NPS Form 10-900
(Oct. 1990)

OMB No. 10024-0018

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 *How to Complete the National Register of Historic Places Registration Form* (National Register Bulletin 16A). Complete each item by marking "x" in the appropriate box or by entering the information requested. If an 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 entries and narrative items on continuation sheets (NPS Form 10-900a). Use a typewriter, word processor, or computer, to complete all items.

1. Name of Property

historic name Mammoth Spring Dam and Lake

other names/site number FU0083

2. Location

street & number 17 Hwy. 63 North ☐ not for publication

city or town Mammoth Spring ☐ vicinity

state Arkansas code AR county Fulton code 049 zip code 72554

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 for 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
☐ nationally ☒ statewide ☐ locally. (See continuation sheet for additional comments.)

Catherine Mazzanti 5/29/09
Signature of certifying official/Title Date

Arkansas Historic Preservation Program
State or Federal agency and bureau

In my opinion, the property ☐ meets ☐ does not meet the National Register criteria. (☐ See Continuation sheet for additional comments.)

Signature of certifying official/Title Date

State or Federal agency and bureau

4. National Park Service Certification

I hereby certify that the property is:
☐ entered in the National Register.
☐ See continuation sheet
☐ determined eligible for the National Register.
☐ See continuation sheet
☐ determined not eligible for the National Register.
☐ removed from the National Register.
☐ other, (explain:) _____

Signature of the Keeper Date of Action

5. Classification

Ownership of Property
(Check as many boxes as apply)

- ☐ private
- ☐ public-local
- ☒ public-State
- ☐ public-Federal

Category of Property
(Check only one box)

- ☐ building(s)
- ☐ district
- ☐ site
- ☒ structure
- ☐ object

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

Contributing	Noncontributing	
		buildings
1		sites
1		structures
		objects
2	0	Total

Name of related multiple property listing
(Enter "N/A" if property is not part of a multiple property listing.)

N/A

Number of Contributing resources previously listed in the National Register

N/A

6. Function or Use

Historic Functions
(Enter categories from instructions)

INDUSTRY/waterworks
INDUSTRY/energy facility
LANDSCAPE/natural feature

Current Functions
(Enter categories from instructions)

INDUSTRY/waterworks
LANDSCAPE/park
RECREATION AND CULTURE/museum
RECREATION AND CULTURE/outdoor recreation
LANDSCAPE/natural feature

7. Description

Architectural Classification
(Enter categories from instructions)

OTHER: Cut stone dam

Materials
(Enter categories from instructions)

foundation STONE
walls STONE
roof METAL
other STONE

Narrative Description
(Describe the historic and current condition of the property on one or more continuation sheets.)

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. birthplace or grave of a historical figure of outstanding importance.
- ☐ D a cemetery.
- ☐ E a reconstructed building, object, or structure.
- ☐ F a commemorative property
- ☐ G less than 50 years of age or achieved significance within the past 50 years.

Levels of Significance (local, state, national)
State

Areas of Significance (Enter categories from instructions)
Community Planning and Development
Engineering
Industry

Period of Significance
1887-1959

Significant Dates
1887
1927

Significant Person (Complete if Criterion B is marked)

Cultural Affiliation (Complete if Criterion D is marked)

Architect/Builder
Mammoth Spring Improvement and Water Power Company
Arkansas-Missouri Power Company

Narrative Statement of Significance
(Explain the significance of the property on one or more continuation sheets.)

9. Major Bibliographical References

Bibliography
(Cite the books, articles, and other sources used in preparing this form on one or more continuation sheets.)

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

Primary location of additional data:

- ☒ State Historic Preservation Office
- ☒ Other State Agency
- ☐ Federal Agency
- ☐ Local Government
- ☐ University
- ☐ Other

Name of repository:
Mammoth Spring State Park

Record # _____

10. Geographical Data

Acreage of Property Approximately 9.5 acres

UTM References
(Place additional UTM references on a continuation sheet.)

	Zone	Easting	Northing		Zone	Easting	Northing
1	15	631246	4040039	3			
2				4			

☐ See continuation sheet

Verbal Boundary Description
(Describe the boundaries of the property on a continuation sheet.)

Boundary Justification
(Explain why the boundaries were selected on a continuation sheet.)

11. Form Prepared By

name/title Rachel Silva, Preservation Outreach Coordinator
organization Arkansas Historic Preservation Program date January 21, 2009
street & number 1500 Tower Building, 323 Center Street telephone (501) 324-9788
city or town Little Rock state AR zip code 72201

Additional Documentation

Submit the following items with the completed form:

Continuation Sheets

Maps

A **USGS map** (7.5 or 15 minute series) indicating the property's location

A **Sketch map** for historic districts and properties having large acreage or numerous resources.

Photographs

Representative **black and white photographs** of the property.

Additional items
(Check with the SHPO or FPO for any additional items.)

Property Owner

(Complete this item at the request of SHPO or FPO.)

name Arkansas State Parks
street & number One Capitol Mall, 4A-900 telephone (501)682-1191
city or town Little Rock state AR zip code 72201

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Summary

Constructed in 1887-88 by the Mammoth Spring Improvement and Water Power Company, the Mammoth Spring Dam powered the Mammoth Spring Roller Mill and Elevator, which ground soft wheat into flour, and the Mammoth Spring Cotton Mill and Cotton Gin. The dam, located about one-eighth of a mile south of the Mammoth Spring head, creates a 9.5 acre water reservoir called Spring Lake. Mammoth Spring, Arkansas's largest natural spring, produces an average of 9.78 million gallons of water per hour at a constant temperature of 58 degrees Fahrenheit. Mammoth Spring is the source of the Spring River, which flows south through the extreme eastern portion of Fulton County, eventually emptying into the Black River. The Mammoth Spring Dam is made of cut limestone set in a concrete footing on solid rock. The dam is approximately 198' in length, including the two turbine wells, with a 10' base and a 7' spillway. The Arkansas-Missouri Power Company purchased the Mammoth Spring Dam in 1925 and converted it into a hydroelectric power plant. In 1927, the south turbine well was retrofitted with a new turbine and generator to provide electrical power, and a stone masonry powerhouse was constructed atop the south turbine well. The Arkansas-Missouri Power Company operated the hydroelectric power plant until 1972, when it donated the plant to Arkansas State Parks.

Elaboration

Constructed in 1887-88 by the Mammoth Spring Improvement and Water Power Company, the Mammoth Spring Dam powered the Mammoth Spring Roller Mill and Elevator, which ground soft wheat into flour, and the Mammoth Spring Cotton Mill and Cotton Gin. Turbines, which provided power to the mills, were located in turbine wells on each end of the dam; the roller mill was located adjacent to the south turbine well, while the cotton mill was near the north turbine well. The dam, located about one-eighth of a mile south of the Mammoth Spring head, creates a 9.5 acre water reservoir called Spring Lake. Mammoth Spring, Arkansas's largest natural spring, produces an average of 9.78 million gallons of water per hour at a constant temperature of 58 degrees Fahrenheit. Because the water flow from the spring is constant, water continuously flows over the dam weir. Mammoth Spring is the source of the Spring River, which flows south through the extreme eastern portion of Fulton County, eventually emptying into the Black River. The Spring River's dependable flow year-round made it ideal for powering manufacturing industries in the late nineteenth and early twentieth centuries, and it is now a popular destination for fishermen and canoeists/kayakers for the same reason.

The Mammoth Spring Dam is made of cut limestone set in a concrete footing on solid rock. The dam is approximately 198' in length, including the two turbine wells, with a 10' base and a 7' spillway. Steel dowel pins were drilled into the limestone for additional support. A cut limestone turbine well measuring 30' x 30' is situated on each end of the dam. Each turbine well contained three sluice gates, which directed water to one turbine. In addition, two sluice gates were evenly spaced along the bottom of the dam spillway.

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A reinforced concrete walkway with redwood rails extends along the top of the dam and is supported by 3" square steel tubing anchored to the limestone. The walkway is about 3.5' above the top of the concrete weir, which runs the length of the dam spillway, allowing water to flow continuously over the spillway between the walkway and the weir.

Mammoth Spring, Arkansas's largest natural spring and the seventh-largest spring in the world, constantly flows out of the ground about eighty feet below the surface of Spring Lake and forms the northern spring pool or spring head. The spring head flows over two small weirs and around an island to form Spring Lake. Mammoth Spring produces an average of 9.78 million gallons of crystal clear water each hour at a constant temperature of 58 degrees Fahrenheit. Spring Lake was originally around 16 acres in size, but it has been reduced to about 9.5 acres. A weigh station was to be constructed near the springhead in 1972 just to the east of U.S. Hwy. 63, so the western portion of Spring Lake was filled with dirt to create enough space for it. The weigh station was never built, but the volume of Spring Lake was reduced. In addition, an island was built in the middle of the lake in the mid-1970s and a concrete cap was removed from the top of the dam, which further reduced the size of the lake.

The Arkansas-Missouri Power Company purchased the Mammoth Spring Dam in 1925 and converted it into a hydroelectric power plant. In 1927, the south turbine well was retrofitted with a new turbine and generator to provide electrical power, and a powerhouse was constructed atop the south turbine well.[1] The north turbine well was capped with a concrete slab at that time; however, the well still contains the original turbine and retains its three sluice gates. The gates measure 5.25' x 4.3', and each gate is controlled by a five-spoke hand wheel on a steel stem attached to the gate.[2] The two deep spillway gates are approximately 6' x 9'.[3] When the south turbine well was being converted to a hydroelectric facility, its three openings (originally the same size as those on the north turbine well) were enlarged to a size of 6' x 9', and the sluice gates were replaced by stoplog gates. A stoplog gate allows operators to control the amount of water flowing through the gate by dropping long rectangular beams into premade slots in the opening. A concrete cap was added to the dam spillway around 1928, raising it about two feet. This cap was removed around 1972 to allow greater space between the top of the dam weir and the bottom of the concrete walkway. Spring Lake is an ideal environment for underwater vegetation because the water has a high nitrogen content, a constant temperature of 58 degrees Fahrenheit, and the clear spring water allows sunlight to reach the bottom of the lake. This

[1] Sanborn maps and historic photographs indicate that each turbine well was originally covered by a one-room, rectangular shed with a gable roof.

[2] Two sluice gates on the north turbine well have their steel stems and hand wheels, but the middle gate is missing its stem and hand wheel. It is unlikely that these gates are still operational because they have not been opened in many years.

[3] The two deep sluice gates were originally controlled by the same steel stem and hand wheel mechanism as the gates on the north turbine well; however, the hand wheels became very difficult to turn, so the stems were replaced in 1998. The two deep sluice gates on the spillway are the only gates still in use. Spring Lake is usually drained every winter for a brief time in order to allow a layer of frost to develop on the lake floor. This helps to control the large amount of vegetation that grows in the lake during the summer months.

vegetation becomes a problem during the summer months, interfering with recreational activities like kayaking and pedal boating. Before this concrete cap was removed, vegetation was blocking the smaller opening and prohibiting water flow.

The one-room powerhouse, which was constructed on top of the south turbine well in 1927, measures 25' x 25' with a height of 30'. The fieldstone powerhouse building features grapevine mortar and rests on a concrete block foundation. The building has a flat metal roof with low concrete coping at the roofline. Mr. A.D. Couch of the Arkansas-Missouri Power Company acted as general contractor for the project of converting the dam into a hydroelectric power plant. The materials for the powerhouse building were provided by the Fulton Iron Works Company of St. Louis, MO, and the same company sent representatives to Mammoth Spring to oversee the construction of the powerhouse.

The north (front) elevation of the powerhouse is fenestrated by a pair of six-pane half-light steel doors with opaque glazing. A fixed, screened louvered vent is centered on the lower half of each door as well. The doors are crowned by a single concrete panel. Three concrete steps bounded by low stone porch railings with concrete caps lead up to the building's main entrance. A rectangular panel created by slender concrete blocks set into the fieldstone wall is centered on the building's upper façade. Centered inside this panel is a smaller rectangular panel of slender concrete blocks, which surrounds an engraved granite panel that reads, "Arkansas-Missouri Power Co. 1927."

The building's east (side) elevation is punctuated by three evenly-spaced, twenty-pane stationary windows with four-pane central awning sashes. The windows have opaque glass, metal muntins, and concrete lintels and sills. A small fixed louvered vent, centered below the southernmost window on this elevation, is situated just above the building's concrete block foundation.

The south (rear) façade of the powerhouse features a set of twelve-pane half-light steel double doors with opaque glazing. A fixed, screened louvered vent is centered on the lower half of each door. The doors are crowned by a single concrete panel. A dual-bulb outdoor light is centered just above the concrete panel. Three concrete steps bounded by low stone porch railings with concrete caps lead up to the building's rear doors.

The west (side) elevation of the powerhouse is punctuated by three evenly-spaced, twenty-pane stationary windows with four-pane central awning sashes. The windows have opaque glass, metal muntins, and concrete lintels and sills. Two small fixed louvered vents, centered below the two northernmost windows on this elevation, are situated just above the building's concrete block foundation. A third vent opening located below the southernmost window has been bricked in. Power lines are still connected to the building on this side, but they have been cut off close to the foundation.

The Arkansas-Missouri Power Company purchased the generator, turbine, governor, and all related equipment necessary to convert the Mammoth Spring Dam into a hydroelectric power plant for $10,670 in 1927. The generator, which has been preserved along with the other powerhouse equipment, was manufactured by Westinghouse Electric and Manufacturing Company in East Pittsburgh, PA, in 1925. General Engineering and Management Corporation of New York City sold the generator to the Arkansas-Missouri Power Company for $2,200. It was installed by Fulton Iron Works Company of St. Louis, MO, and technicians from Trenton Gas and Electric Company put the generator into service. It was rated at 500 kilowatts and 2,400 volts. The turbine was manufactured by James Leffel & Company of Springfield, OH, in 1926, and it had an operating head of 15.5' and a hydraulic capacity of 750 cubic feet per second.[4] The governor was an HR Oil Pressure Direct, manufactured by the Woodward Governor Company of Fort Collins, CO, and had a capacity of 8,400 foot-pounds. The Mammoth Spring Dam powerhouse had an average annual net generation of 2,128,875 kilowatt-hours, providing electricity to Mammoth Spring, AR, as well as Thayer, Koshkonong, Brandsville, and West Plains, MO.

Mammoth Spring State Park was established by an act of the Arkansas State Legislature in 1957, but the first land was not acquired until 1966. The abandoned Kansas City, Fort Scott, and Memphis Railroad Depot was leased to the park in 1968, and most of the land purchases were completed by 1975. The railroad depot was completely restored as a museum in 1999. The Arkansas-Missouri Power Company operated the hydroelectric power plant until 1972, when it donated the plant to Arkansas State Parks. The stone powerhouse and equipment were restored in 1993 and currently serve as another museum. Mammoth Spring State Park now encompasses 62 acres, including the Mammoth Spring head; Spring Lake; the Mammoth Spring Dam and powerhouse; the Queen Anne-style Kansas City, Fort Scott, and Memphis Railroad Depot (1886); a Welcome Center; playground; picnic area; interpretive walking trail; and baseball field.

Integrity

The Mammoth Spring Dam retains excellent integrity of location, design, setting, materials, workmanship, feeling, and association. The dam is still in its original location, and the cut limestone construction of the spillway and turbine wells dates to the dam's construction in 1887-88. The addition of the powerhouse and equipment in 1927 is historic and only adds significance to the Mammoth Spring Dam. In 1953 and 1998, the limestone was core drilled, and cement slurry was added to repair leaks in the dam. The two deep spillway gate operators were replaced in 1998 to aid the yearly lake draining process. However, these repairs did not visibly alter the dam. The dam is located inside the Mammoth Spring State Park, so its immediate surroundings have been preserved. The crystal-clear Mammoth Spring water continues to flow over the dam weir, and the powerhouse and original hydroelectric equipment were restored to museum quality in 1993.

[4] The operating head and hydraulic capacity of the turbine varied depending on the rate of flow from Mammoth Spring.

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Although the Mammoth Spring Dam no longer generates power, it appears as it did in 1927 when the Arkansas-Missouri Power Company converted it into a hydroelectric power plant.

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Summary

Constructed in 1887-88 by the Mammoth Spring Improvement and Water Power Company, the Mammoth Spring Dam powered the Mammoth Spring Roller Mill and Elevator, which ground soft wheat into flour, and the Mammoth Spring Cotton Mill and Cotton Gin. This masonry gravity dam was built by stacking six limestone slabs on a solid rock base. The widest slab was positioned on the bottom, and each slab was slightly narrower than the one below it, forming a series of small steps. This method of dam construction, devised by French engineer M. De Sazilly in the 1850s, ensured that the hydrostatic force of a body of water would not be enough to overtake the weight of masonry used for the dam. The construction of the Mammoth Spring Dam spurred industrial and commercial growth in the sparsely populated area known as "Head of the River," ultimately leading to the incorporation of the town of Mammoth Spring. The Mammoth Spring Dam, Spring Lake, and the Spring River were popular attractions for wealthy Memphians and residents of the Arkansas Delta as they migrated to the Ozarks every summer to escape the humidity. After the Arkansas-Missouri Power Company purchased the Mammoth Spring Dam in 1925, the south turbine well was retrofitted to produce hydropower. A fieldstone masonry powerhouse was built atop the south turbine well in 1927 to house the generator and other equipment. The Arkansas-Missouri Power Company operated the Mammoth Spring Power Plant until 1972, when it became uneconomical to maintain the small station. The power company then donated the dam and powerhouse to Arkansas State Parks. Mammoth Spring State Park was established in 1957, but most of the park's land was not acquired until 1975. The Mammoth Spring Dam and Lake continue to serve as the focal point of the state park because visitors can still walk over the dam and feel the mist of the cool spring water as it pours over the dam weir beneath them. The powerhouse was restored in 1993 and serves as a museum. The Mammoth Spring Dam and Lake are being nominated to the National Register of Historic Places with **statewide significance** under **Criterion A** for their association with the growth and development of Mammoth Spring and **Criterion C** as a unique intact example of an early stone masonry gravity dam constructed in accordance with M. De Sazilly's model. Furthermore, the Mammoth Spring Dam is far larger than the other National Register-listed nineteenth century stone masonry gravity dams in the state (Osage Mills Dam, Benton County, BE2993; Ruddell Mill Site, Independence County, IN0274; Spring Mill, Independence County, IN0498) and is the only one later used to generate hydroelectric power for a sizeable population.

Elaboration

Located in north central Arkansas with the Arkansas-Missouri state line as its northern border, Fulton County was established on December 21, 1842, from part of Izard County. Fulton County was named after William Savin Fulton, who was the last territorial governor of Arkansas (1835-36).[5]

[5] *The Goodspeed Biographical and Historical Memoirs of Northeastern Arkansas* (Chicago: The Goodspeed Publishing Company, 1889): 259; Lea Flowers Baker, "William Savin Fulton," from the Encyclopedia of Arkansas History and Culture.

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Early white settlement in the area that would become Mammoth Spring started a few miles north of the Arkansas-Missouri state line in 1818 when Ridley Thomas built a cabin near the Harry Turnstall spring. This area is now called "Old Town" because many people relocated when it became clear that the Kansas City, Fort Scott, and Memphis Railroad would run their lines a few miles to the south through the current location of Mammoth Spring in 1883.[6]

However, some people did settle immediately around the Mammoth Spring head beginning in the late 1820s. At that time, Mammoth Spring was referred to as "the Big Spring," and the surrounding area was called "Head of the River." William Lindley held an unofficial claim on a 40-acre tract that included the springhead, or so he thought. When Lindley sold his unofficial claim to William Allen in 1830, Allen attempted to secure a formal legal title to the land. Much to his dismay, Allen discovered that the section lines running north-south and east-west went directly through the center of Mammoth Spring. Therefore, property disputes arose over the ownership of Mammoth Spring, with as many as four people claiming the actual springhead and even more claiming the meandering outflow of the spring downriver. This ownership dispute continued until the late 1880s when the property was consolidated into a single tract. Meanwhile, the Lindley and Allen families built cabins on a hillside just to the north of the spring, and Allen constructed the first mill in 1836. This mill did not quickly stimulate additional commercial development because it was small and intended for the family's private use.[7]

The area known as "Head of the River" slowly began to grow in 1850, when brothers William and Joe Mills constructed a larger grist mill and dam on the spring. The Mills brothers also opened the first store in the region, which was operated by William's father-in-law, Daniel Woolford. The settlement had about 25 residents in the early 1850s, but the population would increase by the end of the decade as a result of a state report promoting the geological resources of the area.[8]

Arkansas's first state geologist, Dr. David Dale Owen, conducted the first official survey of Arkansas's northern counties in 1857. In his report, Dr. Owen referred to "the Big Spring" as "Mammoth Spring" because it was thought to be the world's largest spring.[9] Owen determined that the source of the Spring

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Internet; accessed 20 January 2009; available from http://www.encyclopediaofarkansas.net/encyclopedia/entry-detail.aspx?search=1&entryID=2653.

[6] Sarah E. Simers, "Mammoth Spring," from the Encyclopedia of Arkansas History and Culture. Internet; accessed 5 January 2009; available from http://www.encyclopediaofarkansas.net/encyclopedia/entry-detail.aspx?search=1&entryID=885; Brooks Blevins, *Hill Folks: A History of Arkansas Ozarkers and Their Image* (Chapel Hill: The University of North Carolina Press, 2002): 33.

[7] Dorys Ward and Joe Senn, eds., *Historical Sketches of the Warm Fork Hill Country* (Point Lookout, MO: The School of the Ozarks Press, 1973): 12-13.

[8] Ward and Senn, *Historical Sketches*, 12.

[9] Mammoth Spring is actually the world's seventh-largest natural spring.
"Mammoth Spring State Park," from the Encyclopedia of Arkansas History and Culture. Internet; accessed 5 January 2009; available from http://www.encyclopediaofarkansas.net/encyclopedia/entry-detail.aspx?search=1&entryID=1238.

River was Mammoth Spring, which was an up swell of water from an extensive system of underground rivers beginning in Missouri. Mammoth Spring is the largest natural spring in Arkansas and one of the largest springs in the world. Mammoth Spring produces an average of 9.78 million gallons of water per hour at a constant temperature of 58 degrees Fahrenheit. The spring's dependable flow year-round would make it ideal for powering manufacturing industries in the late nineteenth and early twentieth centuries.[10]

The Civil War slowed progress in the area as Federal troops burned the mill and Woolford's store; however, John S. Deaderick and his two sons, James S. and J. Smith, settled in Mammoth Spring in 1874 and realized the potential of the spring. Deaderick purchased the spring from T. Trantham for $1,200. The Deaderick family improved the settlement by adding a flour mill and cotton gin to the existing corn mill, and in 1880, J. Smith Deaderick opened a store. By 1881, the Kansas City, Fort Scott, and Memphis Railroad planned to construct its lines through Fulton County as it completed its route between Memphis, TN, and Springfield, MO. Because the Deadericks knew that their small hamlet was not prepared to make the transition to a bustling railroad town, J. Smith Deaderick platted the town of Mammoth Spring the same year. The plat was recorded at the county courthouse in Salem in 1883, just in time for the arrival of the railroad.[11]

The year 1886 represented a major turning point in the history of Mammoth Spring. Napoleon Hill, a wealthy investor from Memphis, TN, first arrived in Mammoth Spring in the summer of 1886. Hill was en route to Kansas City when his train stopped briefly in Mammoth Spring. The Kansas City, Fort Scott, and Memphis Railroad Depot in Mammoth Spring (NR-listed 6/11/1992) was completed in 1886, just to the southeast of the Mammoth Spring head. The train tracks curve to the northeast to avoid Mammoth Spring, and the depot was constructed in between the tracks and the spring. When Hill stepped off the train at the depot on that hot summer day, he felt the cool breeze coming off the 58-degree spring water nearby and never forgot it. Hill returned to Mammoth Spring later that year with a group of wealthy businessmen, and because he realized the potential of harnessing the spring's water power, the group bought the spring and a significant amount of land throughout the town.[12]

The Memphis capitalists formed the Mammoth Spring Improvement and Water Power Company and resurveyed the town to encompass a larger area. These investors also began construction of the town's first substantial brick buildings. The March 17, 1888, issue of the *Fulton County Informer* cited the unprecedented growth that had taken place in the six months following the creation of the Mammoth Spring

[10] Arkansas Department of Parks and Tourism, "Mammoth Spring State Park," brochure (2005); "Mammoth Spring State Park," from the Encyclopedia of Arkansas History and Culture; Mammoth Spring State Park Superintendent Dave Jackson, interview by author, 6 January 2009; Mammoth Spring State Park Assistant Superintendent Glynda Pryor, interview by author, 6 January 2009.
[11] Ward and Senn, *Historical Sketches*, 15.
[12] Ward and Senn, *Historical Sketches*, 15-16.

Improvement and Water Power Company. According to the article, "twenty new houses, two wooden stores and two 2-story brick business blocks, 50 feet front each, have gone up recently." Additional houses, stores, a livery stable, a public school, and a church were in progress. The population had increased to 500, and the town shipped 3,000 bales of cotton and $20,000 in fruits and vegetables. The town also boasted three hotels and several boarding houses, and a 50' x 70' lodge hall had opened in the upper story of one of the brick commercial buildings. The Mammoth Spring Improvement and Water Power Company was constructing the Mammoth Spring Dam about one-eighth of a mile south of the springhead, and the article listed its tentative completion date as May 1, 1888. The article ended by stating, "Before long, mills for cotton goods, flour, all kinds of wood working industries, etc., will be erected and a large manufacturing town at this point may be looked for."[13]

The Mammoth Spring Improvement and Water Power Company, headed by Napoleon Hill, confirmed the article's prediction when it invested $200,000 in the construction of a dam, flour mill, and cotton mill. The Mammoth Spring Dam was completed in 1888 and powered the Mammoth Spring Roller Mill and Elevator, which ground soft wheat into flour, and the Mammoth Spring Cotton Mill and Cotton Gin.[14] The dam created a 16-acre water reservoir called Spring Lake, and water from Mammoth Spring constantly ran over the top of the dam weir. The Mammoth Spring Dam was made of cut limestone set in a concrete footing on solid rock. Turbines, which provided power to the mills, were located in 30' x 30' cut limestone turbine wells on each end of the dam; the roller mill was located adjacent to the south turbine well, while the cotton mill was near the north turbine well. The dam measured approximately 198' in length, including the two turbine wells, with a 10' base and a 7' spillway. Three sluice gates were located in each turbine well, and two deep sluice gates were evenly spaced along the spillway.[15]

The Mammoth Spring Dam is a unique intact example of an early stone masonry gravity dam, initially constructed to divert water to power a grist mill and cotton mill and later a hydroelectric power plant. Dams have historically been built for the purpose of either diverting or storing water. Diversion dams typically redirect water for use elsewhere, such as in irrigation channels or toward smaller canals where hydroelectric power can be generated. The Mammoth Spring Dam powered the grist mill and cotton mill with a system of turbines connected to gear systems, which ran mechanical belt drives that turned a shaft inside each factory that powered the necessary machinery. Following the development of electric generators in the late nineteenth century, the Mammoth Spring Dam was retrofitted with new turbines and a generator in 1927 to

[13] Ward and Senn, *Historical Sketches*, 16.
[14] The Roller Mill and Cotton Mill were completed circa 1889.
[15] Ward and Senn, *Historical Sketches*, 22; Arkansas Department of Parks and Tourism, "Application for Exemption Dam #1 Spring River," Application filed with the Federal Energy Regulatory Commission for an exemption of the proposed renovation of the Mammoth Spring Hydroelectric Facility from licensing under the Federal Power Act (1983): 1-14, 56-59; The Johnson-McAdams Firm, P.A., "Water Control Gates Study, Mammoth Spring State Park Dam, Mammoth Spring, Arkansas," (September 1996): 1-3; Mammoth Spring State Park Superintendent Dave Jackson, interview by author, 6 January 2009; Mammoth Spring State Park Assistant Superintendent Glynda Pryor, interview by author, 6 January 2009.

generate hydroelectricity. Diversion dams are usually built to allow water to periodically over-top the dam, or in the case of the Mammoth Spring Dam, water is constantly allowed to over-top the dam because the spring constantly replenishes Spring **Lake.**[16]

Gravity dams are those in which "the force of gravity acting on the dam is what provides structural stability." In other words, the construction of a gravity dam is based on using enough construction material to resist the force of the stored water to push it downstream. Early gravity dams were constructed with earth, rock, or timber. French engineer M. De Sazilly developed a model for constructing stable masonry gravity dams in the early 1850s based on achieving the "profile of equal resistance," which referred to a balance between the pressure exerted on the upstream and downstream faces of a dam. De Sazilly's model considered the "typical density of stone (approximately 150 pounds per cubic foot) and water that weighed 62.5 pounds per cubic foot," as well as extreme conditions in which the reservoir behind the dam was either full or empty. The profile of equal resistance had to be reached in order for the structure to remain standing, and the best method of construction was a stepped profile divided into horizontal planes. De Sazilly developed a detailed cross-sectional diagram with formulae for calculating the depth of steps and height of the dam structure. Although subsequent theorists argued in favor of using a curved structure by the late nineteenth century, the Mammoth Spring Dam was constructed in accordance with De Sazilly's model. The Mammoth Spring Dam is made of six large limestone slabs, which are stacked on top of each other with the widest slab at the bottom and the thinnest slab at the top, creating a series of steps.[17]

Three other nineteenth century stone masonry gravity dams in Arkansas are listed on the National Register of Historic Places—the Osage Mills Dam in Benton County (NR-listed 1/28/1988), the Ruddell Mill Site in Independence County (NR-listed 8/28/2007), and the Spring Mill in Independence County (NR-listed 3/1/1974). The Osage Mills Dam was built about 1890 out of rusticated stone, and it features the same stair-step construction as the Mammoth Spring Dam. However, it is much smaller than the Mammoth Spring Dam and is situated in a shallow creek, and the dam's grist mill is no longer extant. The Ruddell Mill Site features a stone dam that was built circa 1830 and designed to hold water in a reservoir and direct it through a channel by the mill building. The mill building was destroyed by a fire in 1939, and the dam's appearance has been altered by the construction of a low-water bridge across the top of it. The low-water bridge was likely built by the Works Progress Administration in the mid-1930s. The Spring Mill was built about 1869

[16] Donald C. Jackson, *Great American Bridges and Dams* (Washington, D.C.: The Preservation Press, 1988): 41-44; Arkansas Department of Parks and Tourism, "Application for Exemption Dam #1 Spring River," (1983): 1-14, 56-59; The Johnson-McAdams Firm, P.A., "Water Control Gates Study, Mammoth Spring State Park Dam, Mammoth Spring, Arkansas," (September 1996): 1-3; Mammoth Spring State Park Superintendent Dave Jackson, interview by author, 6 January 2009.

[17] Jackson, *Great American Bridges and Dams*, 44-53; Edward Wegmann, *The Design and Construction of Dams: Including Masonry, Earth, Rock-fill, Timber, and Steel Structures, Also the Principle Types of Movable Dams*, 5th ed. (New York: John Wiley and Sons, 1907): 1-11; David P. Billington and Donald C. Jackson, *Big Dams of the New Deal Era: A Confluence of Engineering and Politics* (Norman, OK: University of Oklahoma Press, 2006): 31-36; Chester Wason Smith, *Construction of Masonry Dams* (New York: McGraw-Hill Book Company, Inc., 1915): 83-86.

and includes a small stone dam, but the dam consists of a smooth rock wall supported by two rock buttresses below the spillway. Although it is a gravity dam, it does not feature the same stair-step method of construction used on the other dams. However, all of these dams are much smaller in scale than the Mammoth Spring Dam, and the bodies of water controlled by the dams cannot compare to the volume of water produced by Mammoth Spring and Spring Lake. In addition, the Mammoth Spring Dam is unique because it was later converted into a hydroelectric power plant and provided electricity to a sizeable population. For these reasons, the Mammoth Spring Dam and Spring Lake are being nominated with statewide significance.

The construction of the Mammoth Spring Dam, Roller Mill, and Cotton Mill spurred additional commercial and industrial development in the area, which ultimately led to the settlement formerly known as "Head of the River" adopting the name Dr. Owen had given the spring in 1857—Mammoth Spring. The city of Mammoth Spring incorporated on June 15, 1889, and enjoyed a booming economy based on industry and tourism from the 1880s until the 1920s.[18] By March 1897, Mammoth Spring had a population of 950 and various amenities in addition to the cotton mill, gin, and roller mill, such as an opera house, three hotels, numerous boarding houses, groceries, banks, hardware/furniture stores, dry goods stores, millineries, and a lumber yard.[19] The Mammoth Spring Roller Mill and Elevator, which consisted of a 4-story brick Second Empire-style building, a large grain elevator, and two warehouses, operated successfully for many years. It was destroyed by fire in the late 1920s. The Mammoth Spring Cotton Mill and Cotton Gin was a large-scale operation and the city's largest employer in 1889; it included a 2-story brick building with 132 looms as well as a gin and several ancillary structures. The cotton mill ran for at least six years before "antiquated machinery" forced it to close. The mill building remained vacant until 1906 when the Arkansas Shoe Manufacturing Company leased it and began operations in July 1907. Financial difficulties caused the shoe factory to close after only six months. The building remained vacant for a period, but by 1914, the brick cotton mill building was used as an electrical supply and repair shop and the Planter's Gin Company moved into the old gin building. These buildings were demolished sometime after 1926. Only the Mammoth Spring Dam remains as evidence of the town's industrialization.[20]

In addition to providing power for the factories, the Mammoth Spring Dam created Spring Lake and became a popular tourist destination itself, with visitors often having their photo taken on or near the dam. After the railroad's completion in 1883, people traveled to Mammoth Spring to witness the spring's impressive flow and enjoy the cool breezes coming off the 58-degree water. The Nettleton Hotel was completed in 1889,

[18] Simers, "Mammoth Spring," from the Encyclopedia of Arkansas History and Culture; "Mammoth Spring State Park," from the Encyclopedia of Arkansas History and Culture; Ward and Senn, *Historical Sketches*, 22; Mammoth Spring State Park Superintendent Dave Jackson, interview by author, 6 January 2009.
[19] Sanborn Fire Insurance Company, "Mammoth Spring, Ark.," March 1897 map.
[20] Sanborn Fire Insurance Company, "Mammoth Spring, Ark.," March 1897, February 1904, December 1908, April 1914, and January 1926 maps; Ward and Senn, *Historical Sketches*, 22; Simers, "Mammoth Spring," from the Encyclopedia of Arkansas History and Culture.

followed shortly by the Culp Hotel and the Charlton Hotel, providing up-scale accommodations for tourists. Just as Arkansas cities like Hot Springs (Garland County), Eureka Springs (Carroll County), and Heber Springs (Cleburne County) attracted people by touting the curative powers of their natural spring water, Mammoth Spring "profited from the health crazes of the late nineteenth century, which recommended bathing in hot natural springs as a cure for a host of physical ailments."[21]

Napoleon Hill and his business associates heavily promoted Mammoth Spring as a resort town, and Mammoth Spring soon became the summer destination of choice for wealthy Memphians and residents of the Arkansas Delta.[22] A circa 1934 pamphlet entitled "Mammoth Spring in the North Arkansas Ozarks Invites You Here, Where the Spring Pours from the Earth" advertised the Spring Beach Playground on Spring Lake, which was "equipped with amusements of various kinds, including a high-powered motor boat, row boats, cheereo to accommodate 30 to 40 kiddies, spring boards, dressing rooms with lockers for women and girls, men and boys, [and] a band stand out in the water where regular concerts make merry the surrounding."[23] In addition, the pamphlet advertised Baertel's Log Cabin Tourist Camp, which was a group of 12 log cabins located on the west bank of the Spring River within sight distance of the spring. These cabins were equipped with the most modern conveniences, including running water, electric lights and fans, dishes, bedding, and showers. The advertisement invited tourists to spend time near "the most beautiful stream in America," where they could enjoy free shower baths, free swimming, free boats, good fishing, and a nearby golf course.[24]

The constant flow of cool water from Mammoth Spring and a close proximity to the railroad also made the area attractive to the United States Fish and Wildlife Service. They established the Mammoth Spring National Fish Hatchery in 1903 adjacent to the Mammoth Spring Roller Mill and Elevator. The fish hatchery obtains water directly from Spring Lake, drawing a constant flow of 3,500 gallons per minute. The reliable water supply allows the hatchery to raise a wide variety of fish. The hatchery stocked rivers and national wildlife refuges, including the Spring River and its tributaries, which added to the town's appeal as a tourist destination. According to the 1934 pamphlet, the area "streams have become a haven for the angler." The hatchery continues to operate in the same location and works to restore populations of endangered or threatened fish and aquatic species.[25]

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[21] Simers, "Mammoth Spring," from the Encyclopedia of Arkansas History and Culture; John Milton Cutter, *Cutter's Official Guide to Hot Springs, Arkansas* (Battle Creek, MI: Gage Printing Co., Ltd., 1917): 1-3.

[22] Ward and Senn, *Historical Sketches*, 22-24; Simers, "Mammoth Spring," from the Encyclopedia of Arkansas History and Culture.

[23] "Mammoth Spring in the North Arkansas Ozarks Invites You Here, Where the Spring Pours from the Earth," pamphlet (1934). From the files of the Mammoth Spring State Park.
The "cheereo" was a floating platform in the lake where children played.

[24] "Mammoth Spring in the North Arkansas Ozarks Invites You Here, Where the Spring Pours from the Earth," pamphlet (1934).

[25] "Mammoth Spring in the North Arkansas Ozarks Invites You Here, Where the Spring Pours from the Earth," pamphlet (1934); United States Fish and Wildlife Service, "Mammoth Spring National Fish Hatchery," Internet; accessed 26 January 2009; available

The Arkansas-Missouri Power Company purchased the Mammoth Spring Dam in 1925 and converted it into a hydroelectric power plant. In 1927, the south turbine well was retrofitted with a new turbine and generator to provide electrical power, and a stone masonry powerhouse was constructed atop the south turbine well to house the equipment. The north turbine well was capped with a concrete slab at that time; however, the well still contains the original turbine and retains its three sluice gates. When the powerhouse started generating electricity in 1927, Mammoth Spring became the first town in the area to have electricity. The Mammoth Spring Dam powerhouse had an average annual net generation of 2,128,875 kilowatt-hours, eventually providing electricity to Mammoth Spring, AR, as well as Thayer, Koshkonong, Brandsville, and West Plains, MO. The Arkansas-Missouri Power Company operated the hydroelectric power plant until 1972, when it donated the plant to Arkansas State Parks.[26]

Mammoth Spring State Park was established by an act of the Arkansas State Legislature in 1957, but the first land was not acquired until 1966. The abandoned Kansas City, Fort Scott, and Memphis Railroad Depot was leased to the park in 1968, and most of the land purchases were completed by 1975. The railroad depot was completely restored as a museum in 1999. The stone powerhouse and equipment were restored in 1993 and currently serve as another museum. Mammoth Spring State Park now encompasses a 62-acre tract of land, including the Mammoth Spring head; Spring Lake; the Mammoth Spring Dam and powerhouse; the Queen Anne-style Kansas City, Fort Scott, and Memphis Railroad Depot (1886); a Tourist Information Center; playground; picnic area; interpretive walking trail; and baseball field.[27]

Spring Lake was originally around 16 acres in size, but it has been reduced to about 9.5 acres. A weigh station was to be constructed near the springhead in 1972 just to the east of U.S. Hwy. 63, so the western portion of Spring Lake was filled with dirt to create enough space for it. The weigh station was never built, but the volume of Spring Lake was reduced. In addition, an island was built in the middle of the lake in the mid-1970s and a concrete cap was removed from the top of the dam, which further reduced the size of the lake. Even when the lake was larger, the power plant could only operate for 30 minutes out of every hour before it had to shut down and let the lake refill. After Spring Lake was considerably reduced in size, feasibility studies conducted in the 1980s and 1990s predicted that the powerhouse could only operate for 15

from http://www.fws.gov/mammothspring/; Fulton County Heritage Foundation, *Fulton County, Arkansas: History and Families* (Morley, MO: Acclaim Press, 2008): 33-44.

[26] Simers, "Mammoth Spring," from the Encyclopedia of Arkansas History and Culture; Arkansas Department of Parks and Tourism, "Application for Exemption Dam #1 Spring River," (1983): 1-14, 56-59; The Johnson-McAdams Firm, P.A., "Water Control Gates Study, Mammoth Spring State Park Dam, Mammoth Spring, Arkansas," (September 1996): 1-3.

[27] "Mammoth Spring State Park," from the Encyclopedia of Arkansas History and Culture; Arkansas Department of Parks and Tourism, "Mammoth Spring State Park," brochure (2005).

minutes out of every hour before stopping to let the lake refill. Therefore, the decision was made not to put the powerhouse back into operation.[28]

When the St. Louis and San Francisco Railroad (now the Burlington Northern Santa Fe Railroad) stopped passenger service in 1968, Mammoth Spring became a relatively quiet community. However, a considerable amount of vehicular traffic still passes through the middle of Mammoth Spring since Hwy. 63 is the main route between Memphis, TN, and Springfield, MO. The City of Mammoth Spring still relies on the waters that gave it life in the late 1800s. Around 300,000 people visited Mammoth Spring State Park in 2008, and the Spring River is very popular among canoeists/kayakers and fishermen because of its reliable flow year-round.[29]

Statement of Significance

Constructed in 1887-88 by the Mammoth Spring Improvement and Water Power Company, the Mammoth Spring Dam powered the Mammoth Spring Roller Mill and Elevator, which ground soft wheat into flour, and the Mammoth Spring Cotton Mill and Cotton Gin. This masonry gravity dam was built by stacking six limestone slabs on a solid rock base. The widest slab was positioned on the bottom, and each slab was slightly narrower than the one below it, forming a series of small steps. This method of dam construction, devised by French engineer M. De Sazilly in the 1850s, ensured that the hydrostatic force of a body of water would not be enough to overtake the weight of masonry used for the dam. The construction of the Mammoth Spring Dam spurred industrial and commercial growth in the sparsely populated area known as "Head of the River," ultimately leading to the incorporation of the town of Mammoth Spring. The Mammoth Spring Dam, Spring Lake, and the Spring River were popular attractions for wealthy Memphians and residents of the Arkansas Delta as they migrated to the Ozarks every summer to escape the humidity. After the Arkansas-Missouri Power Company purchased the Mammoth Spring Dam in 1925, the south turbine well was retrofitted to produce hydropower. A fieldstone masonry powerhouse was built atop the south turbine well in 1927 to house the generator and other equipment. The Arkansas-Missouri Power Company operated the Mammoth Spring Power Plant until 1972, when it became uneconomical to maintain the small station. The power company then donated the dam and powerhouse to Arkansas State Parks. Mammoth Spring State Park was established in 1957, but most of the park's land was not acquired until 1975. The Mammoth Spring Dam and Lake continue to serve as the focal point of the state park because visitors can still walk over the dam and feel the mist of the cool spring water as it pours over the dam weir beneath them. The powerhouse was restored in 1993 and serves as a museum. The Mammoth Spring Dam and Lake are being

[28] Arkansas Department of Parks and Tourism, "Application for Exemption Dam #1 Spring River," (1983): 1-14, 56-59; The Johnson-McAdams Firm, P.A., "Water Control Gates Study, Mammoth Spring State Park Dam, Mammoth Spring, Arkansas," (September 1996): 1-3; Mammoth Spring State Park Superintendent Dave Jackson, interview by author, 6 January 2009.
[29] Mammoth Spring State Park Superintendent Dave Jackson, interview by author, 6 January 2009; Mammoth Spring State Park Assistant Superintendant Glynda Pryor, interview by author, 6 January 2009.

nominated to the National Register of Historic Places with **statewide significance** under **Criterion A** for their association with the growth and development of Mammoth Spring and **Criterion C** as a unique intact example of an early stone masonry gravity dam constructed in accordance with M. De Sazilly's model. Furthermore, the Mammoth Spring Dam is far larger than the other National Register-listed nineteenth century stone masonry gravity dams in the state (Osage Mills Dam, Benton County, BE2993; Ruddell Mill Site, Independence County, IN0274; Spring Mill, Independence County, IN0498) and is the only one later used to generate hydroelectric power for a sizeable population.

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Verbal Boundary Description

From UTM coordinate 15/631079/4040176, proceed easterly for 216 feet to UTM coordinate 15/631146/4040196. From this point, proceed southeasterly for 504 feet until reaching UTM coordinate 15/631287/4040129, thence proceed southerly for 513 feet until reaching UTM coordinate 15/631324/4039963. At this point, proceed southwesterly for 504 feet to UTM coordinate 15/631286/4039846. Then proceed southwesterly for 138 feet to UTM coordinate 15/631240/4039831. At this point, proceed northwesterly for 1,247 feet to the point of beginning.

Boundary Justification

The boundary contains Spring Lake and the land immediately surrounding the Mammoth Spring Dam.

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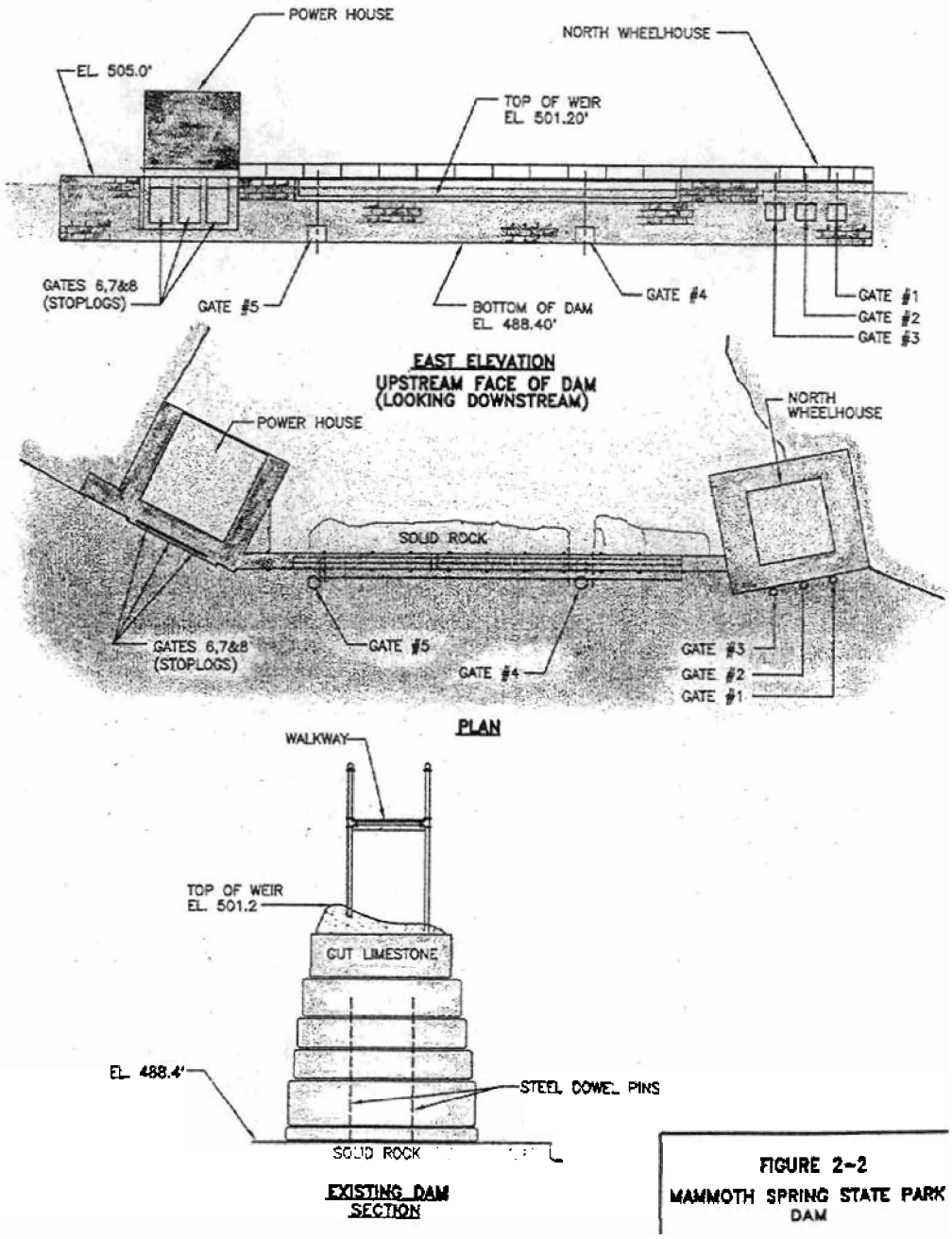

Elevation, plan, and section views of the Mammoth Spring Dam from a Water Control Gates Study conducted by the Johnson-McAdams Firm of Little Rock, AR, in September 1996.

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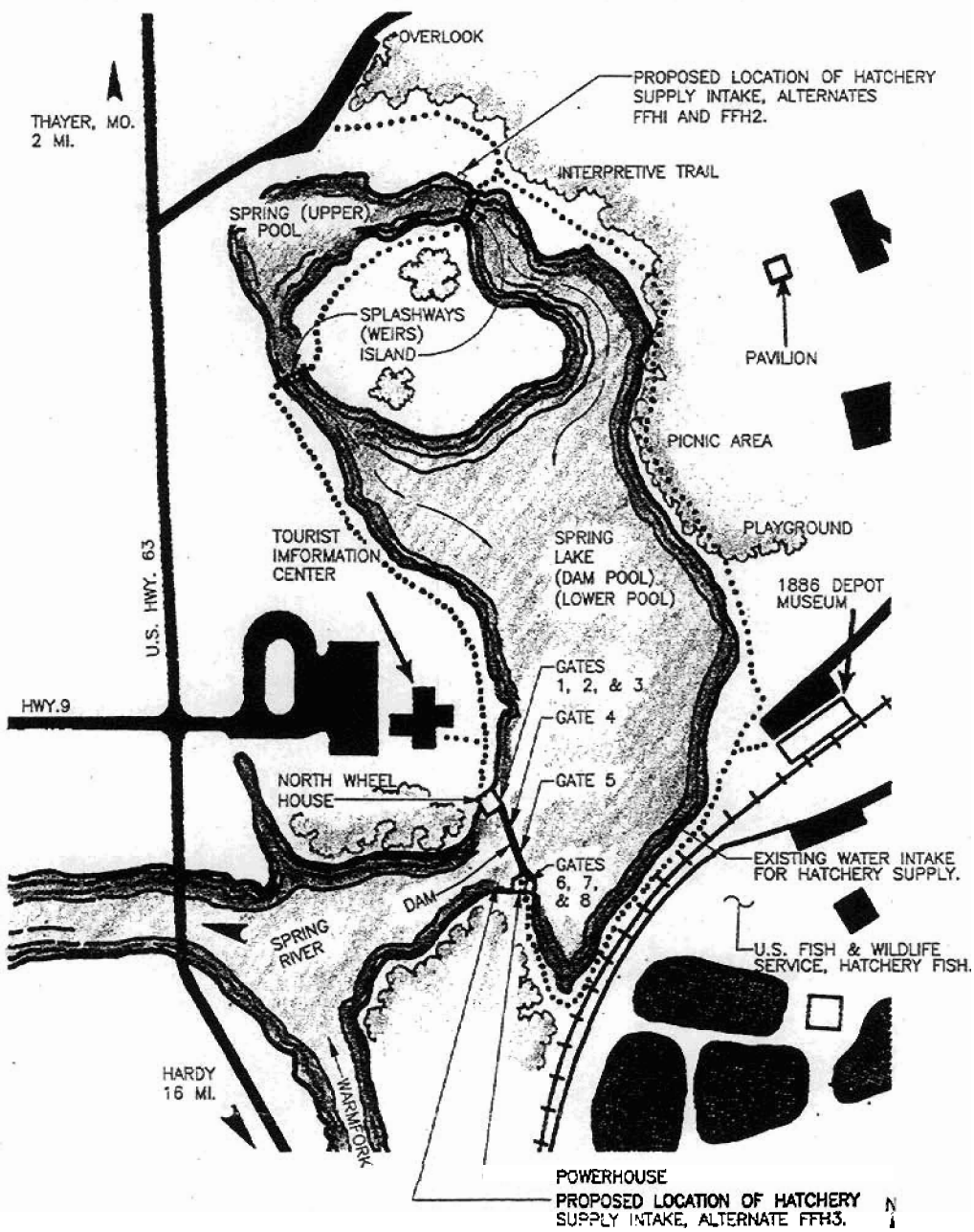
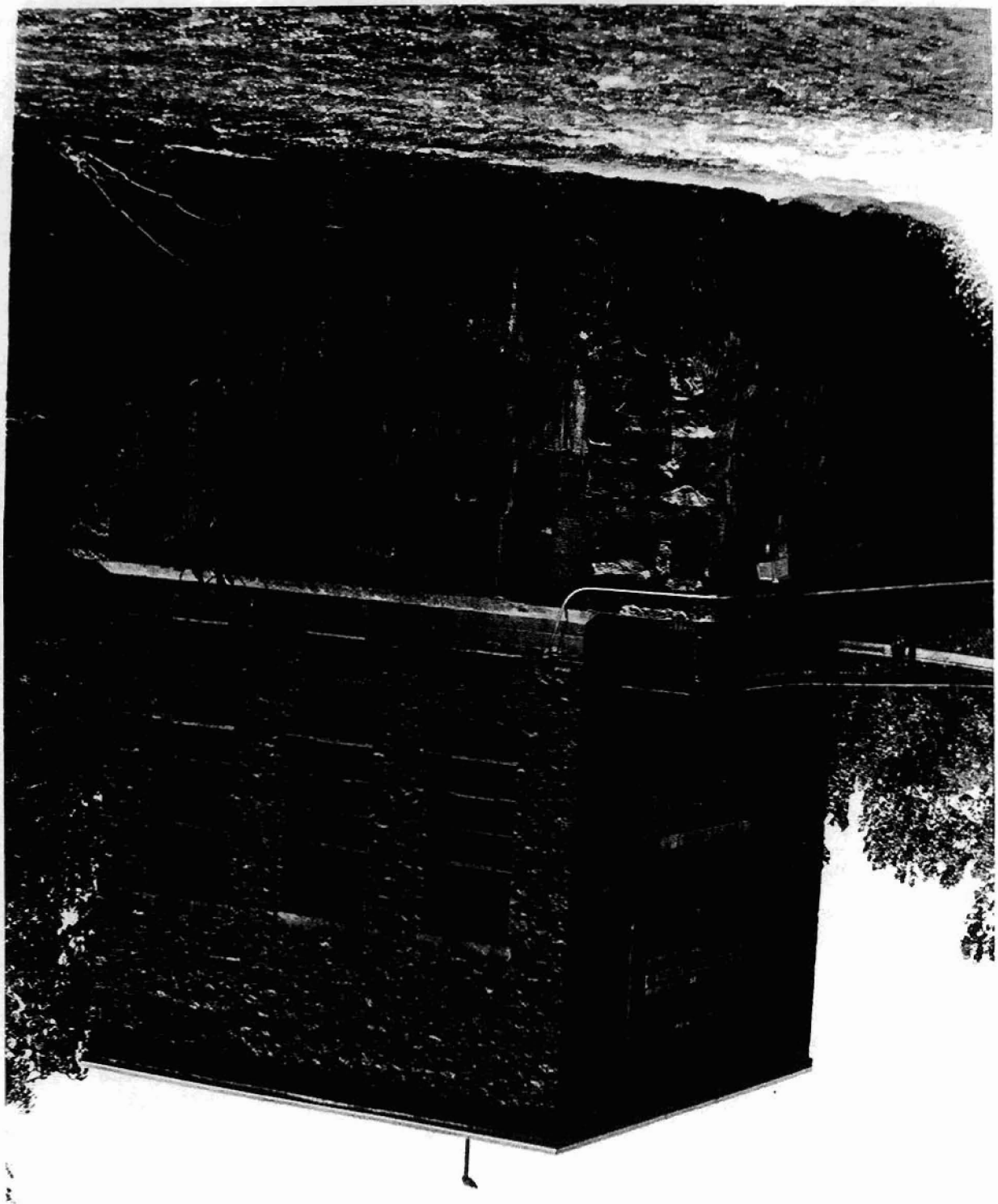
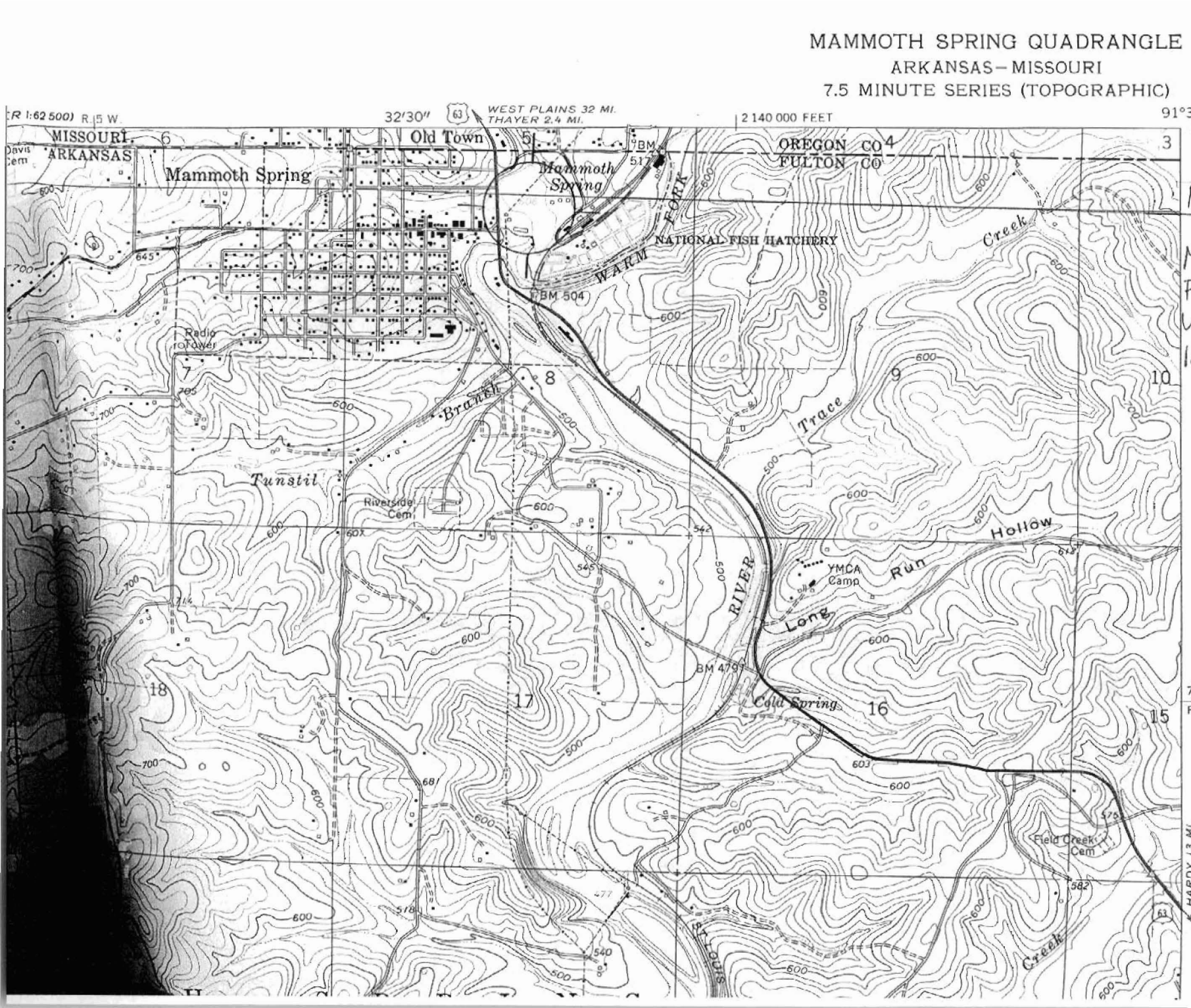


WATER CONTROL GATES STUDY
MAMMOTH SPRING STATE PARK DAM
MAMMOTH SPRING, ARKANSAS

FIGURE 2-1

Map of Mammoth Spring State Park from a Water Control Gates Study conducted by the Johnson-McAdams Firm of Little Rock, AR, in September 1996.




MAMMOTH SPRING QUADRANGLE
ARKANSAS–MISSOURI
7.5 MINUTE SERIES (TOPOGRAPHIC)
(COUCH 1:62 500)
(R 1:62 500) R. 5 W.
32'30"
WEST PLAINS 32 MI.
THAYER 2.4 MI.
2 140 000 FEET
91°30'
36°30'
MISSOURI
ARKANSAS
Old Town
Mammoth Spring
OREGON CO
FULTON CO
NATIONAL FISH HATCHERY
WARM FORK
Creek
BM 504
BM 517
Radio Tower
Branch
Tunstil
Riverside Cem
Trace
Hollow
Run
YMCA Camp
RIVER
Long
BM 479
Cold Spring
Field Creek Cem
HARDY 13 MI.
HOXIE 51 MI.
780 000 FEET
Mammoth Spring Dam and Lake
Mammoth Spring, Fulton County, AR
UTM Reference:
15/631246/4040039