Brief History of the Hanford Site

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Founding

• Acquired February 1943
  – 640 square miles in southeast Washington
  – Conditions perfect for Manhattan Engineer District requirements

• Construction began March 1943
  – Army Corps of Engineers and DuPont
Original Mission

• Produce plutonium for world’s first atomic weapons
• Mission succeeded
  – Trinity bomb test (July 1945)
  – Nagasaki weapon (August 1945)
World War II Operations

- 29 months from beginning of construction to WWII Victory (March 1943-August 1945)
- Huge construction and operations accomplishments
  - Complete fuel fabrication facilities
  - First three full-size reactors in world
  - First two full-size radiochemical separations plants
  - Plutonium isolation facility
  - 64 single-shell tanks for waste storage
  - Site infrastructure (i.e. roads, communications, electrical, water) for self-contained operations
  - Construction camp housing and feeding 51,000 workers
  - City of Richland built up from capacity for 300 to 17,000 people
The Hanford Process
The Hanford Process, con’t
WWII Tank Farm under construction, 1944
Early Postwar Developments

• 1946
  – Production lull and period of indecision
  • Hanford Site employment fell by half (10,000 to 5,000 operations workers)
  – Atomic Energy Act of 1946: AEC created
  – Winston Churchill’s Iron Curtain Speech

• 1947: AEC ordered huge expansion
First Postwar Expansion

• Largest peacetime construction project in American history to that point
  – Cost more than original Hanford construction
  – Two more reactors built
  – Plutonium Finishing Plant
  – 42 additional waste storage tanks
  – Expansion of Richland to 23,000
  – Construction of trailer/barracks enclave for construction workers
Plutonium Finishing Plant new in 1949
Plutonium “button” or “puck”
Cold War Escalates

• 1949 - Soviets explode 1st atomic bomb
  – Mao Tse-tung’s Communist Forces victorious over Nationalist forces in China
  – NATO (North Atlantic Treaty Organization) formed

• 1950 – President Truman decides to pursue development of H-bomb
  – Korean War begins (June)
  – Communist Chinese enter Korean conflict (December)

• 1952 (U.S.) and 1953 (U.S.S.R.) explode hydrogen bombs
Second Postwar Expansion
(Korean War Expansion)

- REDOX Plant
- C Reactor
- 2 evaporators for tank waste
- 18 additional waste tanks
- Major 300 Area laboratories expansion
- U Plant activated and UO3 Plant constructed
Hanford’s 2nd Postwar Expansion: C Reactor under construction, 1951
Cold War Escalates Further

• 1952 – Dwight D. Eisenhower elected president
  – Policy of massive retaliation
    • Deterrent value of large defense production facilities
    • Purposefully leaked information about new facilities

• 1955 – Nikita Khrushchev comes to power in Soviet Union
Third Postwar Expansion
(Second Korean War Expansion)

• President Eisenhower’s Program X
  – KE and KW Reactors built
  – PUREX Plant
  – Plutonium recycle facilities
  – 21 additional waste tanks
K West Reactor under construction, 1954
Hanford’s Peak Production Years

1955-1960 – All 8 single-pass reactors undergo “Modifications for Increased Production”
  – Reactor power levels soar

1956 – PUREX begins operations
  – WWII processing plants close
  – Production capacity quadruples in 4 years
  – REDOX relegated to “special operations”
  – PUREX becomes Hanford’s workhorse

1957 – N Reactor construction authorized in response to Sputnik
President John F. Kennedy dedicates N Reactor  9/23/63
Hanford To Cut Back In 1965

Cutoffs at Hanford will not take place until 1965. The Herald staffs today, Dr. Glenn Seaborg, chairman of the Atomic Energy Commission, said. President Johnson today said production of nuclear weapons would be reduced and that four plutonium-producing reactors would be shut down.

No specific location was given, but Dr. Seaborg said that reactors at Hanford and at Savannah River, Ga., are concerned.

1965 CLOSURE

There was no indication which Hanford reactors would be affected, but it is assumed they would be the three oldest, built during the war years. The first went into service in December, 1944, and the third was put into operation early in 1945.

Three of the nine reactors at Richland and one of the five at Savannah River are to be shut down over a 13-month period beginning July 1, 1964, Dr. Seaborg said.

The reactor shut down will result in a cut in production of about $2 million, by July 1965. When the shut downs are fully in effect, the employment level at Richland and Savannah River will be reduced by about 1500 positions.

Pasco Seeks March Vote

Hanford to Cut Back in 1965

The cuts are part of a larger effort to reduce the nation's nuclear stockpile and to shift resources to other priorities. The Nuclear Council is to assist in diversification of the facilities at Hanford so that they may be used by other government agencies and private industry for the benefit of our nation.

The Tri-Cities have always absorbed changes and adjustments when they have appeared and have always gone forward even stronger as a result of them. We always will. The text of President Johnson's message to Congress is on page 15. Governor's statement on page 1.

Tri-City Herald

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$9-Million Plant Asked For Hanford

The Atomic Energy Commission is asking $9 million to build a fission-products plant at Hanford, Sen. Harry M. Jackson, D-Wash., said today.

Jackson said he understands the AEC will seek authority in its 1965 budget to proceed with the plant in a manner that will permit participation by private industry.

Fission products are among the radioactive byproducts that the government seeks to control. Jackson said that the AEC's proposal would be a step toward reducing the nation's nuclear stockpile.

SPACESHIPS

Jackson said the many potential uses include generation of power for the operation of space satellites and other space vehicles.
Hanford Cut-Backs 1960s, 1970s

• All 8 single-pass reactors close between 1964 and 1971
• N Reactor closes briefly in 1971
  – Re-opens for electric power production only
• Fabrication work ends at PFP, 1965
• Plutonium Reclamation Facility closes 1978-1984
• PUREX closes 1972-1983
Production Cutbacks: Experiments with Non-Defense Work

- PFP’s defense production lines make special oxides for power reactor experiments
- Special radioisotopes extracted for NASA and other programs
- N Reactor operates for power production only
- Fast Flux Test Facility built as largest national experimental facility for power reactor technology
- 28 double-shelled waste tanks built
FFTFT dedication, 1980
Hanford Production Facilities Reactivated

• PUREX retrofitted with multiple environmental upgrades, and oxide conversion facilities
• N Reactor re-tooled to produce weapons-grade material
• PFP and PRF upgraded; reopen for defense material production 1983 and 1984
Hanford Reactor Production over Time

Thermal Capability, Megawatts

End of Year

43 45 50 55 60 65 70 75 80 85 90

- B. D. Reactors Start
- H. DR. reactors Start
- KE. KW reactors Start
- Reactor Power Upgrades
- Reactor shut down
- All reactors Closed except N
- Reagan announces Strategic Defense Initiative, PUREX Plant restarts
- N reactor shuts down
- Reagan and Gorbachev sign INF Treaty
- PUREX Plant shuts down
- Hanford Production ends - Cold War ends

Hanford Reactor Production over Time.
Cold War Ends
K East Reactor basins overflowing, leaking, 1962
Waste Cleanup Project: Largest in the World

- Hanford’s Tri-Party Agreement (TPA-Federal Facility Agreement and Consent Order)
  - May 1989
  - Revised many times; living document

- Hanford cleanup funded at nearly $2B per year
First MCO leaves KW Basin  12/07/2000
Hanford Site Wastes
(expressed in curies)

- Facility Contamination: 2%
- Burial Ground Wastes: 1%
- Plutonium Finishing Plant Wastes and Special Nuclear Materials (alpha radionuclides): 10%
- Spent Nuclear Fuel: 30%
- Cs-137/Sr-90 Capsules: 50%
- Tank Wastes: 250 Million Curies
- Misc.: 55 Million Curies
Preserving our History