

**United States Department of the Interior
Heritage Conservation and Recreation Service**

**National Register of Historic Places
Inventory—Nomination Form**

For HCRS use only
received MAY 20 1980
date entered JUN 20 1980

See instructions in *How to Complete National Register Forms*
Type all entries—complete applicable sections

1. Name

historic Mountain Dell Dam

and/or common

2. Location

N of Salt Lake City
Parleys Canyon, about 13 miles southwest of Salt
street & number Lake City's business district ___ not for publication

city, town Salt Lake City vic. ___ vicinity of congressional district 02

state Utah code 049 county Salt Lake code 035

3. Classification

Category	Ownership	Status	Present Use	
___ district	<input checked="" type="checkbox"/> public	<input checked="" type="checkbox"/> occupied	<input checked="" type="checkbox"/> agriculture	___ museum
___ building(s)	___ private	___ unoccupied	___ commercial	___ park
<input checked="" type="checkbox"/> structure	___ both	___ work in progress	___ educational	___ private residence
___ site	Public Acquisition	Accessible	___ entertainment	___ religious
___ object	___ in process	___ yes: restricted	___ government	___ scientific
	___ being considered	<input checked="" type="checkbox"/> yes: unrestricted	___ industrial	___ transportation
		___ no	___ military	<input checked="" type="checkbox"/> other: <u>city water storage</u>

4. Owner of Property

name Salt Lake City Corp.

street & number Salt Lake City and County Bldg.

city, town Salt Lake City ___ vicinity of state UT 84111

5. Location of Legal Description

courthouse, registry of deeds, etc. Salt Lake City and County Building

street & number Fourth South and State Street

city, town Salt Lake City state UT

6. Representation in Existing Surveys

title Historic American Engineering Record has this property been determined eligible? yes ___ no

date Summer, 1971 federal ___ state ___ county ___ local

depository for survey records Historic American Engineering Record, National Park Service

city, town Washington, DC 20240 state

7. Description

Condition

excellent
 good
 fair

deteriorated
 ruins
 unexposed

Check one

unaltered
 altered

Check one

original site
 moved date _____

Describe the present and original (if known) physical appearance

The Mountain Dell Dam is a reinforced concrete multiple-arch dam of Eastwood Design with a total length of 565 feet and a maximum height of 145 feet from bedrock foundation to the top of the structure. The dam was built in two stages, and as originally constructed in 1916-17 rose to a height of 105 feet above bedrock. The additional 40 feet was added in 1924.

A series of 16 reinforced concrete cylindrical arch rings comprise the dam's water face or upstream face.¹ Originally, there were eleven arches. The cylinders vary in thickness from four feet at the bottom upstream "heel" of the dam to 1 1/4 feet at the top and slant at an angle slightly greater than 50 degrees. The dam is 145 feet in height, but only the arch rings in the middle have this depth because the canyon walls are sloped. Thus, the arch rings at the end of the dam are only about 20 feet in height. Each of the arches has a span width of about 35 feet and encompasses a 120 degree circular arc.

"Vaults formed by these arches are supported by trapezoidal shaped buttresses firmly anchored into bedrock. The buttresses vary in thickness from eight feet at the foundation to two feet at the top and carry the thrust of the water loading to the dams foundation. When the reservoir is filled with water the hydrostatic pressure is exerted directly on the cylindrical vaults. Through their 'arch' action the pressure is concentrated on the buttresses which support them. Because the spans of the arches are all equal, their respective sideward thrusts, due to water loadings, cancel one another out and the only forces the buttresses are required to sustain are those perpendicular to their upstream faces. Due to the upstream inclination of the dams facings, the resultant of the water pressure combined with the structures weight passes almost directly through the center of the dams foundation."

"Though some struts have required patchings due to deterioration, the concrete in the structure has weathered well. Only a small amount of efflorescence, a phenomena frequently effecting concrete, has occurred on the dam. This is evident in the whitish patches of calcium carbonate which have formed on the downstream face of the arch rings." This efflorescence is very slight and does not affect Mountain Dell Dam's integrity in any way.

Salt Lake City decided to complete the final 40 feet of the dam in 1924. Eastwood died earlier in the year and without his supervision an alteration to his design was made. In other Eastwood dams the upper 15 to 20 feet of the ustream face is vertical. However, in the Mountain Dell Dam the Salt Lake City Engineers Office, having no one to consult and being unfamiliar with the design, decided to continue the inclined facing to the top of the dam.

FHR-8-300A
(11/78)

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The present capacity of the dam is 1,145 million gallons, which represents approximately 65% of Salt Lake City's water storage capacity. In 1938 and again in 1959, gunite, a water-proofing agent, was applied to the upstream face of the dam, particularly to the joint between the 1916 and 1924 pours.

¹Much of the description is taken from Donald C. Jackson, "John S. Eastwood and the Mountain Dell Dam" a paper presented at the Society for the History of Technology, 1976.

8. Significance

Period	Areas of Significance—Check and justify below			
<input type="checkbox"/> prehistoric	<input type="checkbox"/> archeology-prehistoric	<input checked="" 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 checked="" 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/
<input type="checkbox"/> 1700-1799	<input type="checkbox"/> art	<input checked="" type="checkbox"/> engineering	<input type="checkbox"/> music	<input type="checkbox"/> humanitarian
<input type="checkbox"/> 1800-1899	<input type="checkbox"/> commerce	<input type="checkbox"/> exploration/settlement	<input type="checkbox"/> philosophy	<input type="checkbox"/> theater
<input checked="" type="checkbox"/> 1900-	<input type="checkbox"/> communications	<input type="checkbox"/> industry	<input type="checkbox"/> politics/government	<input type="checkbox"/> transportation
		<input type="checkbox"/> invention		<input type="checkbox"/> other (specify)

Specific dates 1916-17/1924 **Builder/Architect** John S. Eastwood

Statement of Significance (in one paragraph)

Constructed in 1916-17, with an addition in 1924, the Mountain Dell Dam is significant in the history of U.S. technological development and in the vital development of Salt Lake City's water resources. The dam was designed by John S. Eastwood, considered one of American's most important and innovative hydraulic engineers of the early 20th century. Eastwood, the man most responsible for the development and utilization of the multiple-arch dam, built the first reinforced concrete multiple-arch dam with bedrock foundations in 1908-09; and in the following years that structural form was employed throughout America, Canada, Europe, and Asia. The multiple-ach dam was selected over other design concepts for Salt Lake City's storage reservoir in Parley's Canyon because the bedrock there is a calcareous shale which is not waterlight and tends to decompose, requiring a structure that would not be susceptible to overturning or sliding. John Eastwood was internationally recognized as the most prolific designer of multiple-arch dams in the world, having built 17 of his dams before his death in August, 1924, at the age of 67.

Salt Lake City, located in the Great Basin of the American West, is dependent upon adequate supplies of water. As with other western regions, water conservation and use is of vital concern. In the early years of the 1910's Salt Lake City found itself in a serious condition for the need of a sufficient water supply during certain seasons of the year, primarily in the late summer and mid-winter. A bond issue of 1914 resulted in a program of improvements which included plans to build a dam in Parley's Canyon. In the field of community planning the location of the Mountain Dell Dam was significant because it's location was so near the city (13 miles) that it could serve as an equalizing as well as a storage reservoir.

Three dam designs were considered, but the reinforced concrete multiple-arch dam by John S. Eastwood was chosen primarily because it was not susceptible to sliding or overturning in the bedrock of the Mountain Dell site. Eastwood's design is important as one of the world's first to realize the actual potential of reinforced concrete in the construction of dams and other structures which would have been difficult or impossible to build with other kinds of materials. "In the early 20th century, dam design was still dictated by principles essentially traditional in nature rather than scientific. In developing his multiple-arch dams, Eastwood employed a rigorous, scientific analysis in studying the problem of dam design and, consequently, he derived the reinforced concrete multiple-ach dam as the safest, most practical, most materially conservant and most economical design for almost all dam sites."¹ The material economics inherent in the design rendered the multiple-arch dam as significant in the development of the world's water

9. Major Bibliographical References

See continuation sheet

10. Geographical Data

**UTM NOT VERIFIED
ACREAGE NOT VERIFIED**

Acreeage of nominated property ca. 18

Quadrangle name Mountain Dell, UT

Quadrangle scale 1:24000

UMT References

A	1 2	4 3 9 1 4 0	4 5 1 1 1 2 0
	Zone	Easting	Northing

B	1 2	4 3 9 3 0 0	4 5 1 1 1 0 0
	Zone	Easting	Northing

C	1 2	4 3 9 4 4 0	4 5 1 1 3 0 0
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D	1 2	4 3 9 0 6 0	4 5 1 1 3 4 0
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E	1 2	4 3 9 0 4 0	4 5 1 1 1 7 0
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F			
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G			
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H			
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Verbal boundary description and justification Located in Parleys Canyon, about 13 miles southeast of Salt Lake City's business district. Nominated property to consist of the entire dam, including spillway.

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 Philip F. Notarianni, Historian

organization Utah State Historical Society

date January 1980

street & number 307 West 200 South

telephone (801) 533-6017

city or town SLC

state UT 84101

12. State Historic Preservation Officer Certification

The evaluated significance of this property within the state is:

national 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 Heritage Conservation and Recreation Service.

State Historic Preservation Officer signature

Melvin T. Smith

title Melvin T. Smith, State Historic Preservation Officer

date 3-17-80

For HCERS use only

I hereby certify that this property is included in the National Register

J. W. Ray Luce
Keeper of the National Register

date 6/20/80

Attest: *William H. Abraham*

date 6.13.80

Special Registration

UNITED STATES DEPARTMENT OF THE INTERIOR
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resources, and "more importantly, it demonstrated the capabilities and potential of reinforced concrete construction to engineers and industrial designers involved in all phases of structural technology".²

Actual work on the dam began in 1916 by the Parrot Bros. Company. In August, 1917, the partial height of the dam was completed to 105 feet above bedrock. Late in 1924 Salt Lake City decided to complete the final 40 feet of the dam, with the construction firm of Lynch Cannon Engineering being employed. Eastwood had drowned tragically in August, 1924, and as mentioned in Item 7, his design was somewhat altered by Salt Lake City engineers.

Mountain Dell Dam, when evaluated by the Historic American Engineering Record Survey in 1971, had a capacity of 1,145 million gallons, representing 65% of Salt Lake City's water storage capacity. As with other Eastwood dams, the safety factors contended have been proven sound; and all of John Eastwoods 17 dams, though some alterations have occurred, remain intact and functioning.

¹Quoted from "Little Rock Creek Dam" National Register of Historic Places Inventory Nomination Form.

²Jackson, "John S. Eastwood and the Mountain Dell Dam", p. 1.

