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

499

OMB No. 1024-0018

United States Department of the Interior
National Park Service

MAY 18 1989

NATIONAL REGISTER

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: Gorge Hydroelectric Power Plant
other names/site number: N/A

2. Location

street & number: N/A ☐ not for publication
city, town: Newhalem ☒ vicinity
state: Washington code: WA county: Whatcom code: 073 zip code: 98227

3. Classification

Ownership of Property	Category of Property	Number of Resources within Property	
		Contributing	Noncontributing
☐ private	☐ building(s)	1	buildings
☒ public-local	☒ district		sites
☐ public-State	☐ site	6	1 structures
☐ public-Federal	☐ structure		objects
	☐ object	7	1 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 — Date: April 19, 1989

Washington State Office of Archaeology and 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. — Patrick Andrus — 6/30/89
☐ determined eligible for the National Register. ☐ See continuation sheet.
☐ determined not eligible for the National Register.
☐ removed from the National Register.
☐ other, (explain:) _____

for 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)	Materials (enter categories from instructions)
Neoclassical	foundation concrete walls concrete roof concrete other concrete

Describe present and historic physical appearance.

Located on Gorge Creek in the mountainous Upper Skagit River Valley, the Gorge Hydroelectric Power Plant includes a historically significant powerhouse and pressure tunnel, and a noncontributing dam built in 1961. The following inventory describes the constituent elements of the system:

HEADWORKS: (Noncontributing)

Dam (1961): Combination concrete thin arch and gravity dam; original structure was a rock-filled timber crib weir dam which was replaced in 1950 by a concrete diversion dam.

WATER CONVEYANCE SYSTEM: (Contributing)

Power Tunnel (1921): pressure tunnel, driven through solid granite, is approximately 11,000 feet long, horseshoe-shaped, and concrete-lined; internal diameter of 20 feet, six inches. At the lower end of the tunnel is a simple surge tank, and a riser with a restricted orifice. The tunnel was excavated from solid rock, with concrete extension above the surface. Work completed by contractors R.C. Storie and Company of San Francisco.

Penstocks (1919, 1924, 1929): four steel penstocks, approximately 1,600 feet long.

POWERHOUSE AND EQUIPMENT: (Contributing)

Powerhouse (1924, 1949): Steel and reinforced concrete structure on concrete foundations; flat roof with parapet; large sash windows, pilasters and entablature; projecting outer bays with recessed windows at each end of the powerhouse gives the illusion of a building flanked by towers. In 1949, the Guy Atkinson Company completed a compatable northwest addition, which doubled the size of the powerhouse, but does not destroy the integrity of the original design.

Turbines: All the turbines were modified to use the gross head of 380 feet. Units 21 and 22, installed in 1924, were manufactured by the S. Morgan Smith Company, with a speed of 257.1 r.p.m. In 1959, they were modified with a new rating of 45,000 hp. Unit 23,installed in 1929, is a S. Morgan Smith turbine with a speed of 257.1 r.p.m. It was modified in 1961, and has a new rating of 45,000 hp. Unit 24 is an Allis Chalmers turbine, installed in 1951, with a speed of 163.6 r.p.m. The turbine was modified in 1960 and has a new rating of 95,000 hp.

[x] See continuation sheet

Generators (1924, 1929, 1951): Westinghouse Electric Corporation generators. Two original units rated at 30,000 KVA, 0.9 pf., 11,000 volts; third unit rated at 33,000 KVA, 0.9. pf., 11,000 volts; fourth unit rated at 67,000 KVA, 0.9 pf., 11,000 volts.

Transformers: Water-cooled transformers manufactured by the Westinghouse Electric Corporation. One bank of three single phase, 31,000 KVA transformers serves the three older units, transforming from 10,500 volts to 230,000 volts. A bank of three single phase, 25,000 KVA transformers transforms the power in the largest unit from 10,500 volts to 230,000 volts.

List of Resources:

Contributing Building:
- Powerhouse

Contributing Structures:
- Power Tunnel
- Surge Tank
- Penstocks (4)

Noncontributing Structure:
- Dam

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	1918-1939	1924 (power
Industry		plant completed)

Cultural Affiliation: N/A

Significant Person: N/A

Architect/Builder: conveyance system: R.C. Storie & Company

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

The Gorge Hydroelectric Power Plant is historically significant for its role in the development of a major regional power supply system, and is closely associated with the expansion of the Seattle City Light municipal utility. Situated in the mountainous and inaccessible wilderness of the Upper Skagit River Valley, construction of the high head plant was a major engineering feat. Moreover, the technology of the plant, particularly the 11,00 foot power tunnel which was considered the first of its kind in America, reflected the most advanced technology of the period. Although alterations and additions have compromised the integrity of the original system, most changes have conformed to the initial design intentions. As a result, the property meets the registration requirements established in the Hydroelectric Power Plants in Washington State multiple property documentation form.

Historical Background: The Skagit River, which extends from British Columbia to the Puget Sound, is over 150 miles long and drains an area of more than three thousand miles. In the 1920s, engineers reported that the river had greater power potential than any other on the west slope of the Cascades. Specifically, engineers identified an area in the upper third of the drainage area where the river flowed through a narrow gorge with granite walls and a 700 foot descent. At this location the river flow could reach 50,000 cubic feet per second at high water.[1]

But despite the potential, the cost of construction in the remote region was considerable. The only road ended at Marblemount, and the only means of transportation beyond was by pack-horse on what was described as a "tortuous trail" used by hunters and miners.[2] Nevertheless, plans for a large scale development on the upper river date to as early as 1905 when the Skagit Power Company was formed. The company made no progress on their plans, however. Even after the company was purchased by the giant Stone and Webster Corporation in 1913, the project seemed too formidable.

But the treacherous topography did not discourage the engineers at the Seattle City Light municipal system, nor prevent their relentless pursuit to acquire the region for development. By 1912, the power load needs of the city had surpassed the capacity of the city's plant on the Cedar River, and, in 1912 and 1913, J.D. Ross, the system's superintendent, began to look at the Skagit basin for a new facility. Ross even competed unsuccessfully with Stone and Webster to purchase the Skagit Power Company.

☒ See continuation sheet

9. Major Bibliographical References

Pitzer, Paul. Building the Skagit: A Century of Upper Skagit Valley History. Portland: The Galley Press, 1978.

Ross, J.D. "Skagit River Hydro-Electric Development for Seattle," Western Construction News, September 25, 1926.

Seattle City Light. "Power System Information." Seattle: Seattle City Light, 1962.

☐ 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 82

Quadrangle Name: Diablo Dam Quadrangle Scale: 1:24000

UTM References

	Zone	Easting	Northing
A	10	629660	5392620
B	10	629580	5392720
C	10	631790	5395200
D	10	631870	5395400
E	10	632120	5395120

☐ See continuation sheet

Verbal Boundary Description

The boundary of the nominated property is delineated by the polygon whose vertices are marked by the following UTM points (as indicated on the attached Diablo Dam, Washington, USGS quad map): A 10 629660 5392620, B 10 629580 5392720, C 10 631790 5395200, D 10 631870 5395400, E 10 632120 5395120.

☐ See continuation sheet

Boundary Justification

The nominated property includes the water conveyance system and powerhouse historically associated with the Gorge Hydroelectric Project, which reflects the significant technological achievements of the plant. The associated company town is not included in the nomination, but is a descrete resource that may be eligible for listing in the National Register of Historic Places.

☐ See continuation sheet

11. Form Prepared By

name/title Lisa Soderberg; history edited by Leonard Garfield
organization Office of Archaeology and Historic Pres. date October 23, 1986 (rev. 8/88)
street & number 111 West 21st Avenue, KL-11 telephone (206) 753-4011
city or town Olympia state Washington zip code 98504

Late in 1915, Seattle City Light was in the final stages of applying for permits to build a new plant on the Sauk River when Ross learned that Stone and Webster's permits on the Skagit were about to expire because no work had been undertaken. Despite his attempts to convince federal officials that the city would start construction at once, the Stone and Webster permits were extended until January, 1917. But when the permits expired for a second time, Ross launched an intensive lobbying campaign in Washington, D.C. to convince the Secretary of Agriculture of the merits of Seattle's application. He pointed out that Stone and Webster held more sites than they could possibly hope to develop. Moreover, Ross proposed an enormous facility, and emphasized that electricity generated at the Skagit River plant would relieve the severe electrical shortages caused by World War I. Impressed that the plant could contribute to the war effort, federal officials awarded Seattle City Light a permit on December 22, 1917.[3]

Due to the high cost of developing the Upper Skagit site at Ruby Creek or Diablo, Seattle City Light proposed to build their first new dam at Gorge Creek. Before work began, however, it was necessary to provide access to the region. In 1918, a 24-mile standard gauge railroad was completed between Rockport and Newhalem, which included the construction of two heavy railroad bridges across the Skagit River. By the end of 1919, 100 men were living in a camp near Goodell Creek. A sawmill with a capacity of 25,000 board feet had been completed and work was begun on a 2,000 KW power plant on Newhalem Creek. By the time the snow melted in 1920, 500 men were at work on the Skagit project. A small town had arisen on the flat below the Gorge powerhouse site which included six bunkhouses, 75 three-room cottages for married workers, bathhouses, a commissary, a warehouse, a cookhouse, and a hospital. In addition, machine shops, repair shops, compression plants, and car barns were erected.[4]

The original proposal specified construction of a concrete dam, providing a head of 375 feet, across Gorge Creek. However, construction time and the cost of a concrete structure led engineers to erect a "temporary" rock-filled timber crib diversion dam, which provided a head of 285 feet. The timber dam diverted water through an adjoining intake into an 11,000 foot long, 20 foot six-inch diameter, concrete-lined pressure tunnel. The tunnel, a horseshoe shaped structure cut through solid granite, took more than two years to construct. An access tunnel was also driven through the mountain at the mid-point. Large electrically powered air compressors were installed at Newhalem to operate the jackhammers used to drive the tunnel headings. An eight inch pipe carried the compressed air to the drilling sites. A special gun was developed which shot mixed concrete into the area between the wooden forms and the rock walls of the tunnel near the lower end.

A simple surge tank and riser with restricted orifice was constructed. It consists of a vertical shaft 130 feet high and 20 feet 6 inches in diameter. The shaft extends through an opening excavated out of the rock and a concrete extension stands above the surface. The tank serves as an expansion tank to regulate the pressure in the tunnel, and the flow of water into the turbines.[5]

The tunnel conveys water to four 1,600 foot long steel penstocks. When the power plant was completed in 1924, the water operated two S. Morgan Smith Company vertical turbines which were direct connected to two Westinghouse generators. The units produced 30,000 KVA at 11,000 volts. In 1929, a 33,000 KVA unit was installed, and in 1951 a 66,700 KVA unit was added.[6]

On September 14, 1924, the first electrical power from the Skagit generators reached Seattle. It was transmitted on a 1,095 mile long line to the north substation where it was distributed throughout the city. Today, the current generated at the Gorge plant is connected to the Skagit transmission system by means of a 230,000 volt switchyard which employs a ring bus scheme.[7]

Although plans specified that the timber dam would only stand five or six years, it was not replaced by a masonry structure until 1950. At the time, the powerhouse was also enlarged and a fourth turbine unit was added. In 1961, a 300 foot head concrete diversion thin arch and gravity dam was built, raising the head to 375 feet. The power plant's capacity now coincided with the original design intentions. For the first time, the Gorge Dam provided a reservoir which made it possible to regulate the flow of water to the turbines. 8

[1]C.F. Unden, "The Skagit River Development," Journal of Electricity, Volume 45, Number 12, December 15, 1920, p. 568.
[2]"Only Power Pressure Tunnel in the U.S. Opened by the City of Seattle," Pacific Builder and Engineer, August 9, 1924, p. 8.
[3]Paul C. Pitzer, Building the Skagit: A Century of Upper Skagit Valley History. (Portland, Oregon: The Galley Press, 1978, pp. 24-27.
[4]Unden, op.cit., p. 568; Pacific Builder and Engineer, op.cit., p. 8.
[5]Pacific Builder and Engineer, op.cit., p. 9; Pitzer, op.cit., p. 38.
[6]Seattle City Light, "Power System Information," 1962, pp. 10-11.
[7]J.D. Ross, Skagit River Hydro-Electric Development for Seattle, Western Construction News, September 25, 1926, p. 26-28; Ibid, pp. 10-11.
[8]Seattle City Light, op.cit., pp. 10-11.

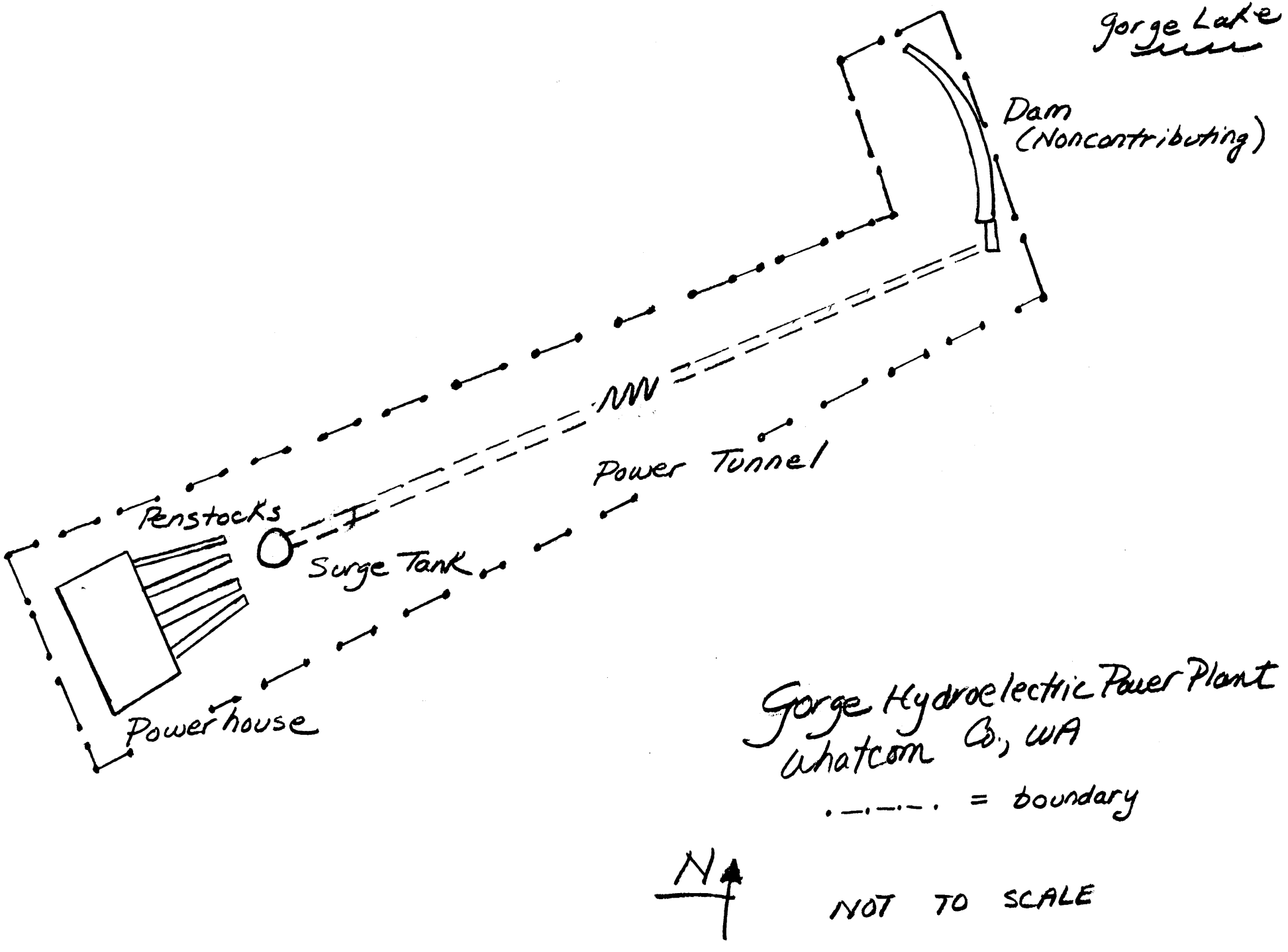
United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Section number Photo **Page** 1

Gorge Hydroelectric Power Plant
Whatcom County, Washington
Photos: Lisa Soderberg, August, 1986
Negatives: Office of Archaeology and Historic Preservation, Olympia, Washington

Photo No.	View
1.	Powerhouse, looking N.E.
2.	Powerhouse, interior, looking S.E.
3.	Dam, looking South
4.	Dam, looking South
5.	Dam, looking N.E.
6.	Intake, looking S.E.



Gorge Hydroelectric Power Plant
Whatcom Co., WA

.-.-.-. = boundary

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NOT TO SCALE