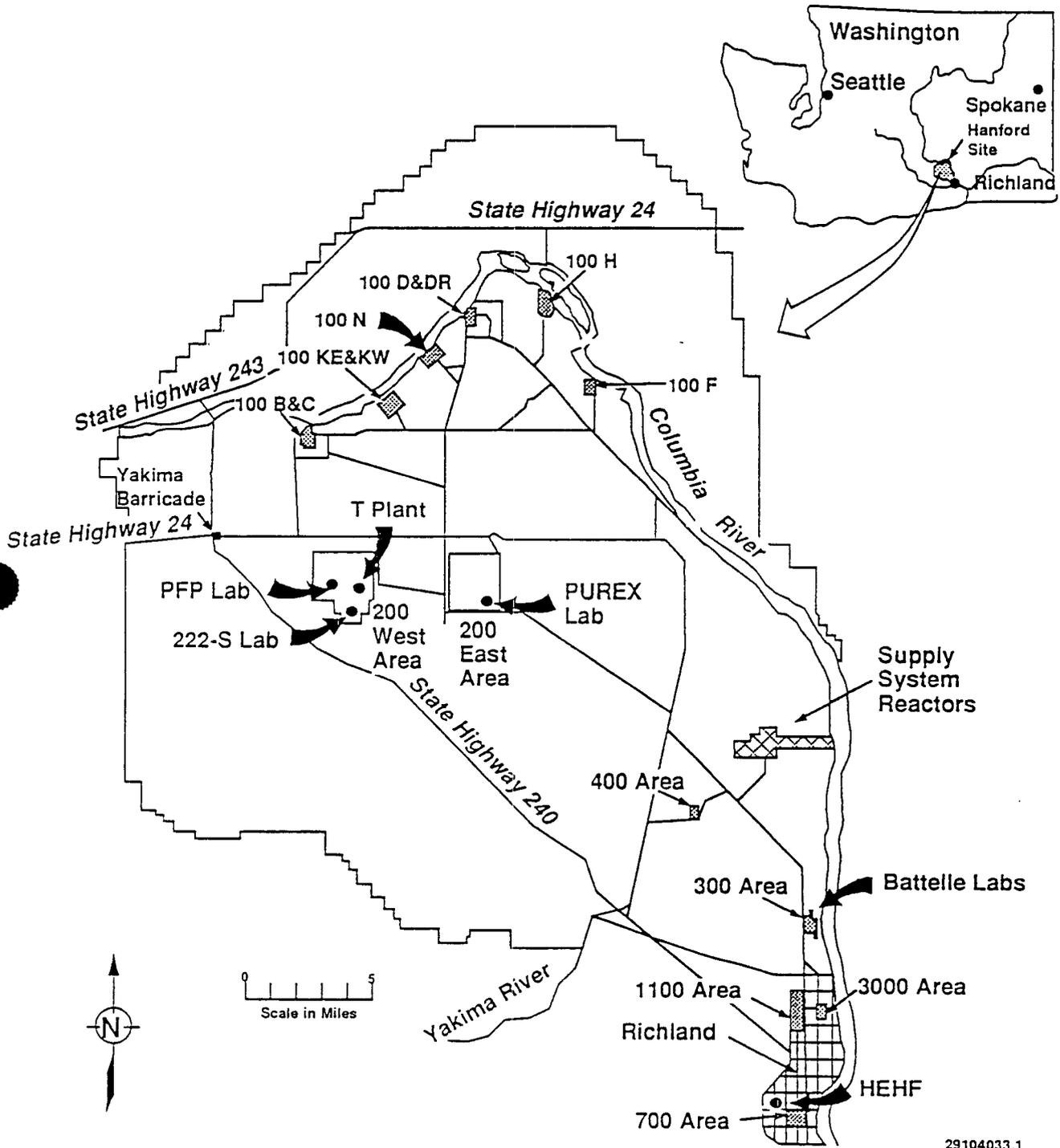


**Nuclear Waste Technical Review Board
Engineered Barrier System Panel Meeting**

**An Overview of the Hanford Site
Tank Waste Remediation System
Program and Recent Changes**

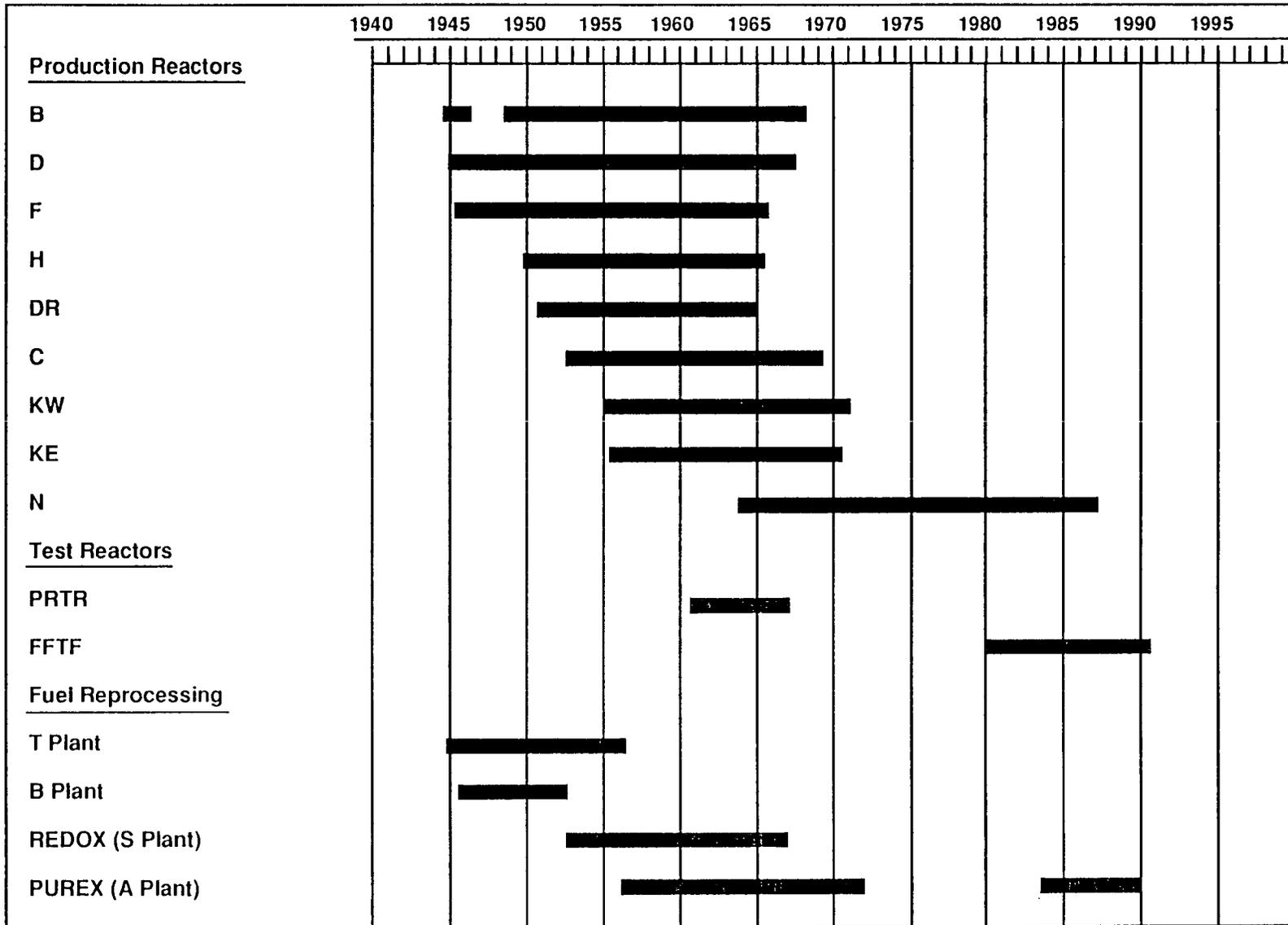
**Don Wodrich, Manager
TWRS Technology Integration and External Interface
Tank Waste Remediation System
Westinghouse Hanford Company
(509) 372-1139**

**Richland, Washington
June 15, 1994**

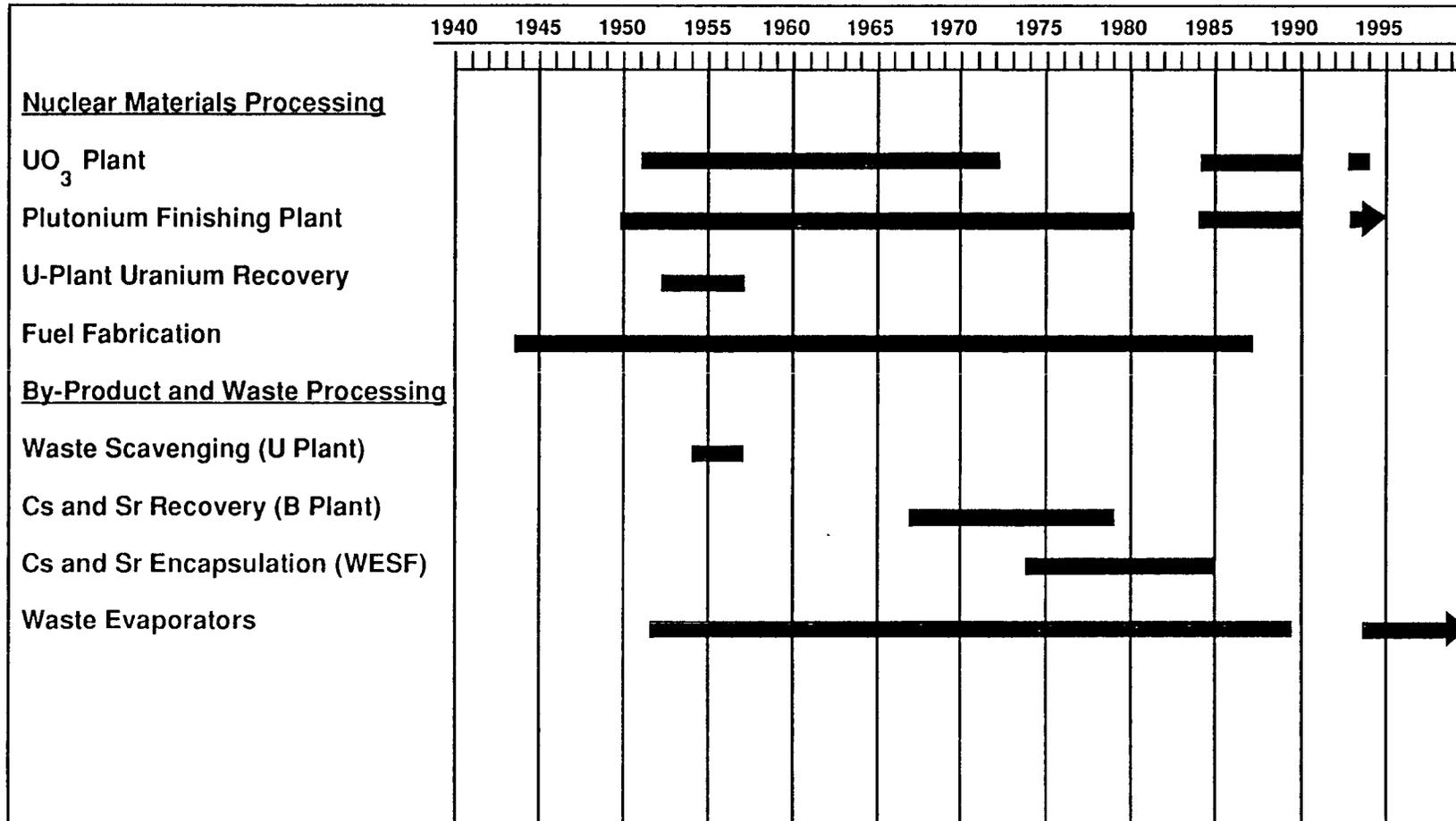


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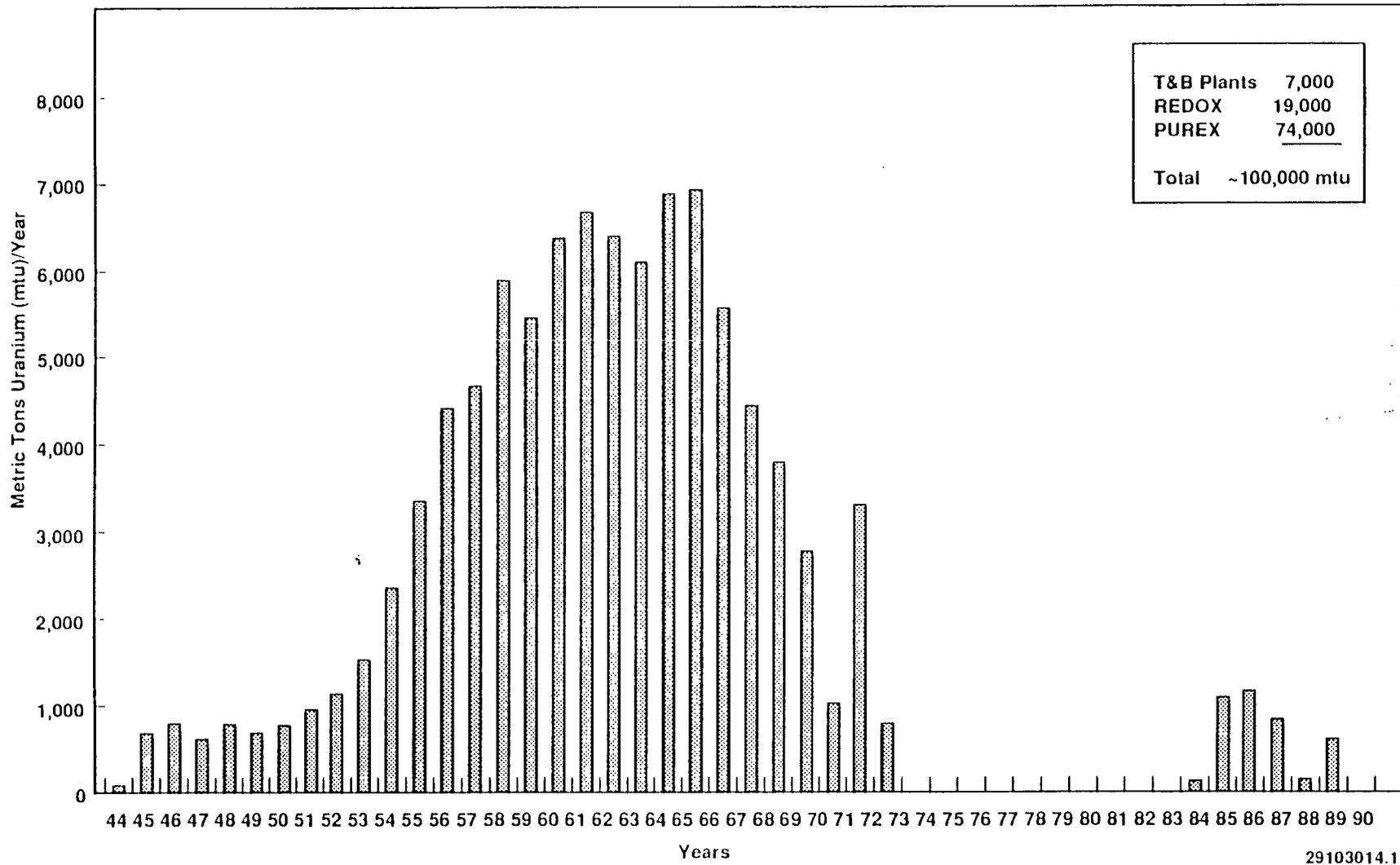
Major Plant Operating Periods



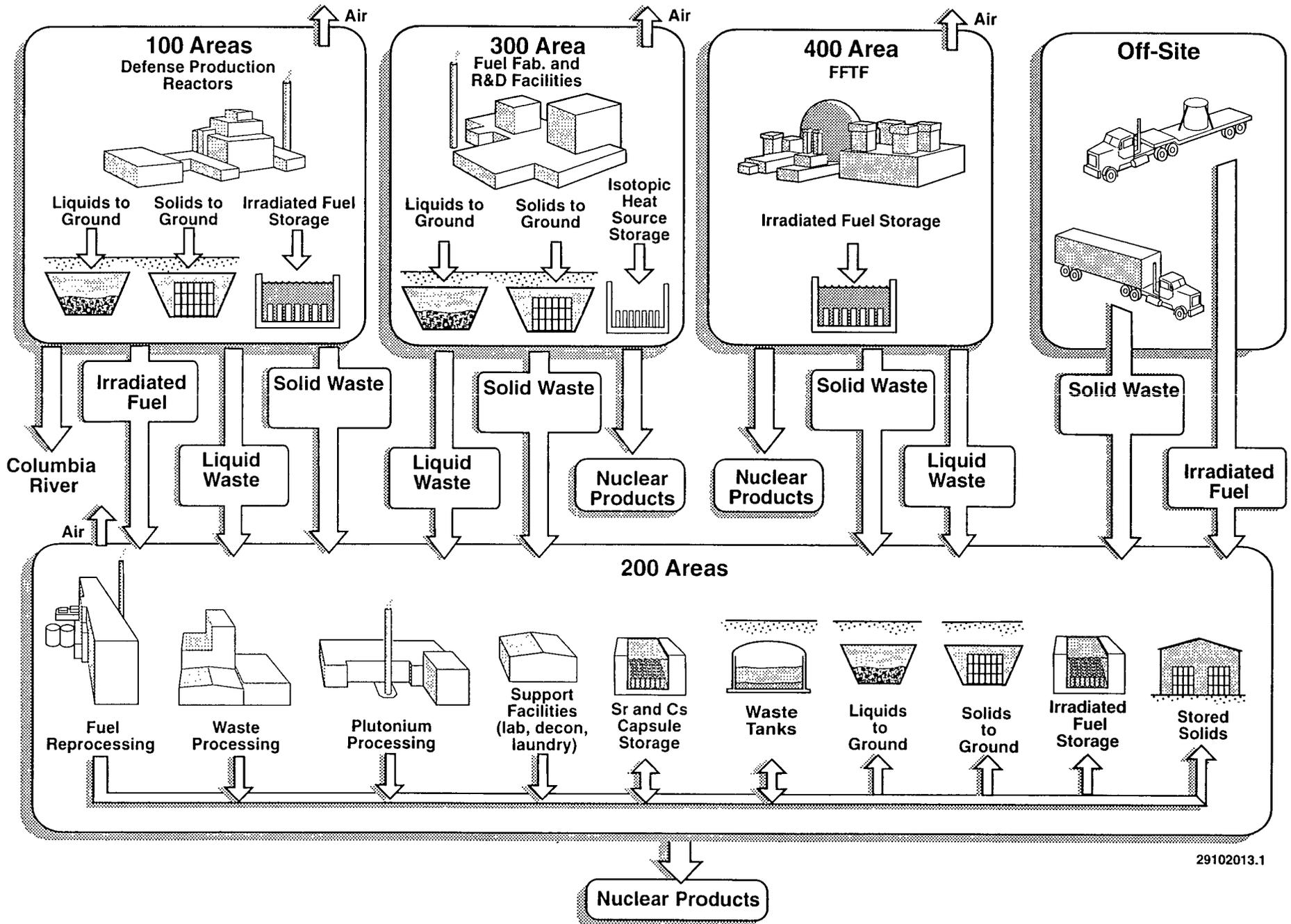
Major Plant Operating Periods (Cont.)



Fuel Reprocessed



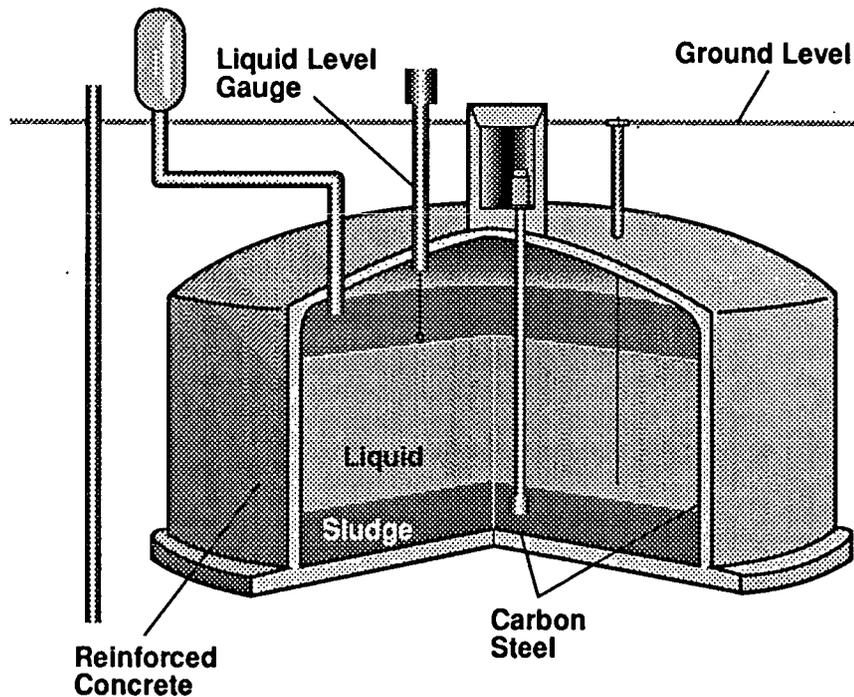
Hamford Radioactive Material Flow Diagram



Wastes Consist of:

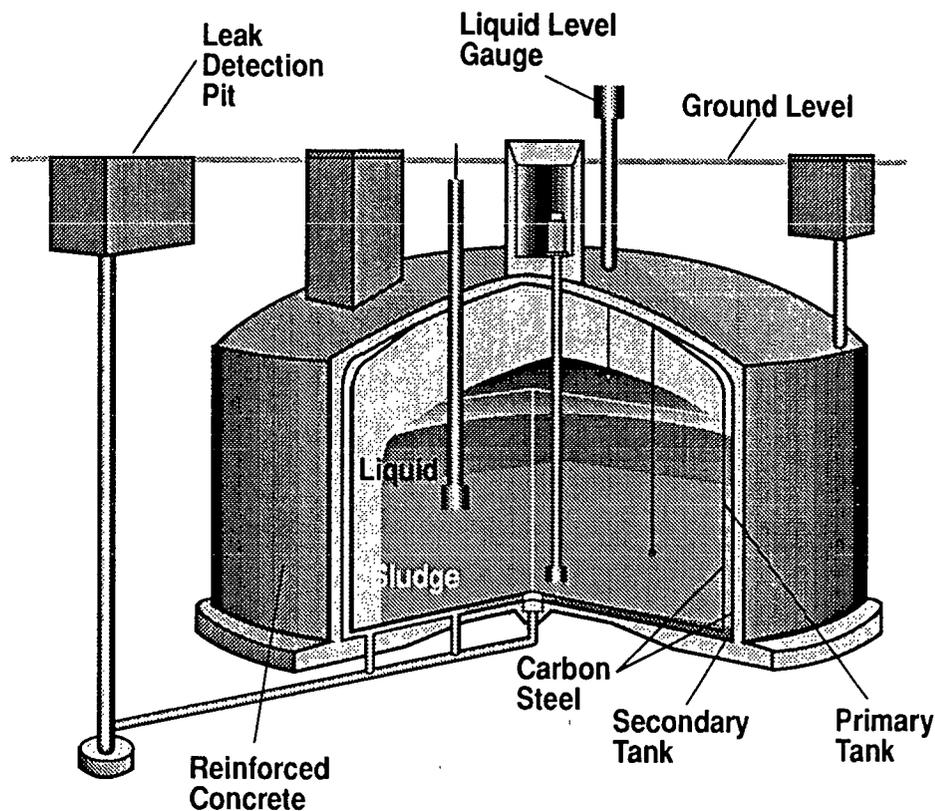
- **Single-shell tank waste**
- **Double-shell tank waste**
- **Cesium and strontium capsules**

Single-Shell Tanks



- 149 Tanks Constructed 1943-64
- ~210 m³ to 3,800 m³ Capacity (55 kgal to 1 Mgal)
- Bottom of Tanks at Least 50 m (150 Feet) Above Groundwater
- No Waste Added to Tanks Since 1980
- Tanks Currently Contain:
 - ~136,800 m³ (36 Mgal) of Salt Cake, Sludge, and Liquid
 - ~555 x 10¹⁶ Bq (150 MCi)
- 67 Are Assumed to Have Leaked ~ 3,800 m³ (~1 Mgal)

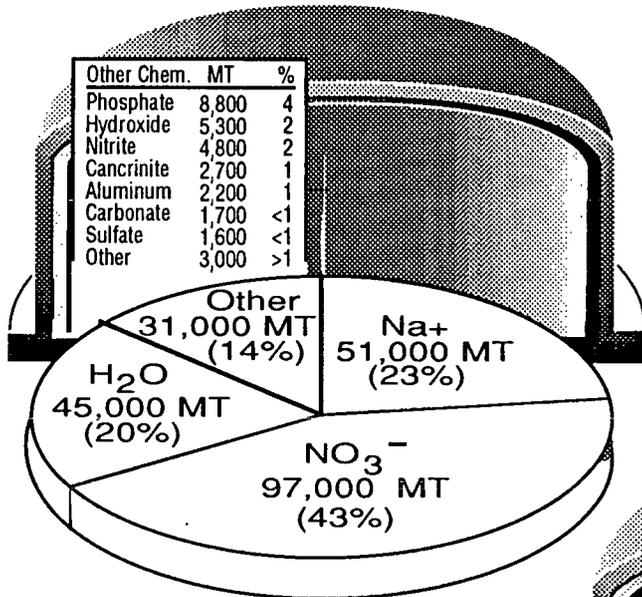
Double-Shell Tanks



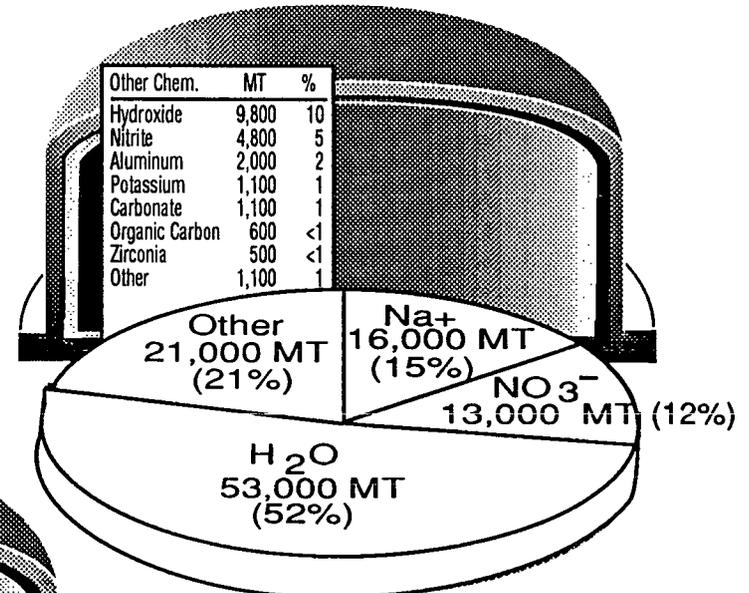
- 28 Tanks Constructed Between 1968-86
- ~3,800 m³ to 4,300 m³ (1 to 1.14 Mgal) Capacity
- Tanks Currently Contain
 - ~ 95,000 m³ (25 Mgal) of Mostly Liquids (Also Sludges and Salts)
 - ~ 360 x 10¹⁶ Bq (100 MCi)
- None Have Leaked

Estimated Chemical Inventory of Hanford Tank Waste

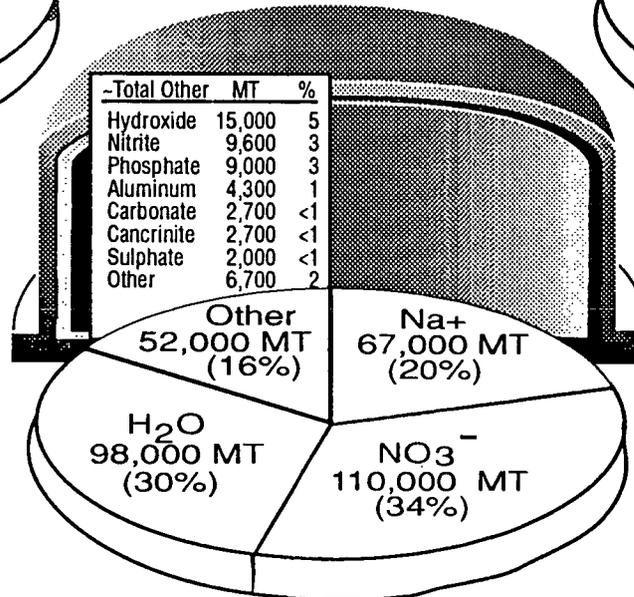
MT = metric tons



Single-Shell Tanks
224,000 Metric Tons



Double-Shell Tanks
103,000 Metric Tons



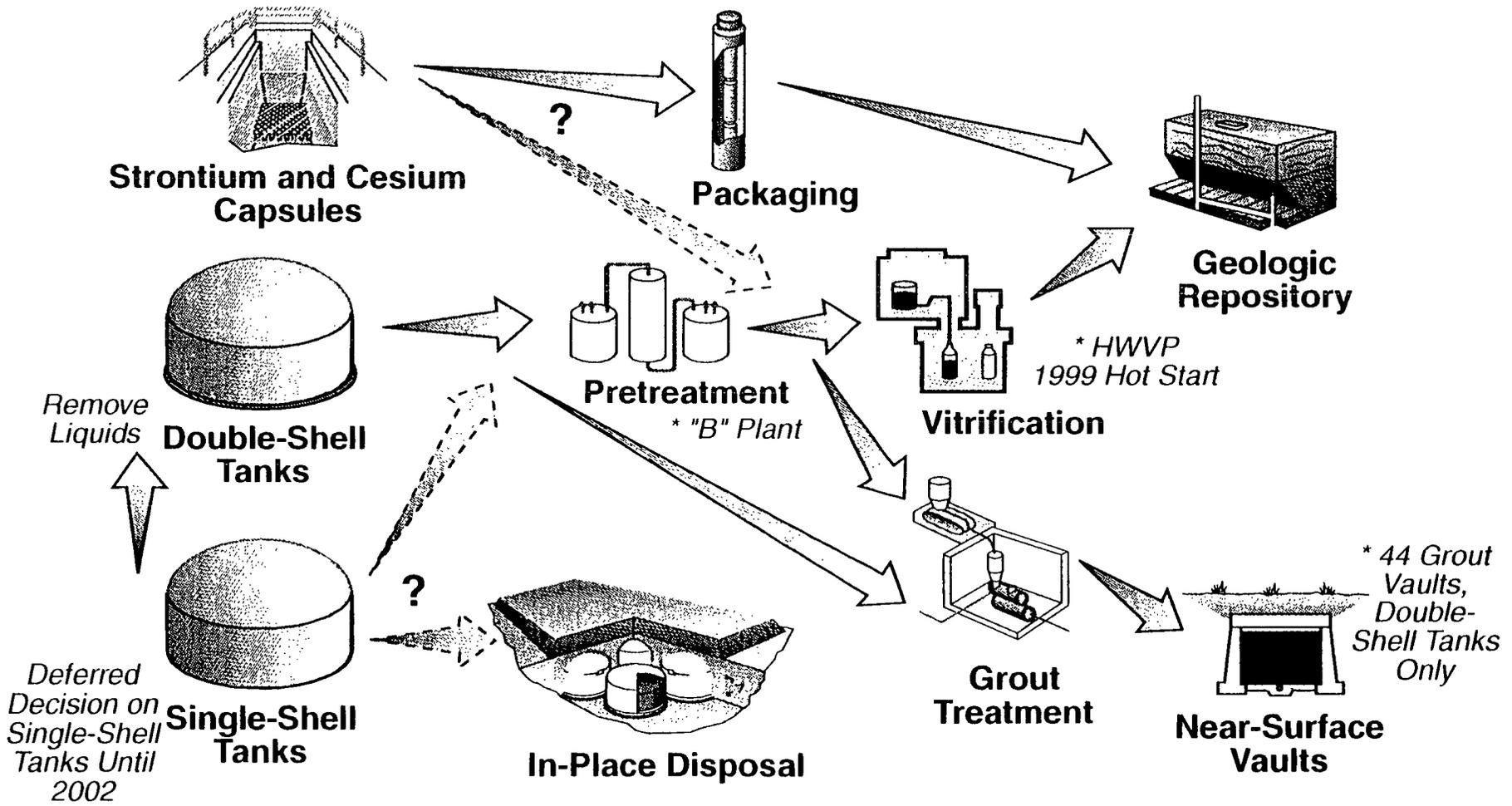
Total of All Tanks
327,000 Metric Tons

Note: Cancrinite is a zeolitic mineral complex sodium aluminum silicate

Photo of Cesium and Strontium Capsules

1988 Hanford Defense Waste – Environmental Impact Statement Baseline

Basis for 1989 Tri-Party Agreement



Key Program Changes Since Signing Tri-Party Agreement

- **Waste tank safety issues identified**
- **Retrieval of waste from all single-shell tanks now planned, four-fold increase in waste volume**
- **Use of existing facilities for pretreatment determined not practical nor cost effective**
- **Concerns raised about the grout low-level waste form**

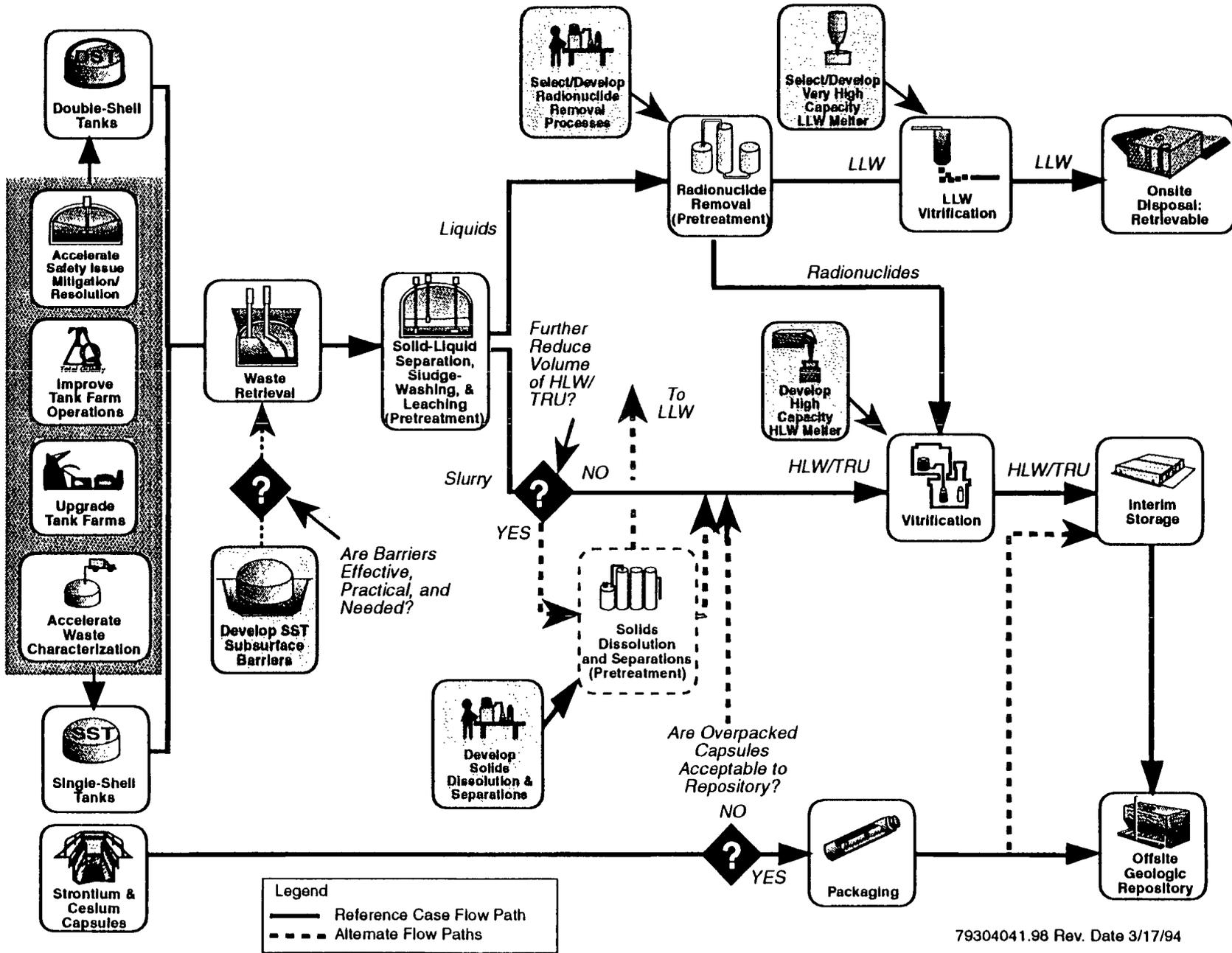
Current TWRS Strategy Developed Over Many Months

- **Broad range of alternatives considered and evaluated**
- **Stakeholder values sought and incorporated**
 - **Public meetings in 5 northwest cities**
 - **Stakeholder Tank Waste Task Force formed**
 - **Formal public review and comment period held**
- **Funding constraints recognized**
- **Negotiated with regulators**
 - **Amended Tri-Party Agreement signed January 25, 1994**

Public Input Applicable to TWRS

- **Safety First: Protect the workers and resolve tank safety issues**
- **Tank Farm upgrades should be high priority**
- **No more delays, get on with cleanup. Do what you know NOW**
- **No Grout: Want better low-level waste form and retrievability**
- **Use available technology while leaving room for future innovation**
- **Get the waste out of tanks and in stable form**
 - **Glass is an acceptable waste form**
- **Minimize amount of new ground contaminated**
- **Accept fact that waste will be at Hanford a long time**
 - **Make sure its stored safely**
- **Minimize transportation of waste offsite**
- **Use tax payer's money wisely**

Hanford Tank Waste Remediation System Strategy



TWRS Major Tri-Party Agreement Milestones

Milestone	Previous Date	Current Date	Reason for Change
<ul style="list-style-type: none"> • Mitigate/Resolve Tank Safety Issues - 13 interim milestones 	None	9/2001	Seriousness of Safety Issues Amplified Since 1989
<ul style="list-style-type: none"> • Complete Single-Shell Tank (SST) Interim Stabilization 	9/1995	9/2000	Program was Suspended Due to Safety Concerns
<ul style="list-style-type: none"> • Provide Additional Double-Shell Waste Tanks 	None	12/1998	Importance of Maintaining Adequate Storage Space for Safety Issue Resolution, Minimizing SST Leakage, and Moving Forward with Waste Treatment
<ul style="list-style-type: none"> • Double-Shell Tank Space Evaluation 	None	9/1994 (Annually)	
<ul style="list-style-type: none"> • Complete Tank Farm Upgrades – 7 Interim Milestones 	None	6/2005	A Major Upgrade Program Established Since 1989
<ul style="list-style-type: none"> • Tank Waste Characterization – Complete Two Cores from Each SST (149) Changed to : – Issue Tank Characterization Reports for All SSTs and DSTs (177) 	9/1998	9/1999	Decision to Plan on Retrieving All SST Waste, Focus on Tank Safety Issues, and Better Understanding of Needs
<ul style="list-style-type: none"> • Complete Closure of All Single-Shell Tank Farms 	6/2018	9/2024	Decision to Plan on Retrieving All SST Waste, Minimize Number of New DSTs, Reduce Resource Profile Peaks; Concern That Tanks Will Leak When Sluiced.
<ul style="list-style-type: none"> – Develop SST Waste Retrieval Technology 	6/1994	9/1994	
<ul style="list-style-type: none"> – Complete Evaluation and Testing of Sub-Surface Barriers 	None	9/1997	
<ul style="list-style-type: none"> – Initiate Full Scale Demonstration of Waste Retrieval 	10/1997	10/1997	
<ul style="list-style-type: none"> – Initiate Full Scale Tank Farm Closure Demonstration Project Change to: – Initiate Tank Waste Retrieval From One SST 	6/2004	12/2003	
<ul style="list-style-type: none"> – Complete Waste Retrieval from All SSTs 	None	9/2018	

TWRS Major Tri-Party Agreement Milestones

Milestone	Previous Date	Current Date	Reason for Change
<ul style="list-style-type: none"> • Complete Pretreatment Processing of Hanford Waste <ul style="list-style-type: none"> – Initiate Pretreatment of DST Waste – Replaced by Following Milestones: <ul style="list-style-type: none"> – Start Construction of LLW Pretreatment Facility – Start Hot Operations of LLW Pretreatment Facility – Start Hot Operation of HLW Pretreatment Facility 	<p style="text-align: center;">None</p> <p style="text-align: center;">TBD</p> <p style="text-align: center;">None</p> <p style="text-align: center;">None</p> <p style="text-align: center;">None</p>	<p style="text-align: center;">12/2028</p> <p style="text-align: center;">11/1998</p> <p style="text-align: center;">12/2004</p> <p style="text-align: center;">6/2008</p>	<p>Reduce Quantity of Radionuclides Disposed Onsite. Use Proven Technology to Extent Practical</p>
<ul style="list-style-type: none"> • Complete Vitrification of Hanford High-Level Waste <ul style="list-style-type: none"> – Initiate Construction of HLW Vitrification Facility – Initiate Hot Operations of HLW Vitrification Facility 	<p style="text-align: center;">4/1992</p> <p style="text-align: center;">12/1999</p>	<p style="text-align: center;">12/2028</p> <p style="text-align: center;">6/2002</p> <p style="text-align: center;">12/2009</p>	<p>With Minimum Pretreatment, Significantly Higher Capacity Needed to Vitrify All DST and SST Waste; Startup of Sister Plant at Savannah River Delayed; Accomodate Accelerated LLW Vitrification Facility</p>
<ul style="list-style-type: none"> • Complete Vitrification of Hanford Low-Level Tank Waste <ul style="list-style-type: none"> – Select Reference Melter – Initiate Construction of LLW Vitrification Facility – Initiate Hot Operations of LLW Vitrification Facility 	<p style="text-align: center;">None</p> <p style="text-align: center;">None</p> <p style="text-align: center;">None</p> <p style="text-align: center;">None</p>	<p style="text-align: center;">12/2028</p> <p style="text-align: center;">6/1996</p> <p style="text-align: center;">12/1997</p> <p style="text-align: center;">6/2005</p>	<p>Public Opposed to Grout; Vitrification Provides Better Waste Form, Retrievability, and Smaller Volume</p>
<ul style="list-style-type: none"> • Complete 14 Grout Campaigns of Double-Shell Tank Waste 	<p style="text-align: center;">12/1996</p>	<p style="text-align: center;">None</p>	<p>Public Opposed to Grout; Program to be Cancelled</p>