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

OMB No. 1024-0018

8902736

United States Department of the Interior
National Park Service

National Register of Historic Places Registration Form

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NATIONAL REGISTER

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 10-900-a).Type all entries.

1. Name of Property

historic name: Lower Baker River Hydroelectric Power Plant
other names/site number: N/A

2. Location

street & number: Baker River at southern end of Shannon Lake ☐ not for publication
city, town: Concrete ☒ vicinity
state: Washington code: WA county: Skagit code: 057 zip code: 98237

3. Classification

Ownership of Property	Category of Property	Number of Resources within Property	
		Contributing	Noncontributing
☒ private	☐ building(s)	—	— buildings
☐ public-local	☒ district	—	— sites
☐ public-State	☐ site	6	— structures
☐ public-Federal	☐ structure	—	— objects
	☐ object	6	— 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: 6/1/90

Washington State Department of Community Development 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. — 7/17/90
☐ 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

JUN 3 1990

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)	
	foundation	concrete
Other: semi-gravity arch dam	walls	concrete
	roof	N/A
	other	

Describe present and historic physical appearance.

Flanked by the high mountains of the North Cascades, the Baker River dam site is situated in a narrow gorge where the rock walls rise 300 feet above the river bed.[1] The following inventory describes the constituent elements of the plant:

Headworks:

Dam (1924, 1927): Concrete semi-gravity arch dam with spillway through control gates. Spillway sections ten feet wide. Sections separated by piers 18 inches by 29 feet; piers slotted and fitted with ten by 12 foot gates. Total height of dam is 234 feet, 400 feet long at crest, 180 feet thick at base. Originally provided 70,000 acre feet of storage. In 1927, dam raised 30 feet. Added 60,000 acre feet of storage. Increased generating capacity by 8,000 hp.

Intake (1924): Located on east side of canyon. Protected by rack bars 50 feet in width. Two steel gates faced with brass, 12 feet by 20 feet. Gates raised and lowered by means of hydraulic cylinders.

Water Conveyance System:

Main Pressure Tunnel (1924): concrete lined, 890 feet, interior diameter 22 feet. Driven through solid limestone, 4,000 cfs capacity.

Circular Forebay or Surge Chamber (1924): Located in main pressure tunnel; 20 foot diameter with spillway opening. Constructed through solid limestone.

Branch Tunnel (1924): About 60 feet north of the surge chamber, tunnel branches into 18 foot diameter tunnel which joins with penstocks.

Penstocks (1924): Eight foot diameter steel penstocks.

Powerhouse and Equipment (Non-contributing and outside boundaries)

Powerhouse (1924/1968): Original-reinforced concrete, four floors, 155 feet long, 98 feet wide, 87 feet high from basement floor to the ridge of the roof. Destroyed by mud slide in 1965; new powerhouse built 1968.

Turbines (1924; replaced 1959-60): Double overhung horizontal Allis Chalmers Francis type turbines; each wheel. rated at 10,000 hp. Under a head of 200 feet, 300 rpm. Original turbine replaced in 1959-60).

Generator (1924; replaced 1959): General Electric 19,500 KVA, 15,000 KW, three phase, 60 cycle, 300 rpm. Replaced by 64,000 KVA General Electric unit in 1959.

[1]William D. Shannon, "The Baker River Development," Journal of Electricity, Vol. 55, No. 12, December 15, 1925, pp. 441-444.

8. Statement of Significance

Jul. 1990

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 Industry	1924-1927	1924
	Cultural Affiliation N/A	
Significant Person N/A	Architect/Builder Stone and Webster	

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

Introduction: The Baker River Dam and Pressure Tunnel are significant examples of medium-high head hydroelectric technology from the 1920s. The arch gravity dam reflects the standard design for power sites located in deep narrow canyons. Moreover, construction of a 263 foot high concrete dam in this steep, unforgiving terrain, and the driving of a 900 foot tunnel through rock represents important engineering accomplishments. However, the integrity of the original system has been compromised as a result of the loss of the original powerhouse and equipment.

Historical Background: The Baker River Plant was completed in 1924 by the Puget Sound Power and Light Company under the direction of the Stone and Webster Construction and Engineering Division. It was built to serve the northern portion of the company's system. The only plant operated by the company in this region was the small outdated 1700 KW Nooksack Falls Plant. For many years, the Puget Sound Power and Light Company had been forced to purchase power from Canada in order to adequately serve the Bellingham area. This practice was immediately discontinued upon the completion of the Baker River Plant.

A concrete "semi-gravity arch" design was chosen for the steep site. In American Building, Carl Condit states that "the arch-gravity form became the standard for dams located in deep narrow canyons in which the rock of the side walls is sufficiently dense and homogenous to sustain without leaks the immense lateral thrust of the arched mass of concrete."[2] The Baker River dam is 234 feet high and 400 feet long at the crest. The upstream face of the dam is laid out on a radius of 250 feet.[3]

Before excavation for the dam could begin, it was necessary to drive a diversion tunnel 17 feet by 24 feet in cross section from a point 200 feet above the upstream face of the dam to a point 300 feet below the downstream face. The tunnel diverted more than two-thirds of the stream flow. Upstream and downstream timber crib cofferdams were also built to prevent the river from encroaching upon the excavation and to make it possible to pour the concrete under ideal dry conditions.[4]

The intake is located in the east side of the canyon adjacent to the upstream face of the dam. Two 12 by 20 foot steel gates faced with brass regulate the flow of water into an 890 foot long, 22 foot diameter pressure tunnel which has a capacity of 4,000 cubic feet per second. A 20 foot diameter surge tank is located in the pressure tunnel approximately 500 feet from the original powerhouse. About 65 feet north of the surge chamber, the tunnel branches into an 18 foot diameter tunnel which is joined to the penstocks. Originally there were two eight foot diameter steel penstocks for each generating unit. The penstocks conveyed water under a head of 200 feet to two 20,000 hp horizontal shaft double overhung Francis turbines direct connected to two 18,000 KW generators.[5]

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[2]Carl Condit, American Building (Chicago: The University of Chicago Press, 1982), p. 265.

[3]Shannon, op. cit., p. 444.

[4]Ibid.

[5]Ibid., pp. 444-445; L.N. Robinson, "The Baker River Development," Journal of Electricity, Vol. 55, No. 12, December 15, 1925, p. 446.

See continuation sheet

In 1965, a mud slide completely destroyed the original reinforced concrete powerhouse. An underground powerhouse was built in 1968. None of the original equipment remains. However, the dam itself is a significant reflection of hydroelectric power plant engineering.

Construction of the facility represented a significant achievement for the utility and the project included some experimental fish ladders which provided partial mitigation for the serious loss of fish runs. But any assessment of the historical impact of this plant must recognize the damage inflicted on both the native inhabitants and the natural environment of the dam site.

9. Major Bibliographical References

Shannon, William D. "The Baker River Development," Journal of Electricity, Vol. 55, No. 12, December 15, 1925, pp. 441-444.

Robinson, L.N. "The Baker River Development," Journal of Electricity, Vol. 55, No. 12, December 15, 1925, p. 446.

☐ 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 approximately two

Quadrangle Name: Lake Shannon Scale: 1:62,500

UTM References

	Zone	Easting	Northing
A	10	593000	5377750
B			
C			
D			

☐ See continuation sheet

Verbal Boundary Description

The nominated property is an irregularly shaped parcel that includes the dam, intake, pressure tunnel, branch tunnel, surge chamber, penstocks and immediate grounds but excludes the powerhouse. It is described thusly:

Beginning at a point 50 feet west of the northwestern edge of the upstream face of the Lower Baker Dam, proceed north 100 feet; then proceed easterly approximately 400 feet (in a line parallel to the upstream face of the dam) to a point on the eastern edge of the intake and pressure tunnel. Follow southerly (downstream) along the eastern edge of the power tunnel

☒ See continuation sheet

Boundary Justification

The nominated property includes the headworks and water conveyance system which historically were part of the hydroelectric power project, but not the nonhistoric power house.

☐ See continuation sheet

11. Form Prepared By

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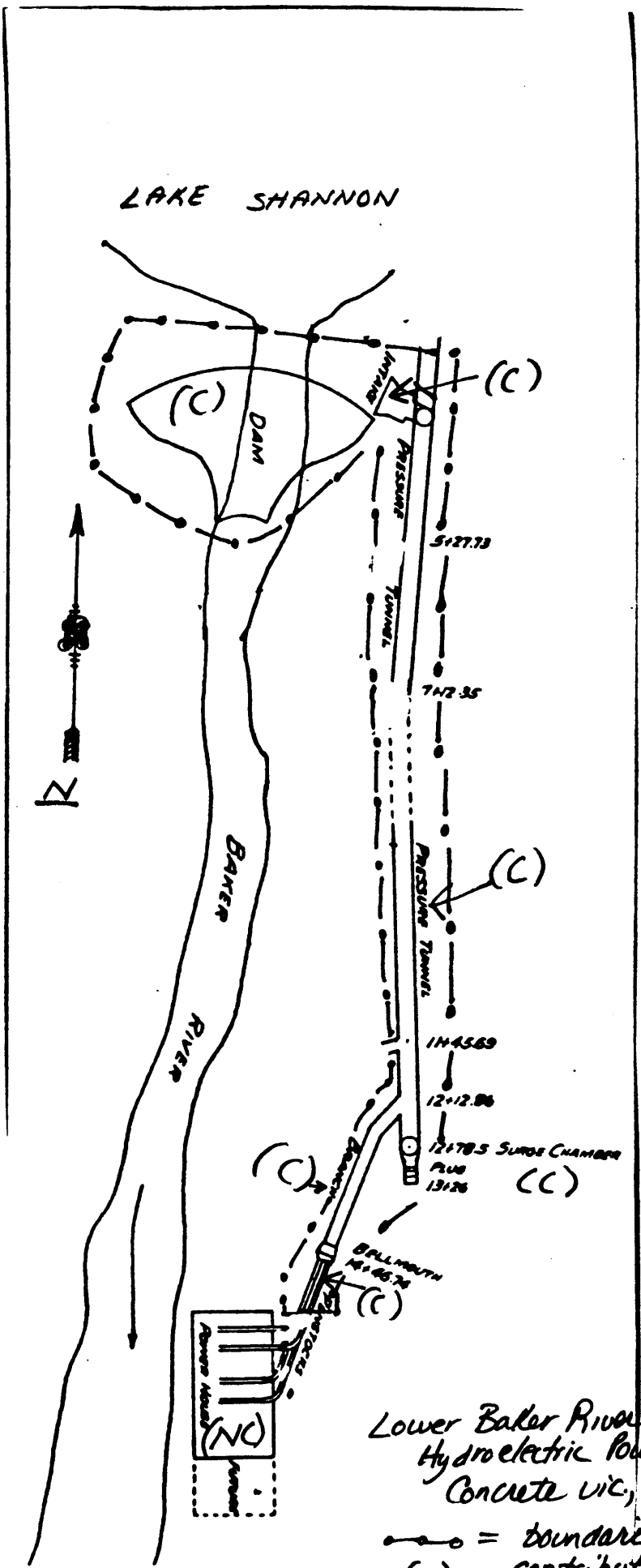
and beyond the surge chamber approximately 1,100 feet; then proceed southwesterly in a line parallel to the branch tunnel and penstocks (approximately 350 feet) to the north wall of the noncontributing power house. Proceed west along the north wall of the powerhouse to the west side of the penstocks and follow the western edge of the penstocks and branch tunnel to the pressure tunnel. Then continue northerly upstream along the west side of the power tunnel approximately 800 feet; then proceed west to the southern downstream face of the dam; and follow the downstream face of the dam westerly and northerly to the point of beginning. See sketch map (drawn to scale of 1"=200') for boundaries.



Lower Baker River
Hydroelectric Power Plant
Concrete vic, Whatcom Co., WA

—o— = boundaries
(C) = contributing
(NC) = noncontributing