

LOWER YELLOWSTONE PROJECT, HEADWORKS  
Intake vicinity  
Dawson County  
Montana

HAER MT-141-B  
*HAER MT-141-B*

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD  
INTERMOUNTAIN REGIONAL OFFICE  
National Park Service  
U.S. Department of the Interior  
12795 West Alameda Parkway  
Denver, CO 80228

HISTORIC AMERICAN ENGINEERING RECORD  
LOWER YELLOWSTONE PROJECT, HEADWORKS

HAER No. MT-141-B

- Location: The Headworks is located on the left (north) bank of the Yellowstone River immediately upstream of the dam. The Headworks comprises the mouth of the Main Canal, which runs roughly parallel to the Yellowstone River for a length of 71.6 miles, as it trends northeast through Dawson and Richland counties in Montana, and crosses the border into McKenzie County, North Dakota, then back into Montana to empty into the Missouri River at Nohly, in Richland County.  
USGS Quadrangle: Intake, MT (1991)  
Township 18 North, Range 56 East, Section 36  
Dawson County, Montana
- Dates of Construction: 1905–1910
- Engineer: U.S. Reclamation Service
- Present Owner: U.S. Department of the Interior, Bureau of Reclamation
- Present Use: Irrigation, municipal water supply, recreation
- Significance: In 2000, the Headworks of the Main Canal of the Lower Yellowstone Project was determined to be part of a complex of sites directly related to the Lower Yellowstone Irrigation Project that constituted a National Register-eligible historic district significant for its association with the broad pattern of federal reclamation efforts in the early twentieth century and the agricultural development of the Lower Yellowstone Valley. The Headworks (24DW287), as a contributing element of this historic district, retains sufficient integrity to convey its historic importance and all aspects of integrity.
- Historian: Jason Marmor, September 2010; Kathleen Corbett, February 2011
- Project Information: This documentation was produced in order to mitigate adverse effects to important elements of the historic Lower Yellowstone Irrigation Project, as determined through consultations between Reclamation, the Corps of Engineers, and the State Historic Preservation Officer (SHPO) of Montana in compliance with Section 106 of the National Historic Preservation Act (as

amended), and the associated implementing regulations codified in Title 36 of the Code of Federal Regulations, Part 800. A Memorandum of Agreement (MOA) was developed between Reclamation, the Corps of Engineers, the Montana SHPO, and the Lower Yellowstone Irrigation Project Board of Control. This MOA specified that Historic American Engineering Record (HAER) documentation be made as a permanent record of the Lower Yellowstone Project complex as a whole (HAER No. MT-141), as well as for certain significant features subject to impacts from the federal undertaking:

HAER MT-141-A  
Lower Yellowstone Project, Lower Yellowstone Diversion Dam

HAER MT-141-B  
Lower Yellowstone Project, Headworks

HAER MT-141-C  
Lower Yellowstone Project, Cable System

HAER MT-141-D  
Lower Yellowstone Project, Gate Tender's Residence

HAER MT-141-E  
Lower Yellowstone Project, Garage

HAER MT-141-F  
Lower Yellowstone Project, Privy

The documentation was prepared in accordance with the National Parks Service's "Manual for Editing HABS/HAER Documentation" including the "Addendum" to that report which covers documentation requirements for HAER complexes. Large-format black-and-white photographs were processed and prepared in accordance with guidelines outlined in the National Park Service's "Photographic Specifications for HABS/HAER."

This documentation of the Lower Yellowstone Project Canal Headworks (MT-141-B) includes the following: 1) a written narrative at least two pages in length, describing the character-defining attributes; 2) five archival-quality, large-format photographs and negatives of the system, including views of significant engineering and historic features; and 3) an index to photographs.

## NARRATIVE

The Headworks (24DW287) of the Main Canal of the Lower Yellowstone Project was built during the initial construction phase of the Lower Yellowstone Project, beginning in 1905 and completed in 1909. It comprises the mouth of the Main Canal, which runs roughly parallel to the Yellowstone River for a length of 71.6 miles, as it trends northeast through Dawson and Richland counties in Montana, and crosses the border into McKenzie County, North Dakota, then back into Montana to empty into the Missouri River at Nohly, in Richland County. The canal is fed by waters diverted at Intake by the Diversion Dam (24DW443.1). The Headworks functions to control and regulate the water released into the canal and has an initial capacity of 1,200 cubic feet per second. At the outlet of the Headworks, the canal is approximately 95' across, narrowing within a short distance to 25'-0" in width at its bottom.<sup>1</sup>

Early twentieth century irrigation engineers put tremendous effort into designing headworks and headgates that were substantial and sound, understanding that the failure of these structures could have dire consequences, not only to the canal system but to the irrigated lands below. Site selection was key, and one of the primary reasons the Intake site was chosen by Reclamation engineers in 1904 was that the north bank of the Yellowstone River at this location was of sufficient height and stability to hold a headworks structure of this height and mass.<sup>2</sup>

The Headworks consists of a reinforced concrete headwall, which is approximately 163' long and 45'-0" tall. It tapers from a base width of 31'-6" to a width of 7'-0" at the top, which stands at approximately 2,010' in elevation. The headwall has two concrete wing walls: the upstream wing wall and the headwall itself are constructed as gravity structures, which can withstand the impact of the river's flow, and the downstream wing wall has been constructed primarily as a retaining wall. Each of these wing walls is 80'-0" long.

The Headworks contains eleven sluiceways. These are circular and are 5' in diameter, and each is controlled by a 5'-0"-wide steel slide gate. These gates are raised and lowered by means of a threaded gate stem. This gate stem was originally lifted with a standard operating wheel, but in recent years this simple early system was modified, and it is now hoisted with an electric motor.<sup>3</sup>

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<sup>1</sup> Cynthia Kordecki et al, *Lower Yellowstone Project, 1996 and 1997 Cultural Resources Inventory, Dawson and Richland Counties, Montana, and McKenzie County, North Dakota* (University of North Dakota Department of Anthropology, Grand Forks, ND, and Renewable Technologies Inc., Butte, MT for the U.S. Bureau of Reclamation, Montana Area Office, Billings, 2000), p. 5.12.

<sup>2</sup> Ibid., p. 5.5.

<sup>3</sup> See B.A. Etcheverry, *Irrigation Practice and Engineering*, Vol. III (New York: McGraw Hill Book Company, Inc., 1915), p. 153; Kordecki et al., p. 5.12; Water and Power Resources Service, *Project Data: Lower Yellowstone Project*. (Washington, D.C.: U.S. Department of the Interior, Water and Power Resources Service, 1983), p. 4.

Concrete piers with timber screening—a system known as a “trashrack”—are in place on the inlet side of the headwall. This system exists in order to prevent the sluices from becoming clogged with debris from the river (these are visible in photograph no. MT-141-A-4). The top of the Headworks also features a wooden plank walkway or bridge, which was constructed at the time the Cable System towers (24DW443.3) were erected. This walkway straddles the top of the headwall and wing walls until it meets the embankment, and is braced with timber knee braces.<sup>4</sup> It is surrounded by a steel balustrade rail, which has been mounted and fixed in place.

The Headworks of the Main Canal is visually dominated by the tail tower of the cable system. This tower sits just to the north of the Headworks, in the crook of the downstream wing wall.

## BIBLIOGRAPHY

Etcheverry, B. A.

1915 *Irrigation Practice and Engineering*, Vol. III. New York: McGraw Hill Book Company, Inc.

Kordecki, Cynthia, Mary McCormick, Carrie F. Jackson, and Jennifer Bales

2000 *Lower Yellowstone Project, 1996 and 1997 Cultural Resources Inventory, Dawson and Richland Counties, Montana, and McKenzie County, North Dakota*. Prepared by the University of North Dakota Department of Anthropology, Grand Forks, ND, and Renewable Technologies Inc., Butte, MT. Report submitted to the U.S. Bureau of Reclamation, Montana Area Office, Billings, April 2000.

Water and Power Resources Service

1983 *Project Data: Lower Yellowstone Project*. Washington, D.C.: U.S. Department of the Interior, Water and Power Resources Service.

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<sup>4</sup> See Kordecki et al., p. 5.12; Water and Power Resources Service, p. 4.