NPS Form 10-900
(Rev. 8-86)

2735

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NATIONAL REGISTER

**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 of eligibility for individual properties or districts. See instructions in *Guidelines for Completing National Register Forms* (National Register Bulletin 16). Complete each item by marking "x" in the appropriate box or by entering the requested information. If an item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, styles, materials, and areas of significance, enter only the categories and subcategories listed in the instructions. For additional space use continuation sheets (Form 10-900a). Type all entries.

## 1. Name of Property

historic name: Nooksack Falls Hydroelectric Power Plant

other names/site number: N/A

## 2. Location

street & number: Route 542, on Nooksack River ☐ not for publication

city, town: Glacier ☒ vicinity

state: Washington code: WA county: Whatcom code: 073 zip code: 98244

## 3. Classification

| Ownership of Property | Category of Property | Number of Resources within Property | |
|---|---|---|---|
| | | Contributing | Noncontributing |
| ☒ private | ☐ building(s) | 2 | ____ buildings |
| ☐ public-local | ☒ district | ____ | ____ sites |
| ☐ public-State | ☐ site | ____ | ____ structures |
| ☐ public-Federal | ☐ structure | ____ | ____ objects |
| | ☐ object | 2 | 0 Total |

Name of related multiple property listing:
Hydroelectric Power Plants in Washington State

Number of contributing resources previously listed in the National Register 0

## 4. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act of 1966, 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 forth in 36 CFR Part 60. In my opinion, the property ☒ meets ☐ does not meet the National Register criteria. ☐ See continuation sheet.

Signature of certifying official — October 12, 1988 Date

Washington State Office of Archaeology & Historic Preservation
State or Federal agency and bureau

In my opinion, the property ☐ meets ☐ does not meet the National Register criteria. ☐ See continuation sheet.

Signature of commenting or other official — Date

State or Federal agency and bureau

## 5. National Park Service Certification

I, hereby, certify that this 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

## 6. Function or Use

| Historic Functions (enter categories from instructions) | Current Functions (enter categories from instructions) |
|---|---|
| INDUSTRY/energy facility | INDUSTRY/energy facility |

## 7. Description

**Architectural Classification (enter categories from instructions)**

Other/industrial vernacular

**Materials (enter categories from instructions)**

foundation concrete
walls concrete
roof tar
other

Describe present and historic physical appearance.

The Nooksack Falls plant is located on the Nooksack River in Whatcom County and includes a historic power plant from 1906, with well preserved equipment, and a rebuilt water conveyance system and dam (outside boundaries). The constituent elements are described below:

HEADWORKS (Noncontributing and Outside Boundaries):

Dam (1906, 1931, 1980): The original structure consisted of a four foot diameter log placed across the river, approximately 80 feet above Nooksack Falls. Concrete piers anchored the log to the steep rock banks. When the water conveyance system was replaced in 1931, a new rock-filled timber crib dam was built 1,050 feet upstream from the original structure. It was five feet high and 72 feet long, and consisted of two 65 foot long fir logs, 36 inches in diameter. Concrete piers anchored the dam to the bank, and a single concrete pier supported it in the middle. The log structure was sheathed with two layers of six by 12 inch planks, which were 22 feet in length. The spaces between the toe and the logs were rock-filled. In the 1980s, the dam was dismantled and replaced with new components.

Intake: (1906, 1931; Noncontributing): The original intake opening was excavated out of solid rock. It consisted of two gates supported by two concrete walls. Remnants of the original structure still exist. When the water conveyance system was replaced in 1931, a new concrete intake was constructed.

WATER CONVEYANCE SYSTEM (Noncontributing and Outside Boundaries):

Reinforced Concrete Flume (1931, 1980s): Water was diverted into a reinforced concrete flume, eight and one-half feet wide and six and one-half feet high. The flume, which is supported on a solid rock foundation, extends 4,500 feet along the river to a settling basin. In the 1980s, the original flume was replaced in kind.

Timber Wood Stave Conduit (1931, 1980s): from the settling basin, the water flows into a 566 foot long, 6 foot diameter wood stave pipe, reconstructed in the 1980s.

Rock Tunnel (1931, 1980s): unlined horseshoe tunnel, 12,025 feet in length, eight feet in diameter; built on a grade of 7 feet /1000 feet. In the 1980s, the tunnel was excavated further to increase its height two feet, 9 inches. It was also lined with shotcrete.

Reinforced Concrete Forebay/Surge Tank (1931): Ten to 24 feet wide, 35 feet long, 25.5 feet high. Trash racks on concrete bulkhead. In order to flush out sand and gravel, the bottom slopes from all points to a steel side gate.

[x] See continuation sheet

Penstock (1931): the water is carried to the turbine casings by means of a 60-inch diameter welded steel penstock built above grade.

POWERHOUSE AND EQUIPMENT (Contributing):

Powerhouse (1906): concrete structure, 40 feet by 60 feet by 29 feet high. Consists of three concrete walls. The west wall, composed of corrugated iron on a wood frame, was designed to facilitate future expansion which never occurred. The round arched wood frame windows are two stories in height and have multiple sash and panes. A plank roof covered with tar and gravel is supported by steel Howe trusses. The original 209-ton hand-operated travelling crane manufactured by Northern Engineering Works of Detroit, which was used to move the equipment, is still in place. The penstock enters the powerhouse partially below grade at the north wall. The following generating equipment is housed in the plant:

Turbine (1912): one horizontal Pelton tangential water wheel, 3,200 hp, 200 r.p.m., serial number 13165. Four of the original six runners remain in operation. Consists of four backshot nozzles controlled by needle valves, and four undershot nozzles with gate valves. The turbine unit was manufactured by the Pelton Water Wheel Company in 1910. It was installed in the Nooksack Plant in 1912 to replace the original Francis turbine which continually clogged with debris.

Generator Unit (1906): The turbine is connected through a flexible coupling to a Westinghouse Electric alternating current generator, 1,500 KW, 2,200 volts, 3 phases, 60 cycle.

Exciter (1906): original fir wheel belt driven and direct connected to a direct current Westinghouse generator, 45 KW, 125 volts, 360 amp., 850 r.p.m. Supplied current to operate the generator field, the plant lights, and the headgates.

Governor (1906): the speed of the waterwheel is controlled by a Type Q governor, manufactured by the Lombard Governor Company in Boston; serial number 938, patent date 1902.

Oil Pump (1906): one double three inch by three inch Lombard oil pump with a vertical tank, originally operated by a 5 hp motor, which supplied oil for the operation of the governor.

Switchboard (1906): Originally consisted of three panels of Westinghouse standard equipment. The marble panels remain. Other early original equipment includes a General Electric synchroscope and brass plated gauges; a Thompson voltmeter, a Westinghouse watt,meter (1902) and direct current gauges (1899).

Transformers (1906; replaced 1980s): Originally three 600 KW General Electric water-cooled transformers were located in a concrete structure on the hillside 150 feet above the powerhouse. The transformers raised the voltage from 2,300 to a line voltage of 55,000 volts. This equipment remained in use until the open air substation was built west of the power plant. The original equipment stood in three concrete bays in a 24 foot by 22 foot by 17 foot high building with concrete walls and floors. Only remnants of the paneled doors, wooden window sash, and wood plank roof with tar sheathing are evident in this

deteriorated structure. Water pipes, ceramic insulators, and three ceramic pipe outlets for high voltage wires are also visible. Portions of the electrolytic aluminum cell lightning arresters which protected the line against surge and storms lie behind the transformer house.

OUTBUILDINGS: Three frame cottages and a hotel were built by the company early in the 20th century but only the concrete foundations of the structures remain. A machine shop located west of the powerhouse at the base of the hill remains. The gable roof frame structure retains the following equipment on the interior: a forge on a bed of sand, fan for bellows, drill press, compressor, belts and pulleys for grinders and press, small electric motor, wooden work benches. The machine shop is a contributing structure

## 8. Statement of Significance

Certifying official has considered the significance of this property in relation to other properties:

☐ nationally ☒ statewide ☐ locally

Applicable National Register Criteria ☒ A ☐ B ☒ C ☐ D

Criteria Considerations (Exceptions) ☐ A ☐ B ☐ C ☐ D ☐ E ☐ F ☐ G

| Areas of Significance (enter categories from instructions) | Period of Significance | Significant Dates |
|---|---|---|
| Engineering | 1906-1915 | 1906 |
| Industry | | |

Cultural Affiliation: N/A

Significant Person: N/A

Architect/Builder: Not Known

State significance of property, and justify criteria, criteria considerations, and areas and periods of significance noted above.

The Nooksack Falls Hydroelectric Power Plant is historically significant as a rare surviving example of an early hydroelectric facility in Washington. The property reflects the first phase of hydroelectric development in the state, when small traction companies built plants for urban power loads. Although the integrity of the dam and water conveyance system has been compromised, the powerhouse itself, and the well-preserved equipment inside, provides a remarkable example of hydroelectrical technology from the period. As such, the plant meets the registration requirements established in the Hydroelectric Power Plants in Washington State multiple property documentation form.

Historical Background: In 1903, the Whatcom County Railway and Light Company began construction of a 1,500 KW power plant at Nooksack Falls. Like most early hydroelectric facilities, the Nooksack plant was designed to generate power for an expanding interurban railway system. Surplus power would provide light to Bellingham and the surrounding communities.

The plant was located on the Nooksack River which originated in the glaciers on the north side of Mount Baker and flowed at an average rate of 250 second feet. The original headworks were located 80 feet above the falls. At this site, a timber crib dam diverted water into a concrete intake which conveyed water through a 260 foot long rock tunnel to a timber forebay above the powerhouse. Two 1,300 foot long penstocks, one of 47 inch diameter riveted sheet steel and the other of 44 inch diameter wood stave pipe, carried the water to the turbine casing under a head of 176 feet. Concrete blocks anchored the penstocks to the hillside.

The remote location complicated construction. Supplies had to be shipped by rail to Glacier and hauled several miles to the site by horses and steam donkey. Because of the isolation of the site, the plant required construction of a small community to house construction workers and plant operators. The company built a hotel to house temporary employees, which also served as a school for children at the site. In addition, three cottages for operators were built on the hill north of the powerhouse.

When complete, the plant represented state-of-the-art technology. The original Francis turbine, for example, reflected common practice of the period despite the fact that the turbine was continually clogged with river debris. In 1912, a Pelton tangential water

☒ See continuation sheet

## 9. Major Bibliographical References


Beery, E.J. The Electrical Development in the State of Washington, unpublished thesis, University of Washington, 1915.

Puget Sound Power and Light Company, Draft Environmental Report: Exhibit E to License Application for Nooksack Falls Project, FERC Project No. 3721, January 1982.

Van Norden, Rudolph. "Puget Sound Traction, Light, and Power Company's System," Journal of Electricity, Power and Gas, Volume 28, Number 22, June 1, 1912.


☐ See continuation sheet

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 Record # _____

Primary location of additional data:

- ☐ State historic preservation office
- ☐ Other State agency
- ☐ Federal agency
- ☐ Local government
- ☐ University
- ☐ Other

Specify repository: _____

## 10. Geographical Data

Acreage of property about 2

Quadrangle Name: Mt. Baker Scale: 1:62500

UTM References

| | Zone | Easting | Northing |
|---|---|---|---|
| A | 10 | 586080 | 5417800 |
| B | | | |
| C | | | |
| D | | | |

☐ See continuation sheet

Verbal Boundary Description

The nominated property is a rectangular parcel of land with boundaries shown on the attached map (Scale 1" = 100').

☐ See continuation sheet

Boundary Justification

The nominated property includes the hydroelectric power plant historically associated with the Nooksack project, but does not include the reconstructed dam or water conveyance system which post-dates the period of significance.

☐ See continuation sheet

## 11. Form Prepared By


name/title Lisa Soderberg

organization Office of Arch'y & Historic Preservation date October 23, 1986

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city or town Olympia state Washington zip code 98504

wheel was installed which remains in operation today. The Pelton was specifically designed to accommodate high head conditions, and its installation reflects changing technology in the early 20th century.

Throughout the lifetime of this early system, rock slides proved to be a problem. Walls were built into the hillside in an attempt to protect and minimize damage to the structures. But by 1930, rock slides had seriously undermined the penstocks. A full reconstruction of the water conveyance system, located north of the original, was completed in 1931 under the direction of H.E. Barnes. The concrete intake, the rock tunnel, and some of the concrete anchors which supported the penstocks are all that remain of the original conveyance system.

Before the plant was complete, management was assumed by the Stone and Webster engineering firm, although the facility continued to serve the Whatcom County Railway and Light Company until 1912. In that year Stone and Webster merged five power companies, including the Whatcom County firm, into the Puget Sound Traction, Light, and Power Company. Despite the merger, however, the Nooksack Falls facility was unable to keep up with the growing demand in the Bellingham area, and by 1915 the parent corporation was forced to buy power from the Western Canada Power Company in Sumas. Today, the Nooksack plant cannot meet the power needs of the small town of Glacier, but the Puget Sound Traction, Light And Power company's successor continues to operate the system today.

Although construction of the facility represented a significant achievement for the utility, the project provided no mitigation for the serious loss of fish runs, the inundation of wildlife habitat, or the disruption to the tradition cultural and subsistence economy of the Nooksack tribe. Any assessment of the historical impact of this plant must recognize the damage inflicted on both the native inhabitants and the natural environment.

[1]Louis C. Hunter. Water Power: A History of Industrial Power in the United States, Volume I, (Charlottesville: University Press of Virginia), 1979, p. 400.

[2]E.J. Beery. "The Electrical Development in the State of Washington." Unpublished thesis, University of Washington, 1915, pp. 513. Rudolph W. Van Norden. "Puget Sound Traction, Light and Power Company's System," Journal of Electricity, Power and Gas. Volume 28, Number 22, June 1, 1912, p. 16.

[3]Puget Sound Power and Light Company. Draft Environmental Report: Exhibit E to License Application for Nooksack Falls Project. FERC Project No. 3721, January 1982, p. 49, 54.

[4]Beery, op.cit., p. 16-20.

APPROXIMATE PROPERTY BOUNDARY

POWERHOUSE (C.)

EXISTING PENSTOCK (N.C.)

TO GLACIER— 7 MILES

SR 542

EXISTING SURGE TANK (N.C.)

TUNNEL EXIT

TO MT. BAKER SKI AREA— 14 MILES

MACHINE SHOP (C)

TAILRACE

Machine Shop (C)

NORTH FORK NOOKSACK RIVER

SR 542

USFS ROAD 33

EXISTING TUNNEL (N.C.)

DISTRIBUTION LINE

TUNNEL ENTRANCE (N.C.)

APPROXIMATE PROPERTY BOUNDARY

WOOD STAVE PIPE (NC)

INTAKE (N.C.)

SETTLING BASIN (N.C.)

APPROXIMATE PROPERTY BOUNDARY

DIVERSION DAM (N.C.)

CONCRETE FLUME (N.C.)

EXISTING PARKING AREA

USFS ROAD 33

NOOKSACK FALLS

WELLS CREEK

APPROXIMATE PROPERTY BOUNDARY

1350 1400 1450 1500 1550 1600 1650 1700 1750 1800 1850 1900

N MN

SCALE

100 0 200 FEET

50 100 300

CONTOUR INTERVAL 50'

+++++++++++++++ = Nomination boundaries

C = Contributing

NC = Noncontributing

♂ = photo Key

Nooksack Falls Power Plant
glacier vicinity
Whatcom Co, WA