

BAGNELL DAM AND OSAGE POWER PLANT
WEST RETAINING SECTION
Spanning Osage River on Business Route 54
Lake Ozark
Miller County
Missouri

HAER No. MO-117-D

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
Midwest Regional Office
601 Riverfront Drive
Omaha, Nebraska 68102-4226

HISTORIC AMERICAN ENGINEERING RECORD

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Location: Spanning Osage River on Business Route 54
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Missouri

UTM References:

	East End:		West End:	
Zone	Easting	Northing	Easting	Northing
15	532816	4228210	532591	4228048

Quad: Lake Ozark Quadrangle - Missouri 7.5 Minute Series, 1983
Bagnell Quadrangle - Missouri 7.5 Minute Series, 1983

Construction: 1929-31

Designer: Stone and Webster Engineers

Present Owner: AmerenUE, Lake Ozark, Missouri

Present Occupant: AmerenUE, Lake Ozark, Missouri

Present Use: Dam and Power Plant

Significance: This property is listed on the National Register of Historic Places for significance related to social history and engineering. The construction of the dam and power plant in 1930-31 began the production of hydroelectric power in mid-Missouri and created the Lake of the Ozarks, a regional tourist attraction that dramatically changed social and economic aspects of central Missouri.

Project Information: Bagnell Dam was recorded in 2009 by R. Gail White, White and Borgognoni Architects, Carbondale, Illinois, and by Benjamin Halpern, Halpern Photography, Champaign, Illinois. As a result of relicensing requirements, the historic structures will be altered for required technological upgrades and enhanced safety.

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I. Physical Description of Bagnell Dam West Retaining Section:

The West Retaining Section of the dam is a 1,181', non-overflow gravity type structure. It is constructed of poured concrete and has a vertical upstream face and slope of 8 horizontal to 12 vertical on the downstream face, except for the lower 30' of the maximum section where the slope is changed to 10-1/2 horizontal to 12 vertical.

The dam was built on Gasconade dolomite, which overlies a comparatively shallow layer of Gunter sandstone, under which is a deep layer of Proctor dolomite. A key trench was constructed at the heel of the dam except at the abutments where the rock was removed to permit keying the entire section into the hillsides.

With its cover of about 50' of gravel and silt over the major portion of the river valley, earth, rather than concrete, retaining sections would have been more economical in terms of material savings. However, it was determined that use of concrete to build the retaining sections would save approximately one year in time of construction as well as provide other advantages.¹

The structure is in good condition, but will be altered for required technological upgrades and enhanced safety.

II. History of the Bagnell Dam West Retaining Section:

Union Electric began construction of the Osage hydro-electric development on August 6, 1929. Clearing of timber for the reservoir began at that time, although a few men had already begun work to prepare housing and administration offices.² The layout for the cofferdam for the spillway and west abutment areas located on the flood plain of the Osage River on the west side of the valley was begun on September 30, 1929.³ The spillway cofferdam was unwatered on March 1, 1930.⁴

¹G.R. Strandburg, "The Osage Hydro-Electric Project." *Civil Engineering* Vol. 1, No. 4, January 1931, 246.

²Carole Tellman Pilkington, "The Story of Bagnell Dam," *Lake Area Chamber of Commerce*, 1989, 8-9.

³Pilkington, 15.

⁴Cally Lence and Gail White, "Bagnell Dam and Osage Power Plant," National Register of Historic Places Nomination, U.S. Department of the Interior, National Park Service, Washington, D.C., listed August 27, 2008, 16.

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The construction sequence was to cofferdam the spillway and west abutment areas, and then to complete the excavation for that part of the work. Although earth excavation was started before the spillway cofferdam was completed and unwatered, the major portion of the work, except for the diversion channel, was done in the dry. The west abutment and spillway were then completely concreted except for notches and sluiceways, the bottoms of which were located at the normal river level to provide for later river diversion. The excavation for the diversion channel was carried on simultaneously with the work on the west abutment and spillway portions of the dam. The river was diverted through the temporary notches and sluiceways in the spillway when the concrete in these parts of the structure was completed to a sufficient height. The main power station cofferdam, which extended across the original channel of the river, was then closed and unwatered, after which the erection of the permanent power station structure began.

Because of the depth and permeable nature of the layer of gravel in the valley bottom a cofferdam with watertight cutoff down to rock was built on the west portion of the dam site and in the river channel. Single lines of steel sheetpiling were driven across the floodplain, while a self-supporting cellular type construction cofferdam was used in the river channel. During the first step of the construction program when the flood plain on the west side of the river was closed by the spillway and west abutment cofferdam, a sluiceway capable of flooding the entire excavated area within twenty-four hours was installed in the river end of the cofferdam. This precaution was taken to prevent erosion of the slopes of the earth prism supporting the steel sheeting if the cofferdam were overtopped. As soon as the critical flood period of the year was passed in May 1930, work was started on the power station cofferdam, restricting the river channel to a clear width of 200'. As soon as the concrete in the west abutment and spillway section had been completed to Elevation 585' mean sea level (MSL), the ordinary high stage of the river, the spillway cofferdam was removed, the diversion channel opened and the river returned through the slots and sluiceways in the spillway section of the dam.⁵

Erection of the Power House steel structure began on December 10, 1930. Less than one year later, on August 6, 1931, the generator tests started, and on September 3, 1931, the water wheel tests started. By October 16, 1931, the first commercial operation of the Osage Power Plant began.⁶ At this time, the Osage Plant was connected to the St. Louis system, the expansion of which allowed Union Electric to sell power to St. Louis and Rivermines customers at less cost. Soon thereafter, electrification came to the lake area. The first distribution pole was set on the south side of the Osage River. The first power line extended from the spillway structure to

⁵A.W. Clark, "Construction Features of Osage Hydro-Electric Development," In *Engineering News-Record*, March 26, 1931, 525-526.

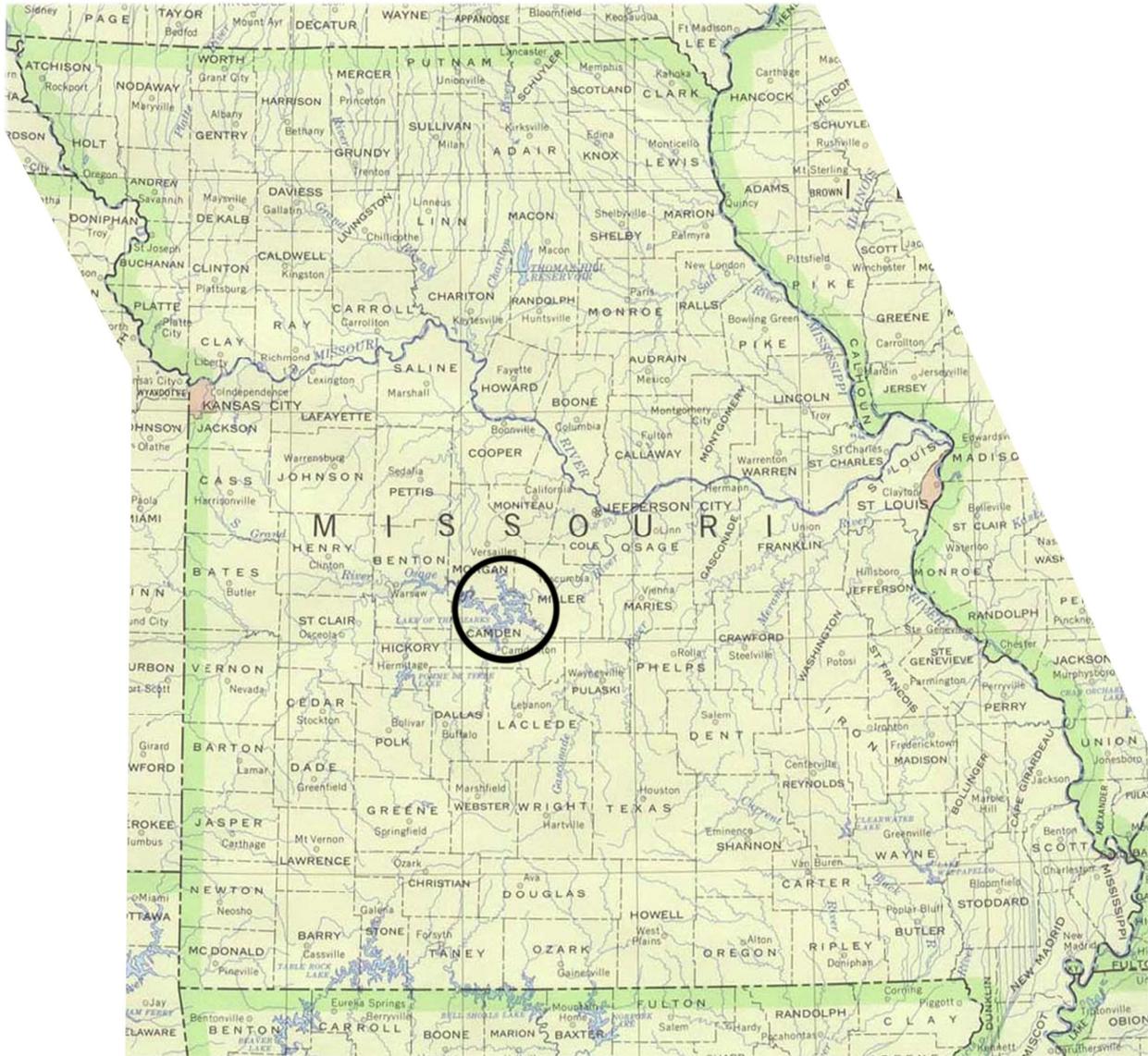
⁶Pilkington, 15.

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an H-frame structure on the south bank. The line was energized on December 24, 1931, and served twenty-four customers.⁷

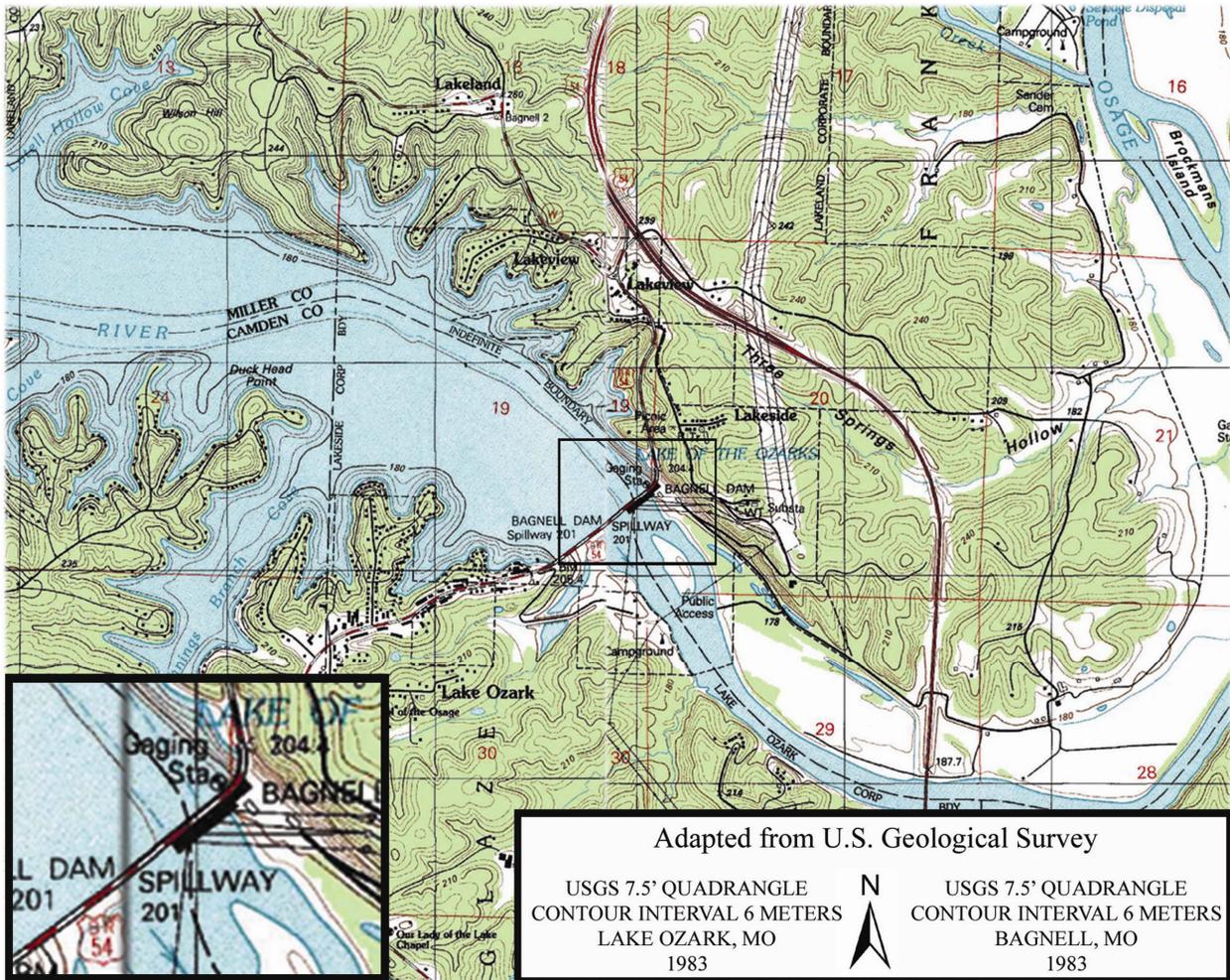
⁷Lorraine Burke, *50th Anniversary Bagnell Dam 1931-1981*, Lake of the Ozarks Area Council of the Arts, 1981, 36.

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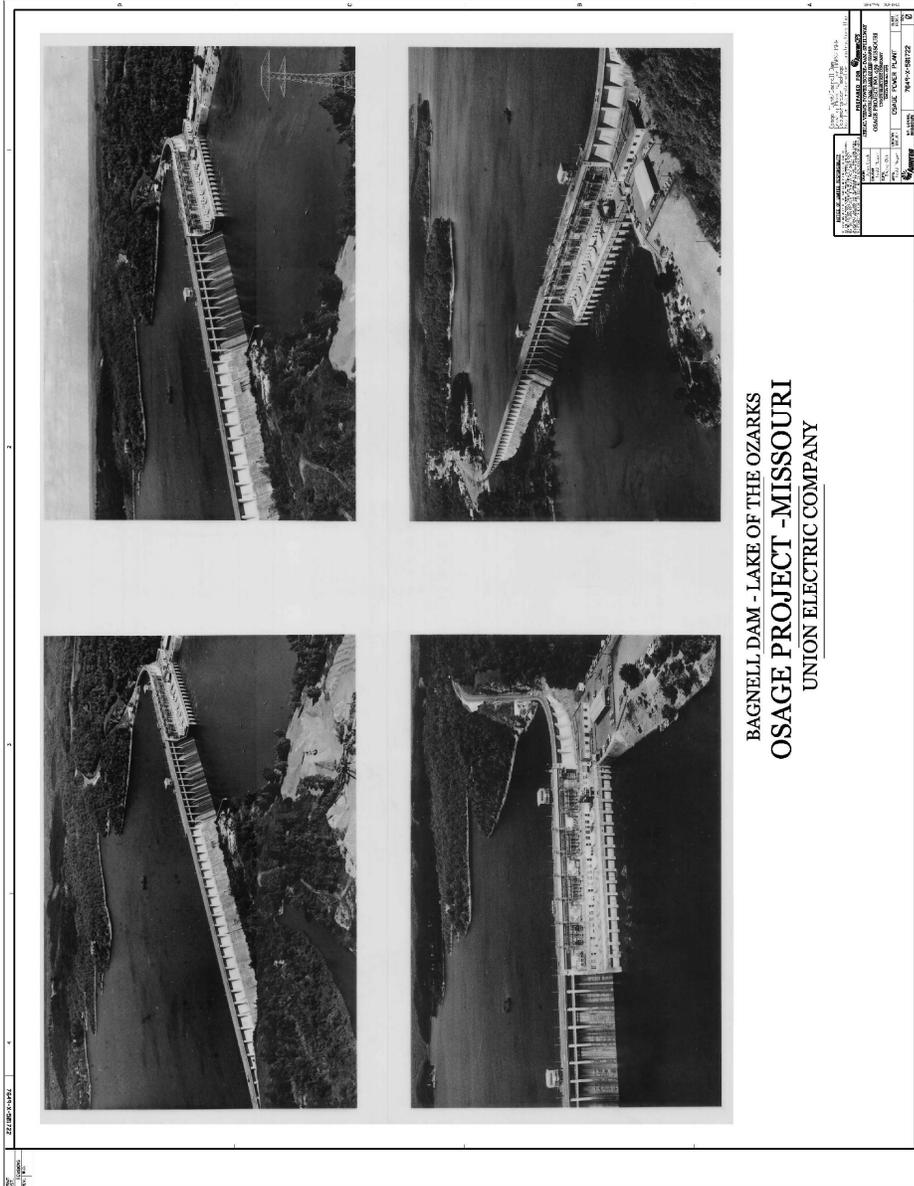
Map of Location within the State of Missouri
Bagnell Dam and Osage Power Plant
Adapted from http://www.lib.utexas.edu/maps/United_states/missouri_90.jpg

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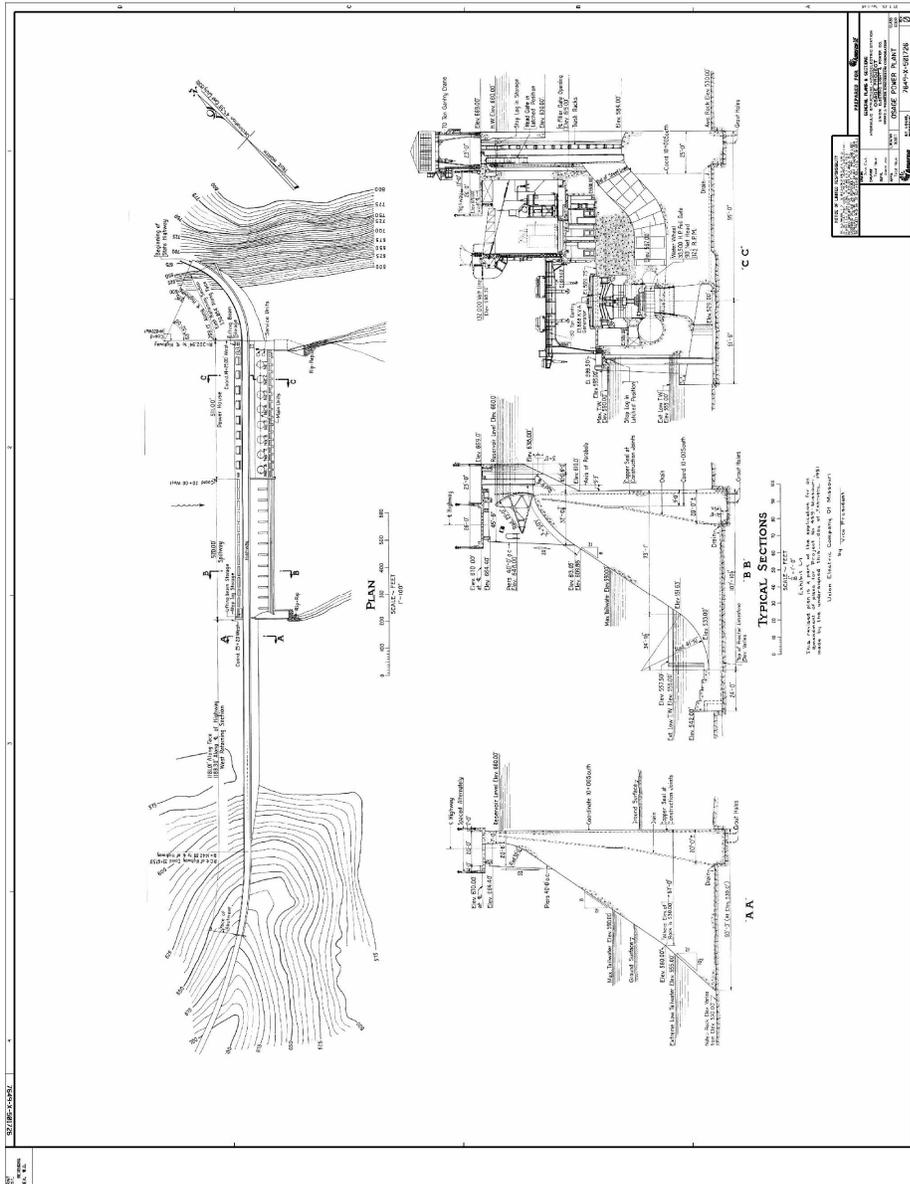
Map of Vicinity of Lake Ozark
 Bagnell Dam and Osage Power Plant
 Adapted from U.S. Geological Survey, Lake Ozark and Bagnell Quads,
http://store.usgs.gov/b2c_usgs/usgs/maplocator

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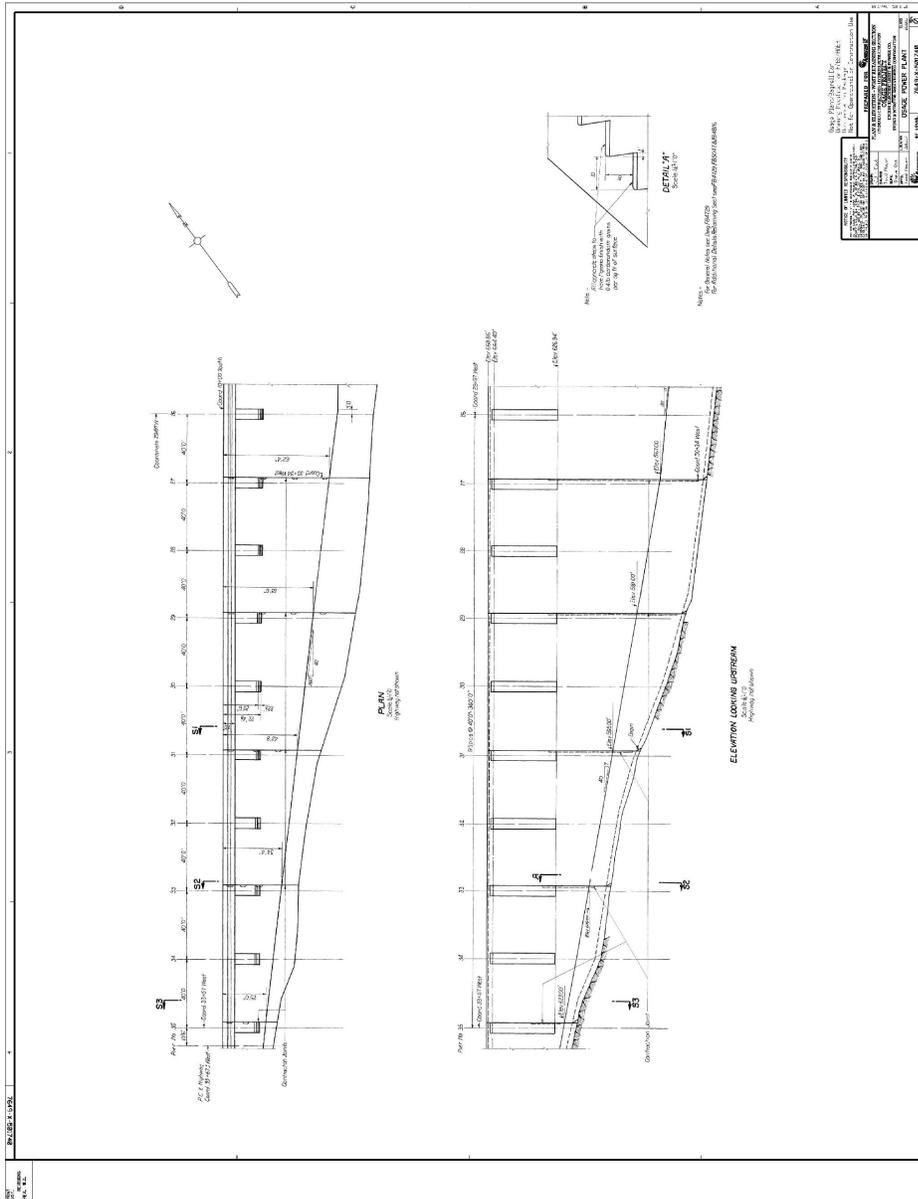
Reduced copy of historic aerial photographs, dated February 20, 1973
 Modified by AmerenUE for HAER documentation on January 6, 2010
 Original on file at AmerenUE, St. Louis, Missouri

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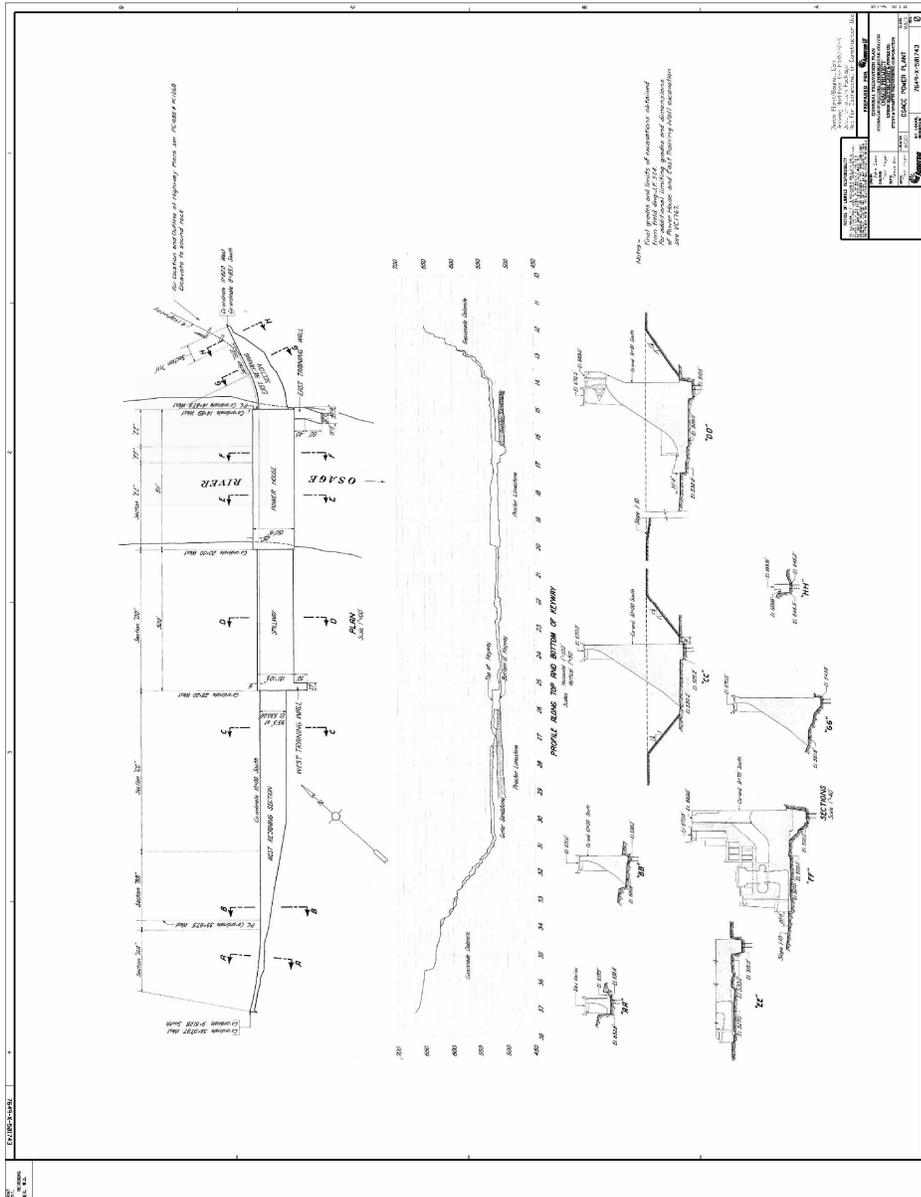
Reduced copy of historic plans and sections, dated May 19, 1930
 Modified by AmerenUE for HAER documentation on January 6, 2010
 Original on file at AmerenUE, St. Louis, Missouri

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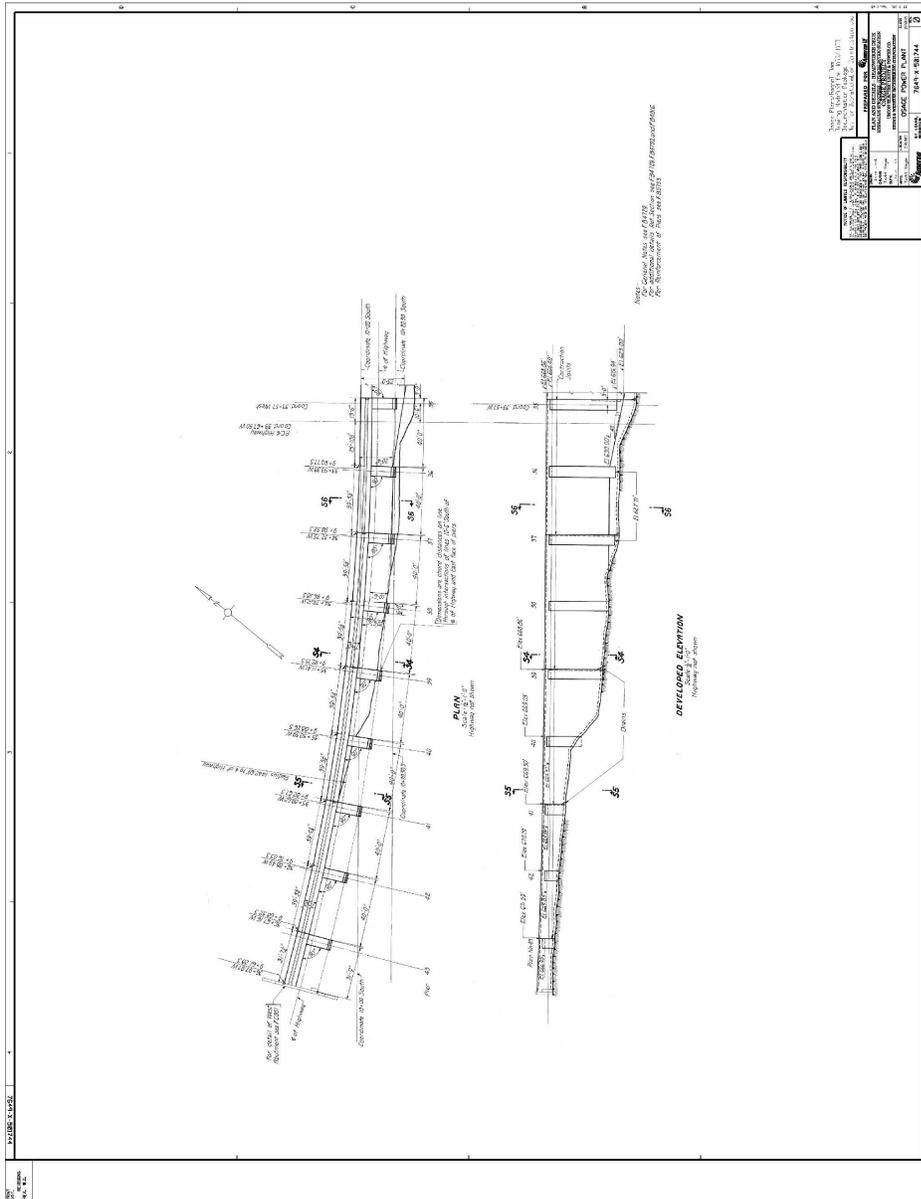
Reduced copy of historic plan and elevation, dated January 17, 1930
 Modified by AmerenUE for HAER documentation on January 6, 2010
 Original on file at AmerenUE, St. Louis, Missouri

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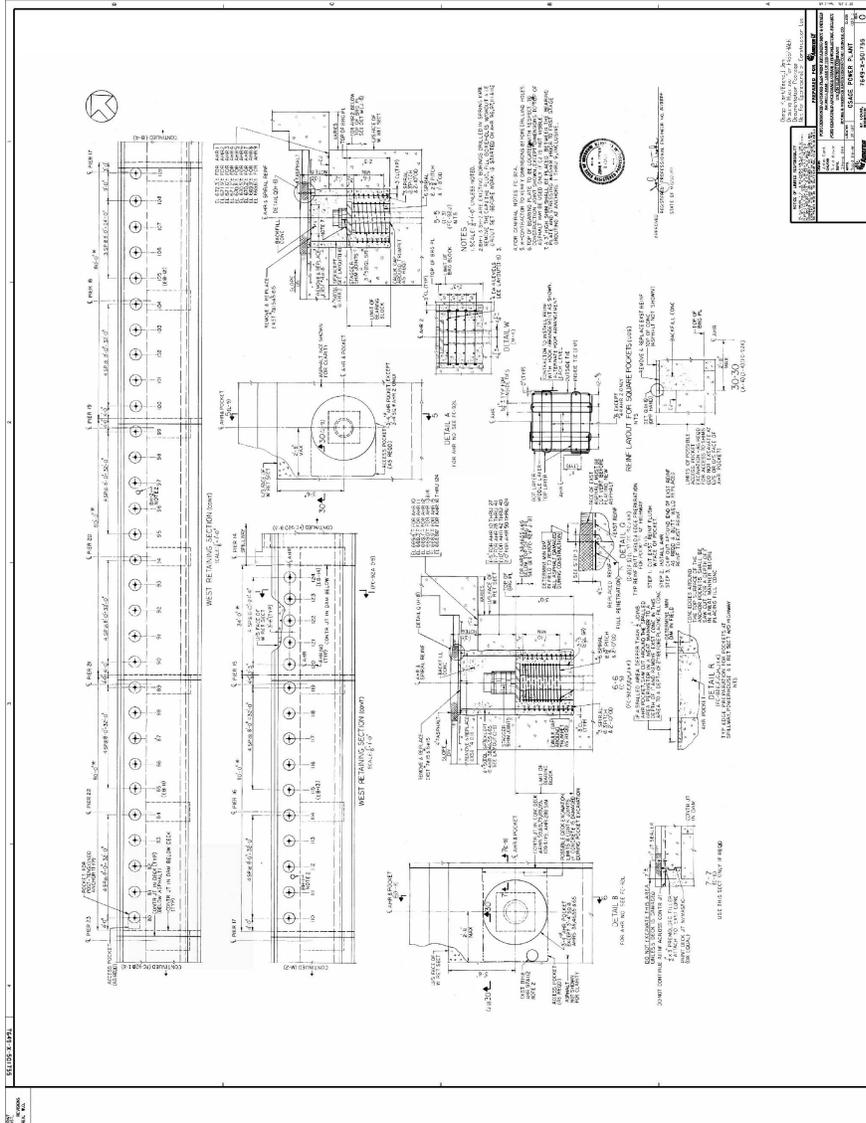
Reduced copy of historic plan, dated December 19, 1930
 Modified by AmerenUE for HAER documentation on January 6, 2010
 Original on file at AmerenUE, St. Louis, Missouri

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Reduced copy of historic plan and details, dated January 17, 1930
 Modified by AmerenUE for HAER documentation on January 6, 2010
 Original on file at AmerenUE, St. Louis, Missouri

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Reduced copy of historic plan, section and details, dated March 17, 1982
Modified by AmerenUE for HAER documentation on January 6, 2010
Original on file at AmerenUE, St. Louis, Missouri

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UNION ELECTRIC LIGHT AND POWER CO. - HYDROELECTRIC STATION-OSAGE DEVELOPMENT
J.O. 5461 N 555, 6-29-51.
STONE & WEBSTER ENGINEERS CORPORATION, Builders
General View from East Hillside N 2393

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UNION ELECTRIC LIGHT AND POWER CO. - HYDROELECTRIC STATION - OSAGE DEVELOPMENT
STONE & WEBSTER ENGINEERING CORPORATION, Builders
J.O. 5461 N9591, 10-19-31. Dam and Powerhouse from East Hillside N.4229

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