United States Department of the Interior
National Park Service

National Register of Historic Places Registration Form

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JUN 27 1991
ARCHEOLOGY AND HISTORIC PRESERVATION

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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 10-900a). Type all entries.

1. Name of Property

historic name Hanford B Reactor
other names/site number 105-B

2. Location

street & number Route 6, Hanford Site, Washington ☐ not for publication
city, town Richland ☒ vicinity
state Washington code county Benton code zip code 99352

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		sites
☒ public-Federal	☒ structure	1	structures
	☐ object		objects
		1	Total

Name of related multiple property listing:

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.

Lois M. Thompson — 2/5/92
Signature of certifying official — Date
Federal Preservation Officer, U.S. Department of Energy
State or Federal agency and bureau

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

[signature] — 6/28/91
Signature of commenting or other official — Date
Office of Archaeology and Historic Preservation, State of Washington
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] — 4/3/92
Signature of the Keeper — Date of Action

6. Function or Use

Historic Functions (enter categories from instructions)	Current Functions (enter categories from instructions)
Defense	Vacant, Not In Use

7. Description

Architectural Classification (enter categories from instructions)	Materials (enter categories from instructions)
Other	foundation walls SEE DISCUSSION BELOW roof other

Describe present and historic physical appearance.

The Hanford B Reactor is a single-pass, water cooled, plutonium production reactor that was constructed during World War II as part of the Manhattan Project. Construction of the Reactor began in 1943 and the facility produced fissionable material for national defense until its deactivation in 1968 (Wahlen 1989).

The property is located on the Hanford Site, a Department of Energy facility in Benton County, southeastern Washington (Figure 1). It is situated on a terrace of glacial flood gravels 0.5 mile south of the Columbia River and 3.5 miles east of Washington State Highway 240 at the Vernita Bridge crossing. The reactor and stack are visible from the highway and could be accessible by a paved road that joins Highway 240 at this location. However, except for guided tours, public access is currently restricted for reasons of safety and security.

The B Reactor is housed inside the 105-B reactor containment building in the B/C Area of the Hanford Site. The containment building is surrounded by various support structures, which are not included in this nomination and are scheduled for demolition in the near future.

The 105-B building is a light-gray, building-block-shaped industrial structure built of reinforced concrete, concrete block, and steel frame (Figure 2). The roof is reinforced concrete or precast concrete tile, depending on the area. Floor space totals 53,750 sq ft. Beside this building is a reinforced concrete exhaust stack 200-ft high and measuring 16 ft-7 in. in diameter at the base. A railroad spur enters the building on the east side, providing access for railroad cask cars.

The main portion of the 105-B building is the reactor or pile, a cubical structure approximately 37-ft wide, 46-ft long, and 41-ft high. The core of the reactor is a graphite cube measuring 36 ft square at the base and 28-ft high surrounded by a cast-iron thermal shield 8-10 in. thick. A biological shield of alternating layers of masonite and steel plates encloses the thermal shield on all sides except the bottom, where it is supported by a 23-ft thick concrete slab. Elevators stand on both the charge and discharge faces of the reactor.

[X] See continuation sheet

In front (west) of the reactor is a large, concrete-enclosed work area, from which the reactor was fueled. Adjacent to the work area are a small laboratory and a valve pit, which houses the main control valves for the process water lines. Approximately 20 ft above the reactor are the vertical control rod mechanisms. Opposite the rear (east) face of the reactor is the fuel storage basin, a large pool which served as a collection, storage, and transfer system for the irradiated fuel elements discharged from the reactor. To the north of the reactor, and separated from it by a 3-ft thick wall of concrete, are the main control room and a suite of offices. Instruments in the control room, most of them hydraulically operated, have been unchanged from the early 1950's. West of the control room is a bay containing an emergency hydraulic power source for shutting down the reactor.

The 105 B building and its contents are intact, with no significant changes having been made since deactivation in 1968. The building is included in the overall surveillance and maintenance program for deactivated facilities and systems in the Hanford 100 Areas.

8. Statement of Significance

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

[X] nationally [ ] statewide [ ] locally

Applicable National Register Criteria [x] A [ ] B [ ] C [ ] D

Criteria Considerations (Exceptions) [ ] A [ ] B [ ] C [ ] D [ ] E [ ] F [XX] G

Areas of Significance (enter categories from instructions)	Period of Significance	Significant Dates
Engineering	Post - 1900	8/9/45
Military		
Politics/government		
Science		

Cultural Affiliation: Euro-American

Significant Person:

Architect/Builder: E.I. DuPont de Nemours and Company

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

The Hanford B Reactor meets criteria for the National Register under criterion (a): having been associated with events that contributed to the broad patterns of history. The Hanford B Reactor contributed in three ways: First, it was the first large-scale reactor to attain full power and, hence, represents the beginning of the nuclear age. Second, it produced the plutonium that was used in the first nuclear explosion and thus represents the beginning of the era of nuclear weaponry, which has had a profound effect on geopolitical history. Third, it was a part of the Manhattan project, which in just three years took nuclear weaponry from the realm of theory into practice in ending World War II. The Hanford B Reactor produced the plutonium that was used in the bomb dropped on Nagasaki, very soon after which the Japanese surrendered.

By 1939 is was apparent to physicists that atomic fission had great civilian and military potential. Because of the coincidence of World War II with this realization, a race ensued to see which of the contending powers could put the military potential into practice. The alliance that could first obtain the necessary materials and master the design problems to produce nuclear bombs would surely win the war. With the concentrated effort of the Manhattan Project, and the labor of the builders of the Hanford B reactor, the United States and its allies won that race. Nuclear power and atomic weaponry have since had a major impact on world affairs, whether or not one views nuclear developments in a positive or negative light.

The Manhattan Project was dedicated to ending World War II swiftly through the use of nuclear weapons. It was a massive cooperative effort including physicists, engineers, chemists, construction laborers of all kinds, and military men and women. The speed with which the Project completed its mission was phenomenal and is unequaled in the history of science and engineering.

[X] See continuation sheet

On December 2, 1942, Enrico Fermi of the University of Chicago demonstrated that plutonium could be created in the core of a nuclear reactor by a controlled, self-sustaining nuclear reaction. The experiment demonstrated that a chain reaction was possible. In January 1943, the Hanford area was chosen as the site for reactors and chemical separation facilities needed to produce enough plutonium for weapons. Based on design of air cooled pile built at Oak Ridge, large-scale reactors were designed and quickly put under construction at Hanford. Housing was built and 45,000 workers were relocated to the site. Work on the B Reactor began in August 1943 (Figure 4) and the reactor was operating 13 months later. Eleven months after that, on July 16, 1945, plutonium produced in the Hanford B Reactor was detonated at the Trinity Site, New Mexico (itself a National Register property). Three weeks later, August 9, 1945, the Fat Man bomb, using plutonium from the Hanford B Reactor exploded over Nagasaki, Japan, killing over 35,000 people. This devastation, following the August 6 destruction of Hiroshima, convinced Japanese leaders to surrender, and demonstrated the destructive power of plutonium.

Lessons learned during operation of the Hanford B Reactor and the use of its plutonium have had far-reaching effects. First, the reactor's operation proved that large-scale, controlled nuclear fission was possible. Nuclear production of electricity (which accounts for over 20% of the Nation's electricity), eventually became possible after scientists worked out early problems with the Hanford B Reactor. Second, the massive power of the Nagasaki explosion has encouraged other nations to develop nuclear weapons capability, with the result that humankind now has awesome destructive power. Finally, fear of this power may have prevented global-scale warfare during the last half century. However one chooses to view these effects, the impact of the construction and use of the Hanford B Reactor has had great technical consequences.

The 100-B Reactor, which at this writing is only 48 years old, is an exception to the "50 years of age" rule. The events surrounding its construction and operation had such far reaching consequences that a perspective of many decades has not been required for them to be widely recognized. For this reason and for the engineering innovations it represents, the site is recognized as an important part of the nation's technological heritage by the American Society for Mechanical Engineering, which in 1976 dedicated it as a National Historic Mechanical Engineering Landmark.

The 100-B Reactor is representative of what may be called the Nuclear Energy theme, for which the National Register also includes such sites as the EBR-1 Reactor at Idaho National Engineering Laboratory and the Trinity Site in New Mexico.

9. Major Bibliographical References

Groves, L. R. 1962. Now It Can Be Told: The Story of the Manhattan Project. Harper and Brothers, New York, New York.

Groueff, S. 1967. Manhattan Project: The Untold Story of the Making of the Atomic Bomb. Little, Brown, and Company, Boston, Massachusetts.

Smyth, H. deW. 1945. Atomic Energy for Military Purposes. Princeton University Press, Princeton, New Jersey.

Wahlen, R. K. 1989. History of the 100-B Area. WHC-EP-0273. Westinghouse Hanford Company, Richland, Washington.

Hewlett, Richard G. and Anderson, Oscar E., Jr., The NewWorld, 1939-1946, Vol. I of A History of the United States, Atomic Energy Commission, University Park. The Pennsylvania State University Press, 1962.

☐ See continuation sheet

Previous documentation on file (NPS):

- [x] 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 # _____
- [x] recorded by Historic American Engineering Record # _____

Primary location of additional data:

- [ ] State historic preservation office
- [ ] Other State agency
- [x] Federal agency
- [ ] Local government
- [ ] University
- [ ] Other

Specify repository: DOE Richland Operations

10. Geographical Data

Acreage of property 9.5 acres

UTM References

	Zone	Easting	Northing
A	11	2 9 7 4 4 0	5 1 6 7 2 8 7
B			
C			
D			

☐ See continuation sheet

Verbal Boundary Description

The Hanford B Reactor is located in the 100B/C Area of the Hanford Site, 0.5 mile south of the Columbia River and 3.5 miles east of the point where Washington Highway 240 crosses the Columbia River at Vernita Bridge. The Building and adjoining land lie within a 650 ft square plot, the center point of which is at the above-referenced UTM coordinate.

Boundary Justification

Boundary includes the structure and space around it as currently defined by fencing.

☐ See continuation sheet

11. Form Prepared By

name/title J. C. Chatters

organization Pacific Northwest Laboratory date 11-13-89

street & number P. O. Box 999 telephone 509/376-9469

city or town Richland state Washington zip code 99352

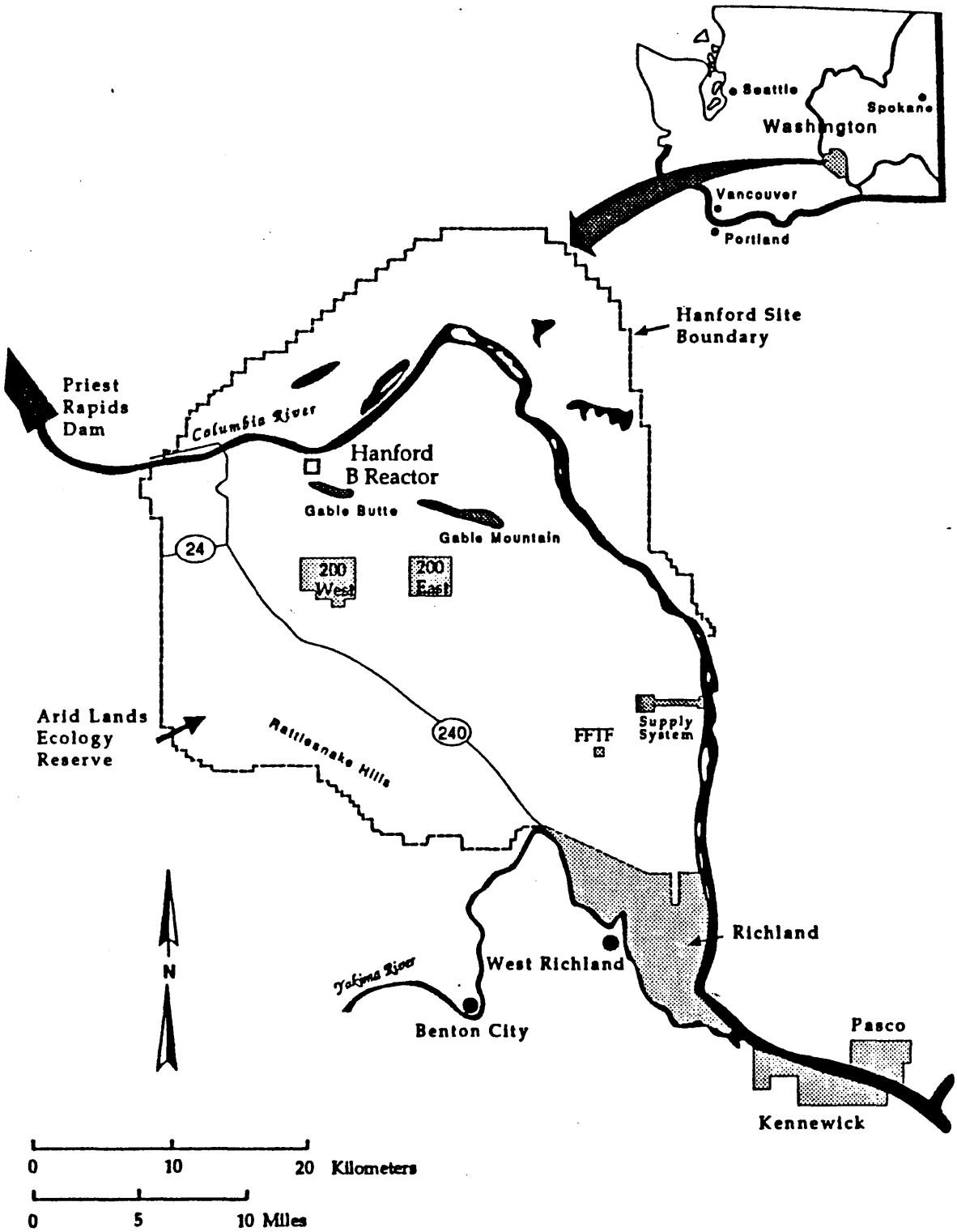

Figure 1. A Map of the Hanford Site, Washington, Showing the Location of the Hanford B Reactor.

NPS Form 10-900-a
(8-86)

OMB Approval No. 1024-0018

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Section number _____ Page _____

SUPPLEMENTARY LISTING RECORD

NRIS Reference Number: 92000245 Date Listed:

Hanford B Reactor
Property Name

Benton WA
County State

N/A
Multiple Name

This property is listed in the National Register of Historic Places in accordance with the attached nomination documentation subject to the following exceptions, exclusions, or amendments, notwithstanding the National Park Service certification included in the nomination documentation.

Signature of the Keeper 4/6/92
Date of Action

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Amended Items in Nomination:

Statement of Significance: The Period of Significance is amended to read: 1943-45.

Under Cultural Affiliation, Euro-American is removed.

This information was confirmed with Charles Pasternak of the Department of Energy at Hanford.

DISTRIBUTION:
National Register property file
Nominating Authority (without nomination attachment)

NPS Form 10-900-a
(8-86)

OMB Approval No. 1024-0018

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Section number _____ Page _____

SUPPLEMENTARY LISTING RECORD

NRIS Reference Number: 92000245 Date Listed: 4/3/92

Hanford B Reactor
Property Name

Benton **WA**
County **State**

N/A
Multiple Name

This property is listed in the National Register of Historic Places in accordance with the attached nomination documentation subject to the following exceptions, exclusions, or amendments, notwithstanding the National Park Service certification included in the nomination documentation.

for Signature of the Keeper — Date of Action: 6/4/92

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Amended Items in Nomination:

Statement of Significance: Under Applicable National Register Criteria, Criterion C should be checked because Engineering is an Area of Significance.

DISTRIBUTION:
National Register property file
Nominating Authority (without nomination attachment)