCES

Baker, T. Lindsay Water for the Southwest 1973
 Wegmann, Edward Design & Construction of Dams 1907
Engineering News 12 May 1898, 1 June 1916
Engineering News-Record 13 February 1930

10 GEOGRAPHICAL DATA

ACREAGE OF NOMINATED PROPERTY 6
 UTM REFERENCES

A	<u>1,2</u>	<u>37,12,25</u>	<u>389,875,0</u>	B			
	ZONE	EASTING	NORTHING		ZONE	EASTING	NORTHING
C				D			

VERBAL BOUNDARY DESCRIPTION

LIST ALL STATES AND COUNTIES FOR PROPERTIES OVERLAPPING STATE OR COUNTY BOUNDARIES

STATE	CODE	COUNTY	CODE
STATE	CODE	COUNTY	CODE

11 FORM PREPARED BY

NAME / TITLE

Marjorie Wilson, Historian

ORGANIZATION

Arizona State Parks

DATE

11-4-75

STREET & NUMBER

1688 West Adams

TELEPHONE

(602) 271-4174

CITY OR TOWN

Phoenix

STATE

Arizona 85007

12 STATE HISTORIC PRESERVATION OFFICER CERTIFICATION

THE EVALUATED SIGNIFICANCE OF THIS PROPERTY WITHIN THE STATE IS:

NATIONAL X

STATE

LOCAL

As the designated State Historic Preservation Officer for the National Historic Preservation Act of 1966 (Public Law 89-665), I hereby nominate this property for inclusion in the National Register and certify that it has been evaluated according to the criteria and procedures set forth by the National Park Service.

STATE HISTORIC PRESERVATION OFFICER SIGNATURE

Dorothy H. Hall

TITLE

Chief, Natural & Cultural Resource Conservation Section
State Parks Director

DATE

11-4-75 5-3-76

FOR NPS USE ONLY

I HEREBY CERTIFY THAT THIS PROPERTY IS INCLUDED IN THE NATIONAL REGISTER

DATE

W.D. 7/30/86

Acting DIRECTOR, OFFICE OF ARCHEOLOGY AND HISTORIC PRESERVATION

ATTEST:

Charles Adams

DATE

5-11-76

CLERK, NATIONAL REGISTER

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CONTINUATION SHEET **Steel Dam** ITEM NUMBER **8** PAGE **1**

tight. However, some leakage occurred where the steel plates were joined to the concrete. To remedy this, the concrete was covered with asphalt in 1900.

The dam was designed by F. H. Bainbridge of Chicago and James Dun, Chief Engineer for the AT&SF. The ironwork was contracted by the Wisconsin Bridge and Iron Co. of Milwaukee, and the remaining construction was done by the Railway Company.

The dam is notable for innovative design, durability, and low maintenance. The impounded water is now used for local livestock.

Note: The dam is temporarily dry for the first time because the water was used in the recent drilling of a well for Ash Fork.