HISTORIC PROPERTY INVENTORY FORM

State of Washington, Department of Community Development
Office of Archaeology and Historic Preservation
111 21st Avenue Southwest, Post Office Box 48343
Olympia, Washington 98504-8343 (206)753-4011

IDENTIFICATION SECTION

Field Site No. 242-T **OAHP No.** _____ **Date Recorded** 5 March 1999
Site Name Historic Waste Evaporator (Concentrator)
Common
Field Recorder JK Keating, DW Harvey
Owner's Name U.S. Department of Energy, Richland Operations Office
Address P.O. Box 550
City/State/Zip Code Richland, WA 99352

Status

- [x] Survey/Inventory
- [ ] National Register
- [ ] State Register
- [ ] Determined Eligible
- [ ] Determined Not Eligible
- [ ] Other (HABS, HAER, NHL)
- [ ] Local Designation

Photography

Photography Neg. No. HCRL Roll 430, frames 12-18
(Roll No. & Frame No.)
View of East, South and West Facades
Date March 1999

Photo at right: Roll 430, Frame 12.
View of north facade.

Classification [ ] District [ ] Site [x] Building [ ] Structure [ ] Object
District Status [x] NR [ ] SR [ ] LR [ ] INV
Contributing [x] **Non-Contributing** [ ]
District/Thematic Nomination Name Hanford Site Manhattan Project and Cold War Historic District

LOCATION SECTION

Address 242-T Buidling, 200West Area
City/Town/County/Zip Code Richland/Benton County/99352
Twp 12N **Range** 26E **Section** 1 **I/4 Section** NE **1/4 1/4 Sec** SW
Tax No./Parcel No. **Acreage**
Quadrangle or map name Riverland, Washington Quad - 7.5 min series
UTM References Zone 11 **Easting** 298590 **Northing** 5159010
Plat/Block/Lot
Supplemental Map(s)

Description Section

Materials & Features/Structural Types

Building Type Industry
Plan Irregular
Structural System Reinforced Concrete and Prefab Steel
No. of Stories One

Roof Type

- [x] Gable
- [x] Flat
- [ ] Monitor
- [ ] Gambrel
- [ ] Shed
- [ ] Hip
- [ ] Pyramidal
- [ ] Other (specify)

Cladding (exterior Wall Surfaces

- [ ] Log
- [ ] Horizontal Wood Siding
  - Rustic/Drop [ ]
  - Clapboard [ ]
- [ ] Wood Shingle
- [ ] Board and Batten
- [ ] Vertical Board
- [ ] Asbestos/Asphalt
- [ ] Brick
- [ ] Stone
- [ ] Stucco
- [ ] Terra Cotta
- [x] Concrete/Concrete Block
- [ ] Vinyl/Aluminum Siding
- [x] Metal (specify) Corrugated Steel
- [ ] Other (specify)

Roof Material

- [ ] Wood Shingle
- [ ] Wood Shake
- [ ] Composition
- [ ] Slate
- [ ] Tar/Built-up
- [ ] Tile
- [x] Metal (specify) Corrugated Steel
- [x] Other (specify) Concrete
- [ ] Not visible

Foundation

- [ ] Log
- [ ] Post & Pier
- [ ] Stone
- [ ] Brick
- [ ] Not visible
- Concrete
  - [ ] Block
  - [x] Poured
  - [ ] Other (specify)

High Styles/Forms (Check one or more of the following)

- [ ] Greek Revival
- [ ] Gothic Revival
- [ ] Italianate
- [ ] Second Empire
- [ ] Romanesque Revival
- [ ] Stick Style
- [ ] Queen Anne
- [ ] Shingle Style
- [ ] Colonial Revival
- [ ] Beaux Arts/Neoclassical
- [ ] Chicago/Commercial Style
- [ ] American Foursquare
- [ ] Mission Revival
- [ ] Spanish Colonial Revival/Mediterranean
- [ ] Tudor Revival
- [ ] Craftsman/Arts & Crafts
- [ ] Bungalow
- [ ] Prairie Style
- [ ] Art Deco/Art Moderne
- [ ] Rustic Style
- [ ] International Style
- [ ] Northwest Style
- [ ] Commercial Vernacular
- [ ] Residential Vernacular (see below)
- [x] Other (specify) Industrial Vernacular

Integrity (Include detailed description in **Description of Physical Appearance)**

	Intact	Slight	Moderate	Extensive
Changes to plan		x		
Changes to windows	x			
Changes to original cladding	x			
Changes to interior		x		
Other (specify)				

Vernacular House Types

- [ ] Gable Front
- [ ] Gable Front and Wing
- [ ] Side Gable
- [ ] Cross Gable
- [ ] Pyramidal/Hipped
- [ ] Other (specify)

NARRATIVE SECTION

Study Unit Themes (check one or more of the following)

	Agriculture		Conservation		Politics/Government/Law
	Architecture/Landscape Architecture		Education		Religion
	Arts		Entertainment/Recreation		Science & Engineering
	Commerce		Ethnic Heritage (specify)		Social Movements/Organizations
	Communications		Health/Medicine		Transportation
	Community Planning/Development		Manufacturing/Industry	x	Other (specify) Cold War Era
			Military	x	**Study Unit Sub-Theme(s)** Waste Management (Liquid)

Statement of Significance

Date of Construction 1951 Architect/Engineer/Builder General Electric Company

x In the opinion of the surveyor, this property appears to meet the criteria of the National Register of Historic Places.

x In the opinion of the surveyor, this property is located in a potential historic district (National and/or local).

Waste Evaporator (or Concentrator) 242-T was one of the first evaporator facilities constructed and operated on the Hanford Site in the early 1950's (the other was 242-B). The waste evaporators were built to reduce the amount of liquid or moisture in the 200 Area single shell waste tanks which held high level radioactive liquid wastes created during the plutonium extraction processes in the 200 Area separations and concentration plants. This was accomplished by pumping waste from the single shell tanks using a floating section (to ensure the least amount of sludge is cycled through the system) to the 118-TX storage pump tank until it has an adequate amount to pump to the evaporator feed tank. Waste was then fed to the two preheaters, whose coils are heated by steam condensate being routed from the evaporator coils to the 241-T retention basin. Preheated waste was then gravity fed to the 242-T evaporator tank where the liquids were boiled down by using steam generated heat. This process left the waste in a more solid and concentrated form (called slurry) which was pumped by the condenser back into the waste tanks in the 241-TX Tank Farm. As the slurry waste cooled in the tanks it became more solidified.

The evaporation process also created low level condensate liquid waste that was disposed in trenches and cribs or recycled back through the evaporator process. Solid condensate (in the form of salt cake) was deposited in specific 241-TX Tank Farm tanks. The cyclone separator extracted liquid vapor and pulled it through the scrubber, a vacuum, a deentrainer, heaters, filters, and finally exhausted it through a stack.

The 242-T Waste Evaporator operated from 1952 to 1955 and was then put on inactive status. 242-T was reopened in 1965 after undergoing modifications to increase capacity and allow for a continuous flow of operations. In 1973, additional modifications to the building (including an additional feed from the 241-Z Building and the 242-RA receiver tank vault) prepared it for neutralizing and concentrating waste from the Plutonium Finishing Plant. The building performed this function until 1976, when there was a failure in the evaporator and it was shut down. However, the 242-T Building received waste from the Plutonium Finishing Plant until November 1980 and the control room has been used to monitor saltwell pumping activities. The 242-T Waste Evaporator reduced a total volume of approximately 33,552,000 gallons of radioactive waste during its operation.

The evaporation process has significantly decreased the amount of waste in the tank farms. More specifically, it concentrated the liquid waste thus providing more storage space in the tanks. A secondary benefit of evaporation was that it reduced the potential for liquid waste leaks because it decreased the amount of liquid in the waste. Waste evaporation has been one of the major technologies used to manage the liquid waste stored in the Hanford Site tank farms. It is therefore the conclusion of the U.S. Department of Energy that Building 242-T is eligible for inclusion in the National Register of Historic Places under Criterion A as a contributing property within the Hanford Site Manhattan Project and Cold War Era Historic District. (For more information on Hanford Site wastes see Section 6 Waste Management)

Description of Physical Appearance

The 242-T building is located between the 241-TX and 241-TY Tank Farms in the 200 West Area. The facility contains a two story high (but only one floor), process building measuring 43 feet by 43 feet by 22 feet high with a total area of 1,849 ft^2. It is constructed of reinforced concrete masonry walls and is divided by one foot concrete walls into three rooms/cells for the feed tank, evaporator, and catch tanks. These rooms have concrete floors and a 5 inch thick, flat roof of removable concrete sections. The roof has been modified with the addition of steel beams (in 1982) for extra reinforcement and weather protectant spray foam; both of which are visible on the roof. The west and south facades contain access doors on the ground level and the west facade also contains a metal staircase leading to a second story door leading to a sample balcony within the condensate tank room. Along the north facade is air supply equipment, building exhaust stack, and other exhaust equipment and piping which connects to several part of the 242-T Building. On the east facade is a metal staircase leading to a platform with equipment cabinets near the roof line. Two structures associated with the main process building are located to the south; 242-TA Vault and 242-TB Vessel Vent Exhaust Building. 242-TA consists of an underground concrete receiver tank with a steel cover at ground level. This tank is connected to the feed cell in 242-T, 242-TB, and the Plutonium Finishing Plant acid waste supply. 242-TB consists of a corrugated steel, gable roofed shack connected to 242-T's process building via a pipe and its function is to exhaust 242-T tank fumes.

See Continuation Page

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Description of Physical Appearance Continued

Attached to the east side of the process building, and separated by 2 feet of concrete shielding, is the one story, operating/control building (242-T-271) measuring 25 feet by 36 feet by 15 feet high with a total of 920 ft^2. It is constructed of prefabricated steel with corrugated steel siding on the walls and roof. It sits on a concrete foundation. The gable roof contains ventilators and a standard metal louver on the east facade. An access door located on the north facade contains one single pane window. The interior walls are made of gypsum board and the ceiling are made of transite in the change room and of gypsum board elsewhere. This section contains a control room (15 feet by 23 feet), a change room, a restroom, and a lunch room. The control room contains instrument panels and a Continuous Air Monitoring system. Two additions were added to the west facade of the control building at an unknown date. One addition is a small corrugated steel shack (241-TX-701) with a metal door on the north facade and a gable corrugated steel roof. The second addition is a two story wooden building (241-T-601) used to store seven tanks of chemicals used in the evaporation process; it has a sliding wooden warehouse type door on the east facade and a south sloping shed type roof.

The feed tank is constructed of stainless steel with a sloping floor towards a drain, has a capacity of 4,200 gallons, and is equipped with instruments to measure levels and take samples. The two preheaters are constructed of stainless steel with equipment to circulate heat, are angled to be self draining, and have a capacity of approximately 47 gallons each. The evaporator is also stainless steel with a dished floor, a capacity of 11,000 gallons, is heated by four coils, and contains instruments operated and monitored in the control room. The cyclone separator, catch tank, and packed scrubber are stainless steel and have capacities of 150, 95, and 475 gallons respectively. The condenser is a shell-tube type made of mild steel and has two associated catch tanks sloped towards a drain. The decontamination tank is located north of the building and stored decontamination solutions to clean the building's tanks and equipment.

The evaporator feed tank, preheaters, cyclone catch tank, packed scrubbers, and decontamination tank were originally located in the 221-U Building and modified for use with the evaporation process and support functions of the 242-T Building. The 242-T Building interior was not examined due to high contamination and hazards.

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