

Outlook Irrigation District:  
Pumping Plant and Woodstave Pipe  
2 miles north of intersection of  
Hudson Road and Snipes Lateral Road  
Outlook  
Yakima County  
Washington

HAER No. WA-10

HAER  
WASH,  
39-OUT,  
1-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering REcord  
National Park Service  
Western Region  
Department of the Interior  
San Francisco, California 94102

HISTORIC AMERICAN ENGINEERING RECORD

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Outlook Irrigation District: Pumping Plant and Woodstave Pipe

HAER No. WA-10

Location: Route 1, Box 132  
Outlook, Yakima County, Washington

Dates of Construction: 1915 - Hydroturbine pump plant  
1977, 1979 - Mechanical repair  
1915 - Woodstave pipe  
1939-1940 - Rebuilt

Engineer: H. A. Treadwell, Superintendent of Construction,  
U. S. Bureau of Reclamation

Present Owner: U. S. Bureau of Reclamation

Present Occupant: Outlook Irrigation District

Present Use: Agricultural Irrigation

Significance: The Outlook Irrigation District (OID) is part of one of the earliest, largest, and most successful federal reclamation projects, the Yakima Project. The OID is part of the Sunnyside Division of the Yakima Project, which was authorized on December 12, 1905. The Sunnyside Division is unique in the Yakima Project for its use of hydraulic turbine pumping plants at drops on the Sunnyside Main Canal, such as at Outlook. The development of irrigation systems in the Yakima Valley opened up large expanses of arid land for development and shaped the economic and social history of the region, resulting in the emergence of the Yakima Valley as a premier farming region nationally.

The pumping plants, with their associated discharge pipelines, are considered to be interesting engineering features of the Yakima Project (U. S. Bureau of Reclamation 1983). The pumping plants represent an early and ingenious method for irrigating ground above the elevation of the Sunnyside Canal.

Historican: Alexy Simmons, February 1984

Transmitted by: Jean P. Yearby, HAER, 1985

HISTORICAL INFORMATION

The U. S. Bureau of Reclamation (1983: 1-2) noted the following historical facts about the Outlook Irrigation District (OID):

The Outlook Irrigation District facilities were constructed by the Bureau of Reclamation in 1915-16. The district facilities are owned in fee title by the United States. Operation and maintenance is accomplished by the Outlook Irrigation District in accordance with an agreement with the Bureau of Reclamation. The OID is located in south-central Washington, east of the Cascade Mountains, and provides water to 4,613 acres of irrigated cropland in the lower Yakima Valley in Yakima County. The service area lies north of the Yakima River and north of the town of Sunnyside, about five miles west of the Yakima/Benton County line. The OID is one of seven districts serving lands within the Sunnyside Division of the Yakima Project.

The Northern Pacific Railroad and the Yakima Irrigation Company began building the irrigation system facilities in the Sunnyside area in the fall of 1890. The U. S. Bureau of Reclamation, then known as the Reclamation Service, purchased the system during the summer of 1906. The OID entered into a contract with the United States for construction of the irrigation facilities on November 23, 1914. Water was first delivered through the system on April 15, 1916. The District took over operation of the completed system on June 1, 1916.

The original distribution system for the Outlook Irrigation District, as completed in 1916, consisted of:

- o A hydraulic turbine pumping plant with one 16-inch diameter, 240-horsepower unit and one 24-inch diameter, 560-horsepower hydroturbine pump unit
- o A 4,900-foot-long, 46-inch diameter woodstave pipeline
- o 9.8 miles of concrete-lined main laterals (east and west laterals)
- o Six semicircular metal flumes on wood supports
- o 14.6 miles of concrete-lined sublaterals
- o 3.4 miles of concrete-lined sublaterals
- o 6.6 miles of vitreous clay pipeline
- o Forty-seven lateral turnouts
- o One hundred and forty wood measuring boxes

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The pumping plant and penstocks were completed July 15, 1915. The pumping plant was constructed by "government forces". One of the largest features of the work was the excavation of the tailrace cut below the plant (U. S. Bureau of Reclamation 1915b:127). The contract for the hydraulic turbines was awarded to the Chas. C. Moore Company of San Francisco. The machinery was manufactured by the Platt Iron Works Company and installed by an engineer from the Chas. C. Moore Company.

The original woodstack pipeline was constructed in 1915 under contract by Pacific Tank and Pipe Company. Construction of the pipe was begun on May 24 and completed June 17. "Water was supplied for testing the pipe by pumping from the Main Canal with a gasoline outfit. Testing was completed and the pipe accepted June 29th" (U. S. Reclamation Service 1915:125). The pipe was 4,600 feet long and built upon concrete saddles. The pipe was rebuilt by Civilian Conservation Corps employees from Camp Zillah beginning in 1939 and rebuilding was completed in 1940. The original concrete footings (saddles) that supported the pipe were left in place and reused as supports for the reconstructed pipe. Structurally sound staves, shoes, and bands were also salvaged from the original pipe and were used in the reconstruction.

The pipe, as replaced in 1939, consisted of 4,900 feet of 46-inch diameter woodstave pipe. In 1969, a section of steel pipe was added to replace the section of woodstave pipe that crossed over the Sunnyside Main Canal (H2M HILL, 1981).

#### ARCHITECTURAL INFORMATION

##### Pumping Plant

Three penstocks of 160 feet in length (U. S. Reclamation Service, 1915) divert water from the Sunnyside Main Canal to the Outlook Pumping Plant by gravity flow. One penstock functions as a bypass if the turbines are not in full operation. Water is supplied to the turbines through two reinforced concrete penstocks of 72 inches and 48 inches in diameter, respectively (U. S. Reclamation Service 1915b:124). Tailwater from the turbines and the bypass penstock discharge into the stilling pool at the beginning of the Snipes Mountain Canal, which flows away from the plant to the south.

The pumping plant is a one-story gabled concrete structure with a rectangular plan. The structure is 21 by 32 feet in plan by 49 feet in height from the base of the foundation to the roof (U. S. Reclamation 1915b). The corners of the structure are aligned with compass points. The facades of the structure features plain recessed panels. Two square recessed panels with two rectangular recessed panels above are featured on the southeast and northwest facades. The two penstocks, which deliver water from the hydroturbine pumps to the discharge pipeline are located on the northwest facade. The southeast facade features two pairs of six-over-six light, double-hung sash windows, divided by a mullion, and set in the square recessed panels.

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Two rectangular recessed panels with a triangular recessed panel above are located in each gable facade. A circular window with four lights is set in the recessed triangular panels on the gable ends. The southwest gable facade features a lift-style door set in the southern rectangular recessed panel. The lift door had a standard-sized, removable door that is set in its southern half and constructed of vertical boards. One six-over-six, double-hung sash window is set in each of the equally sized rectangular recessed panels in the northeast facade. A circular tank, which holds water for cooling the bearings of the hydraulic turbine pumps, is located at the north corner of the structure.

A molded cornice highlights the eaves on the southeast and northwest facades. The gable facades feature parapet gables with S-shaped brackets at the corners supporting a slightly projecting plain molded concrete rake. The structure is roofed with corrugated metal sheeting.

An outdoor set of concrete stairs is located at the southwest corner of the structure to provide access to the pump discharge manifold located on the northwest side of the structure. A narrow concrete walkway with a metal railing is attached to the southeast facade of the building and extends over the tailrace and the Snipes Mountain Canal. The walkway is supported by extensions of the walls that form the tailraces for the turbines and the bypass penstock. A recently constructed wooden stairway leads from the east end of the walkway to the road and the Outlook Irrigation District Headquarters northeast of the plant.

The interior of the pumping plant contains two vertical hydraulic turbines of unequal size with individual pumps. The smaller unit has a 240-horsepower turbine with a 16-inch diameter, direct-coupled, single-stage centrifugal pump (U. S. Bureau of Reclamation 1983; U. S. Reclamation Service 1915b). The larger unit has a 560-horsepower turbine directly coupled to a 24-inch diameter, single-stage centrifugal pump. The turbines are mounted in cast iron flumes above the floor level, with the pumps being located on top of the turbine wheel flumes. Kingsbury thrust bearings carry the weight of the rotating elements. The original power head at the plant was 45 feet and the pumping head 109 feet (U. S. Reclamation Service 1915).

The 24-inch diameter pump was rebuilt in 1977 and has an estimated performance life of an additional 10 years (CH2M HILL 1981:14). The 16-inch unit was repaired after failure in 1979. The plant, with both pumps operating, is presently capable of delivering about 46 cfs to the Outlook system (CH2M HILL 1981:14). The ratio of flow of power water to pumped water is approximately 4:1 (CH2M HILL 1981:14). Pumped water is piped through the northwest wall into a concrete enclosed manifold that connects to a 46-inch diameter woodstave discharge pipe. Power water from the turbines empties into draft tubes built into the plant's foundation and discharges into the stilling pool at the beginning of the Snipes Mountain Canal on the southeast side of the building.

### The 46-Inch Diameter Woodstave Pipe

The woodstave pipeline runs from the pumping plant to the bifurcation of the east and west laterals of the Outlook Canal. The water surface at the discharge end of the pipeline is 106 feet above the Sunnyside Main Canal and 152 feet above the hydropumping plant.

The original woodstave pipe is described in the Advertisement, Proposal and Specifications, Yakima-Sunnyside Project Washington, 46-Inch Continuous Wood-Stave Pipe, U. S. Reclamation Service, Department of the Interior, 1915. The 4,600 linear feet, 46-inch woodstave pipe was originally constructed by the Pacific Tank and Pipe Company under contract with the Reclamation Service. The construction proposal stipulated the specific material types to be used and that structural testing by the Reclamation Service would occur at their expense. The contract was to use seasoned lumber and either yellow fir (Douglas fir), redwood, or other wood acceptable to the engineer, 1/2-inch diameter steel bands with button heads of standard dimension, and one malleable iron shoe. Staves were required to be an average length of 16 feet or long and no shorter than 10 feet. It was specified (U. S. Reclamation Service 1915a:6) that

Fir shall be sound, straight grained, and free from dry rot, pitch seams, pitch pockets, checks, wind shakes, sapwood or other imperfections that may impair its strength or durability. No through knots or knots on the edge or at the ends of staves shall be permitted. Sound knots not exceeding one-half inch in diameter, not falling within the above limitations nor exceeding more than three within a 10-foot length will be accepted. All lumber used shall be seasoned by not less than 60 days air drying in open piles before milling or by kiln drying. All staves shall be accurately planed to a smooth surface to fit a standard metal pattern provided by the contractor. Staves shall be trimmed perfectly square at ends and slots for tongues shall be in exactly the same relative position for all ends and according to detail drawings furnished by the contractor.

The pipe was built on saddle piers that the Reclamation Service was responsible for setting in place prior to construction of the pipe. Water was supplied for testing the pipe by pumping from the Sunnyside Main Canal with a gasoline engine-driven pump. The pipe was accepted on June 29, 1915. A 230-foot-deep well was drilled near the pumping plant and equipped with a deep well pump and gasoline engine to keep the woodstave pipe filled with water in the winter. A short segment of buried concrete pipe at the outlet end of the pipeline contains an irrigation-type Venturi flowmeter of 50-second-feet capacity.

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In 1939-1940, the deteriorated woodstave pipe was dismantled and reconstructed by Civilian Conservation Corps employees from Camp Zillah (C.C.C. Camp BR-87, Zillah, Washington). On the 8th of November, C.C.C. Company No. 1297, which had been transferred from Camp BR-50 to Zillah, were detailed to the Bureau of Reclamation and began replacing the deteriorated woodstaves in the discharge pipeline with new creosoted woodstaves. The original saddle piers were left in place and reused, as well as sound staves, bands, and shoes from the original pipe. By the end of the year, 45 linear feet of 46-inch creosoted woodstave pipe, 68 square yards of riprap, and 25 cubic yards of concrete were in place. The remainder of the work was completed in 1940.

The reconstructed woodstave pipeline was connected to the short segment of buried concrete pipe at the outlet end with a concrete head wall. The head wall is marked with the inscription "CCC 1940." The type of wood used to replace the deteriorated staves in the discharge pipe was not recorded in the U. S. Bureau of Reclamation Annual Project History (1939), although fir is the only identifiable kind of lumber making up the pipelines.

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