

Proposed Plan to Remediate 21 Waste Sites Containing Plutonium and Cesium on Hanford's Central Plateau



Tri-Party Agreement

U.S. Department of Energy
Washington State Department of Ecology
U.S. Environmental Protection Agency

Purpose of Meeting and Agenda

Purpose

- Provide information and receive input on the Proposed Plan for 200-CW-5, 200-PW-1, 200-PW-3, and 200-PW-6 Operable Units

Agenda

- Hanford Cleanup Approach
- 200-CW-5 Operable Unit
 - Background
 - Remedial alternatives
 - Preferred alternative
- 200-PW-1, 200-PW-3, and 200-PW-6 Operable Units
 - Background
 - Remedial alternatives
 - Preferred alternatives
- How You Can Provide Input

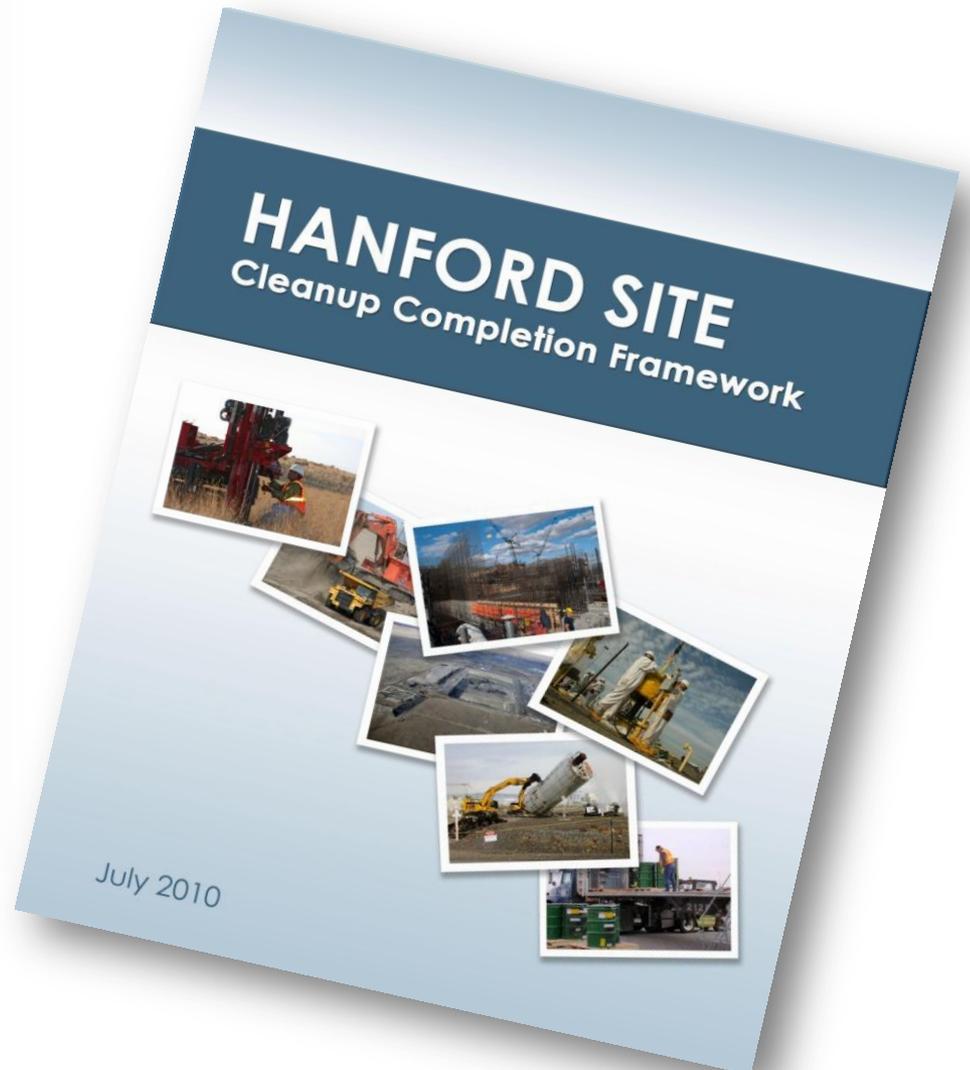
DOE's Hanford Cleanup Approach

Overview of Hanford Site Cleanup

- Strives to make complexities of cleanup more understandable
- Gives context for how individual activities support cleanup completion

Content

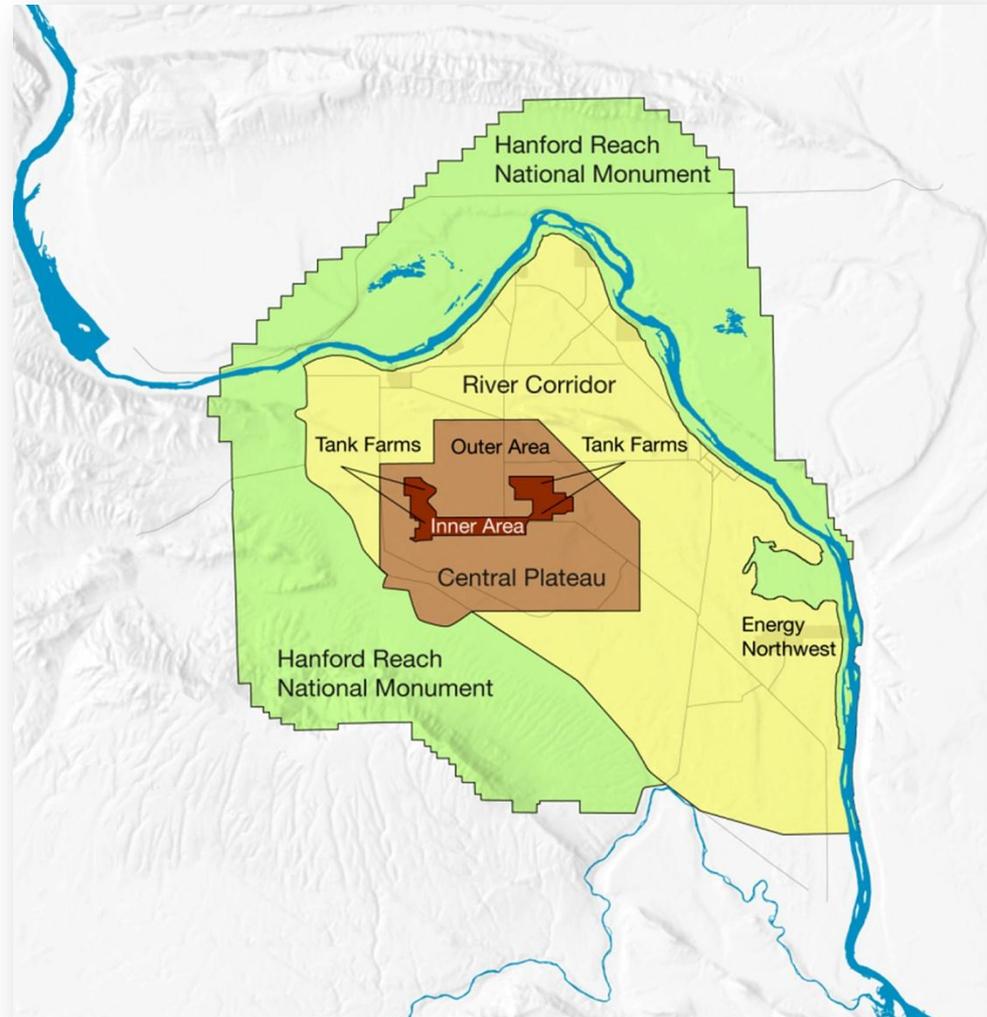
- Goals for cleanup
- Relationships between main components of cleanup: River Corridor, Central Plateau and Tank Waste
- Cleanup challenges



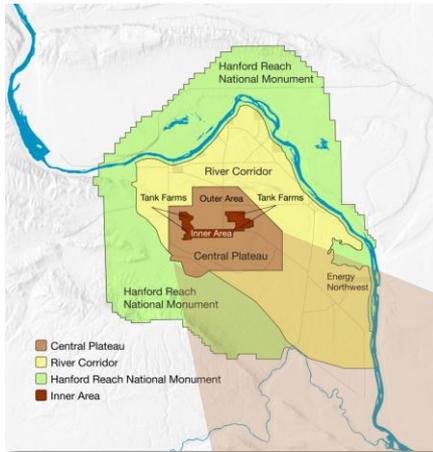
Shrinking Hanford's Cleanup Footprint

Four areas of cleanup:

-  Hanford Reach National Monument (~290 sq. mi.) (including Arid Lands Ecology Reserve)
-  River Corridor (~220 sq. mi.)
-  Central Plateau, Outer Area (~65 sq. mi.)
-  Central Plateau, Inner Area (~10 sq. mi.)

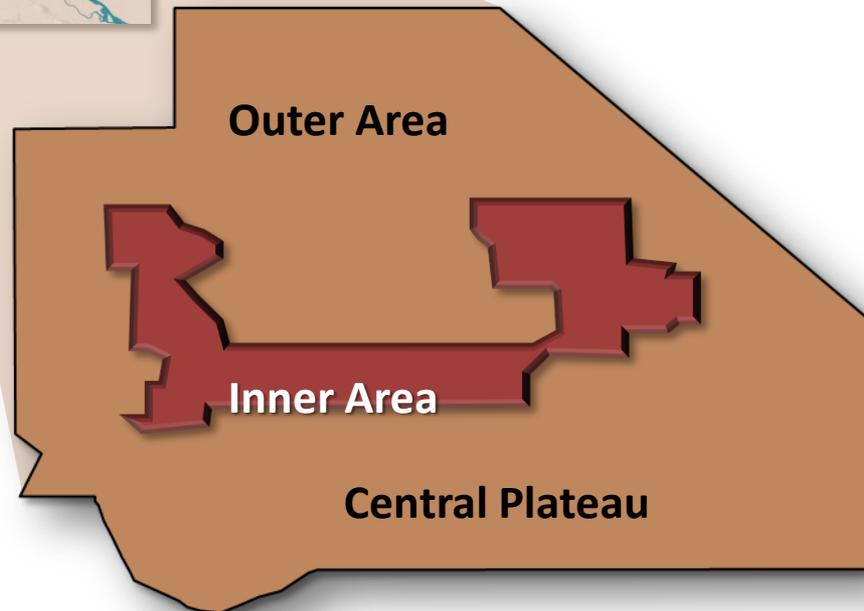


DOE's Central Plateau Cleanup Approach

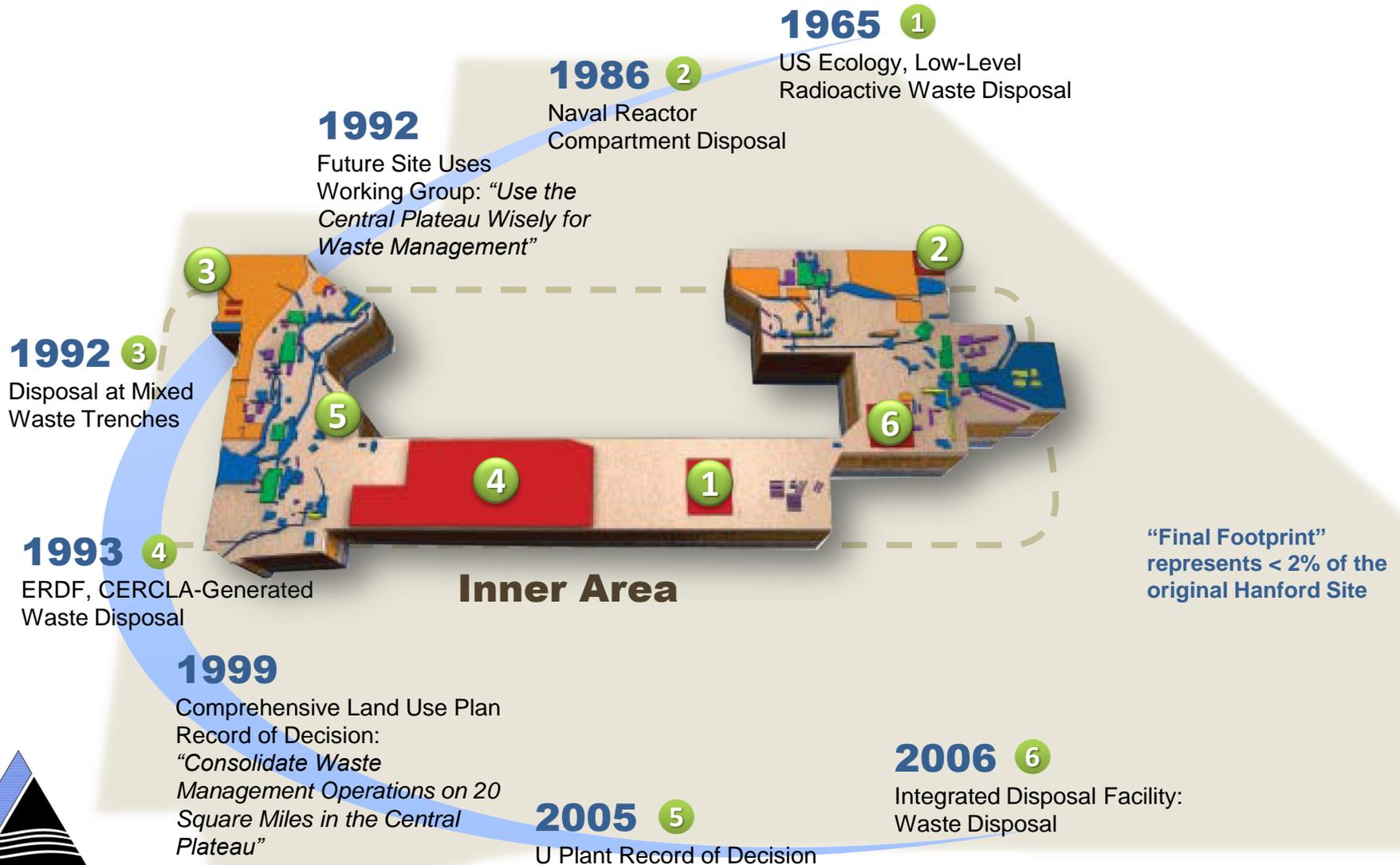


- Central Plateau cleanup is focused in three areas:

- Inner Area
- Outer Area
- Groundwater



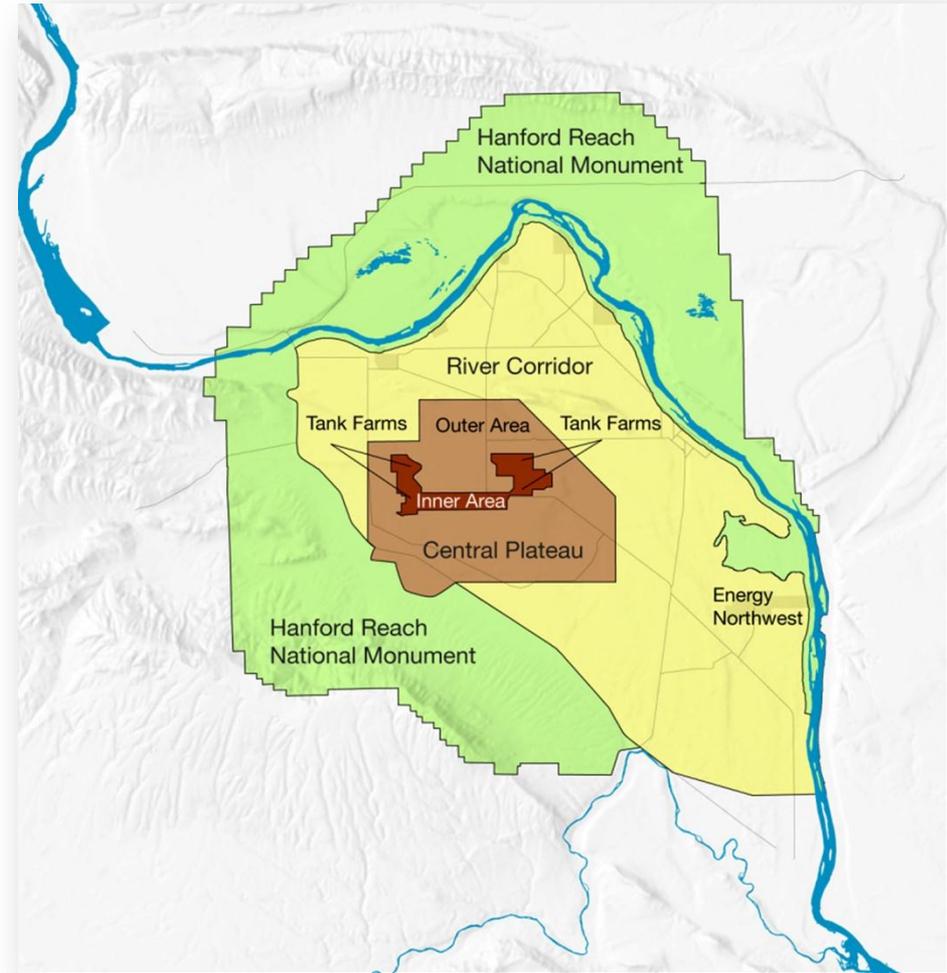
Determining the Final Cleanup Footprint



Hanford's Final Cleanup Footprint

(<10 sq. miles of 586-sq.-mile site)

- Inner Area Approach
 - Make comprehensive, consistent, risk-based and cost-effective cleanup decisions
 - Ensure waste disposal and residual contamination is protective of human health and the environment
 - Leverage use of new and emerging cleanup technologies
 - Re-evaluate effectiveness of remedies with CERCLA 5-year reviews

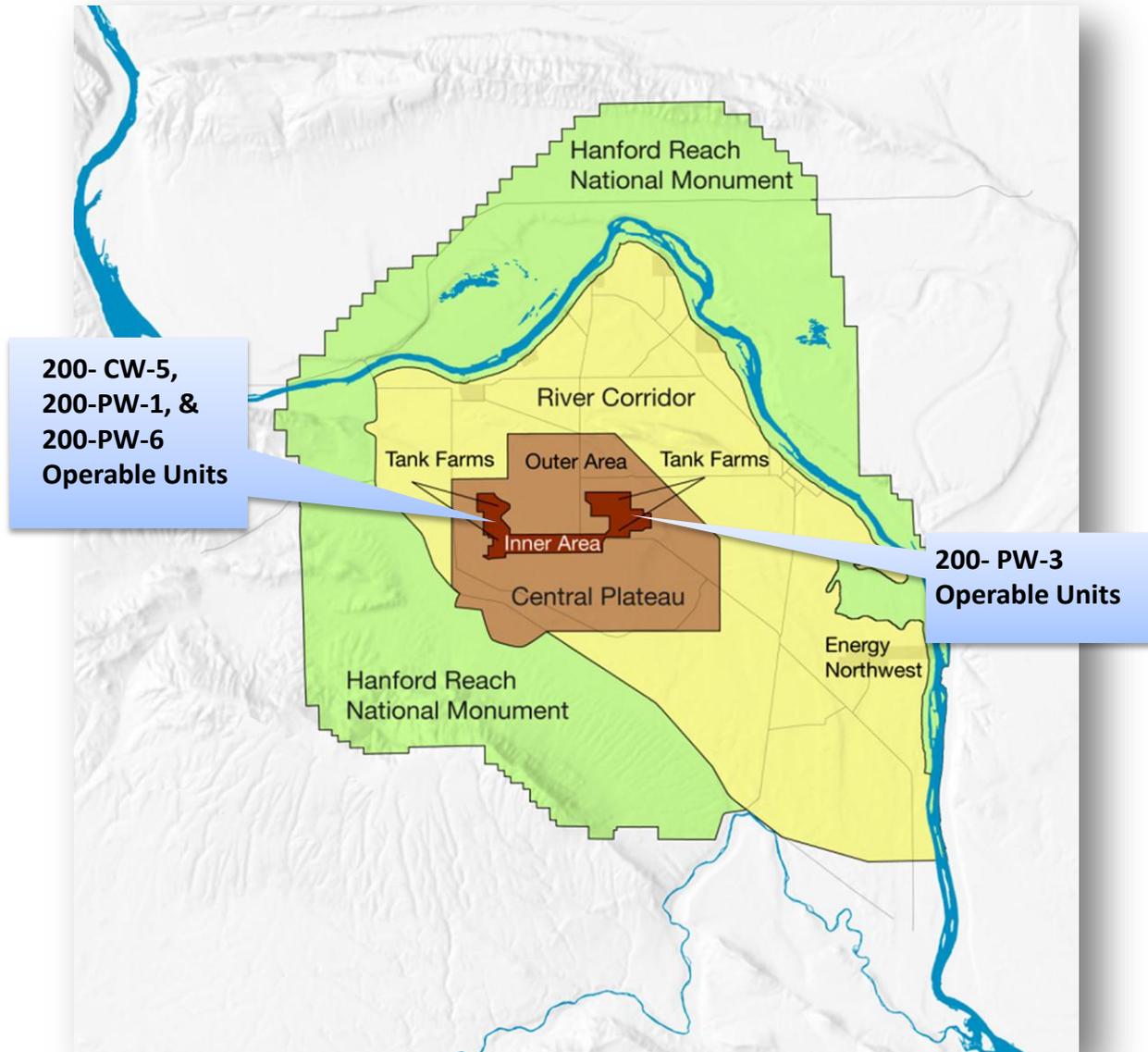


CERCLA Process

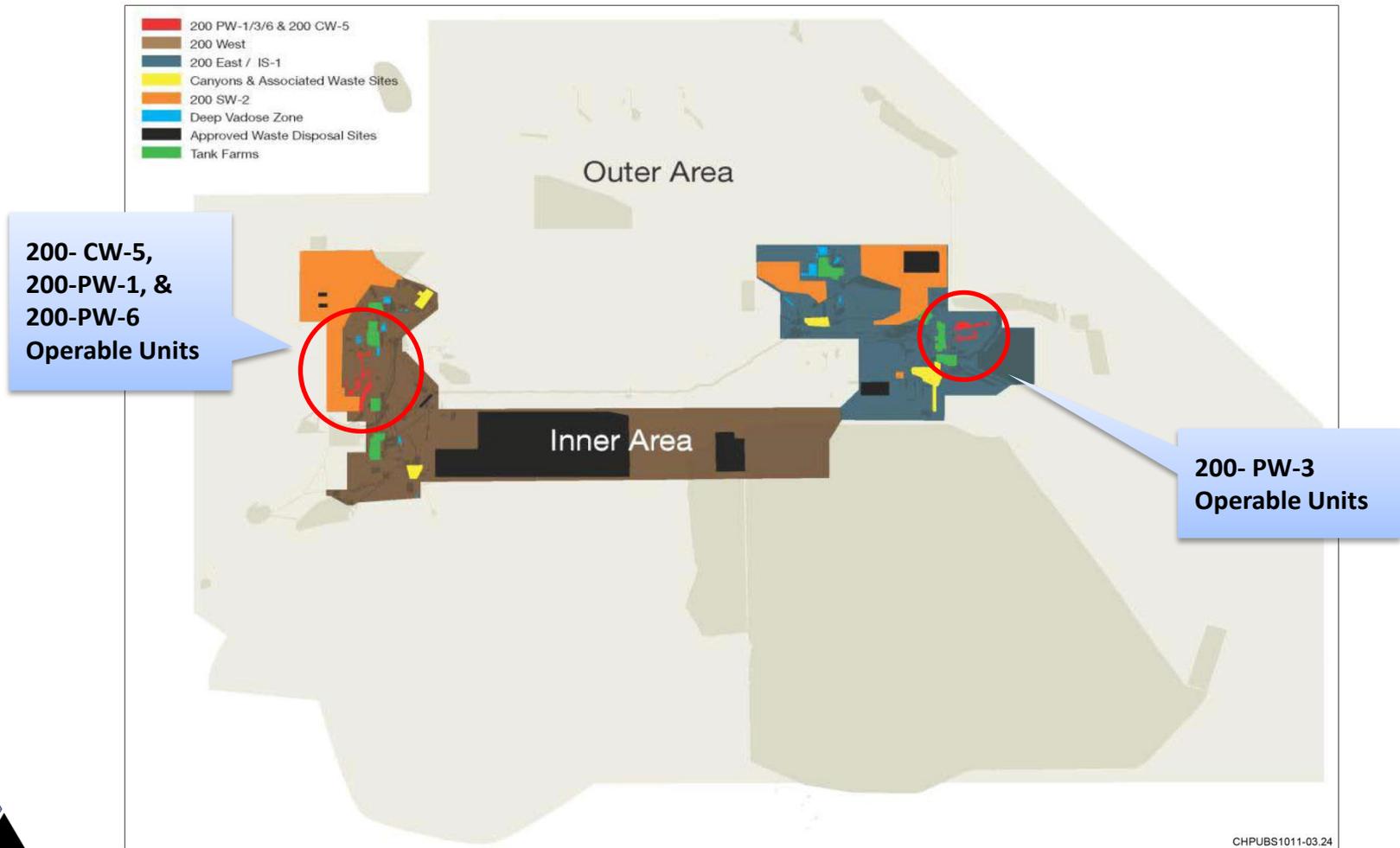
CERCLA Process



Proposed Plan to Remediate 21 Plutonium and Cesium Waste Sites

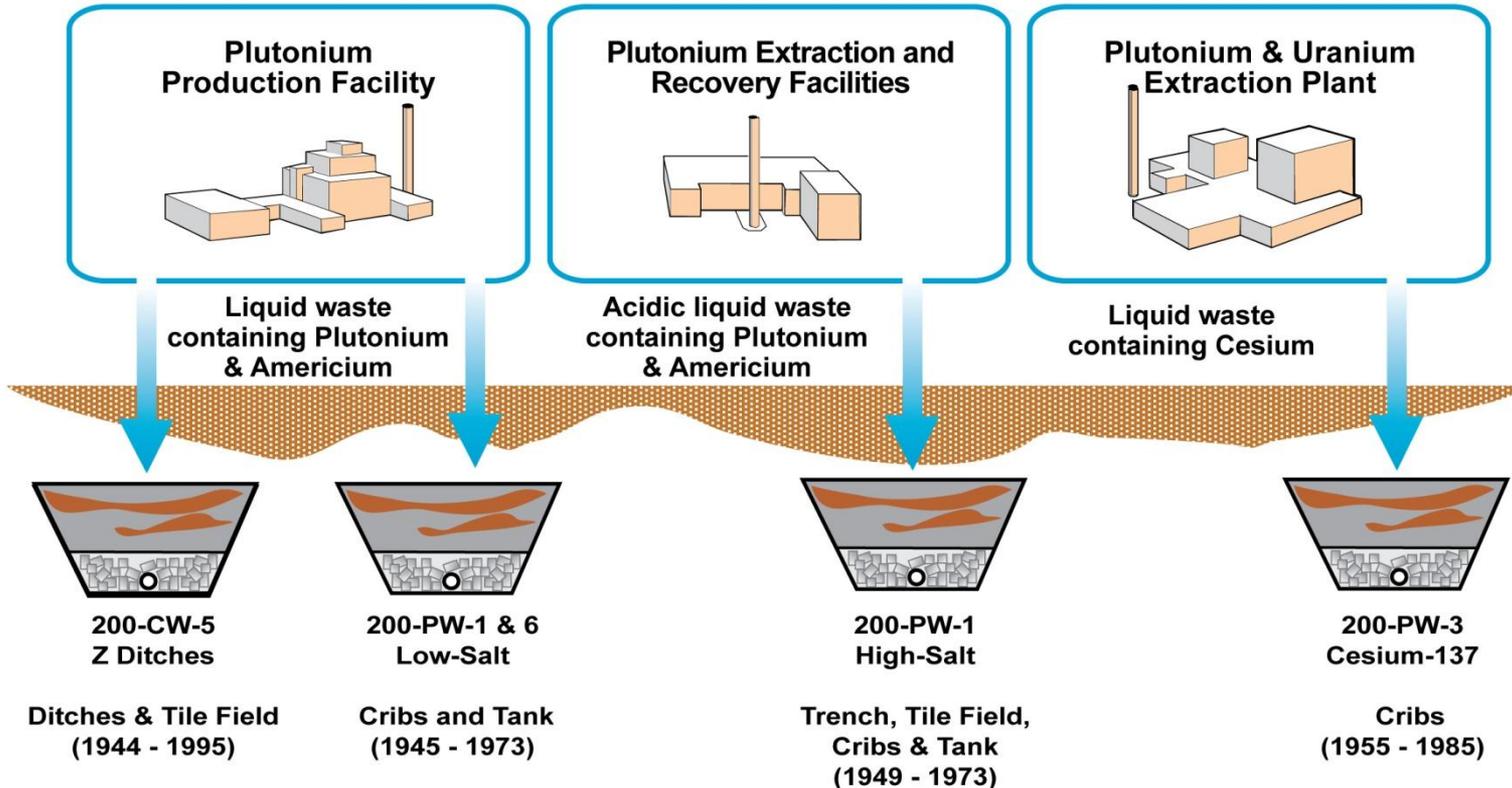


Location of Waste Sites



Liquid Waste Generation

Liquid Waste Generation



200-CW-5 Operable Unit

Background

- Three shallow, open ditches known as ‘Z-Ditches’, one tile field, one unplanned release site
- Received cooling water and steam condensate from the Plutonium Finishing Plant Complex
- Contamination located primarily at and below the bottom of the trenches
- Primary risk drivers: americium-241, plutonium-239/240, cesium-137, and radium-226



Remedial Alternatives Evaluated for 200-CW-5 Operable Unit

- No Action
- Maintain Existing Soil Cover and Institutional Controls
- Remove, Treat (as needed) and Dispose (RTD)
- Engineered Surface Barriers
- In-Situ Vitrification
- Combinations of Alternatives

Preferred Alternative for 200-CW-5 Operable Unit

Remove, Treat and Dispose

- Remove contaminated soil presenting a risk to human health and the environment (approximately 15 feet below surface)
- Treat (as needed)
- Dispose as required

200-PW-1, 200-PW-3, and 200-PW-6 Operable Units

Background

- 16 underground engineered liquid waste disposal sites
- Organized into five waste groups (High-Salt, Low-Salt, Settling Tanks, Cesium-137, and Other Sites)
- During Hanford Site operations the standard practice was to dispose of plutonium-contaminated wastewater here
- Primary risk drivers: plutonium-239/240, americium-241, and carbon tetrachloride
- 200-PW-3 sites also contain cesium-137



Remedial Alternatives Evaluated for 200-PW-1, 200-PW-3, and 200-PW-6 Operable Units

- No action
- Maintain or Enhance Existing Soil Cover (MEESC)
- Engineered Surface Barrier (barrier alternative)
- In-Situ Vitrification
- Remove, Treat (as needed) and Dispose (RTD)
- Soil Vapor Extraction (SVE)

Preferred Alternatives

- High-Salt Waste Group: Combination of Alternatives
 - Continue operating the soil vapor extraction (SVE) system that treats the carbon tetrachloride soil contamination
 - Excavate highest concentrations of contaminated soils and dispose as required
 - Remove and dispose of associated structures
 - Backfill excavated area with clean fill
 - Construct physical Evapotranspiration Barrier over sites

Preferred Alternatives, continued

200-PW-1 and 200-PW-6

- Low-Salt Waste Group:

- Remove significant portion of plutonium contamination, dispose as required
- Evapotranspiration barriers

200-PW-3

- Cesium-137 Waste Group:

- Maintain or Enhance Existing Soil Cover (MEESC) cover to assure waste sites are at least 15 feet below ground

Preferred Alternatives, continued

200-PW-1 and 200-PW-6

- Settling Tanks Waste Group
 - Remove sludge and liquid containing plutonium and americium
 - Stabilize and dispose as required
 - Grout tanks in place

200-PW-6

- Other Sites Waste Group: No action
 - 216-Z-8 French Drain and 216-Z-10 Injection/Reverse Well - Soil contamination concentrations are below risk range and considered protective of human health and the environment

How You Can Provide Input

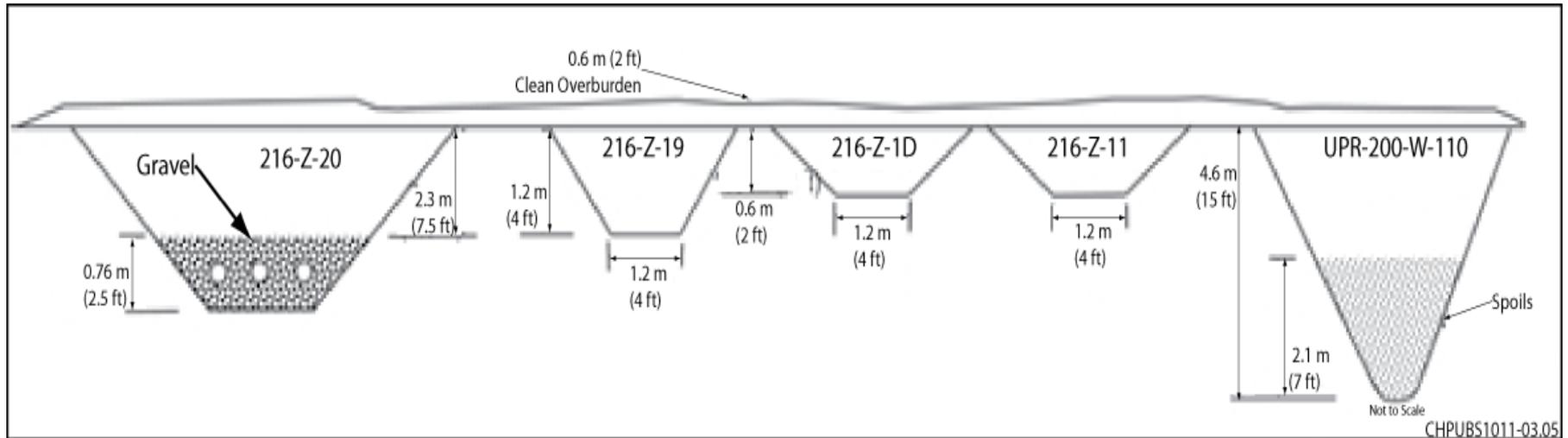
- Public Comment period July 5 - August 5
- Provide verbal comments during this meeting
- Submit written comments to PW136PP@rl.gov
- The TPA agencies will consider all comments before making a decision
- The TPA agencies expect to issue a Record of Decision and comment responses by the end September, 2011

Back Up Slides

200-CW-5 Background

- Draft B FS/PP issued Fall 2008 (CW-5 only)
 - Preferred alternative: RTD ends of trenches and place barrier over more contaminated center portion
- 2010 Central Plateau Strategy
 - RI/FS process “near completion” for CW-5: EPA and DOE agreed to continue with current FS documents, but combine the CW-5 OU and the PW-1/3/6 OUs into a single Proposed Plan
- January 2011 Draft A combined CW-5 and PW-1/3/6 PP submitted to EPA

200-CW-5 Diagram



200-CW-5 Operable Unit Remedial Alternatives

	Threshold Criteria		Balancing Criteria				Cost (Net Present Worth in \$ Millions)
	Overall Protectiveness of Human Health and the Environment with ARARs	Compliance with ARARs	Long-Term Effectiveness and Permanence	Reduction in Toxicity, Mobility, and Volume Through Treatment	Short-Term Effectiveness	Implementability	
No Action	No	No	Not Ranked				\$0
MESC/MNA/IC	No	No	Not Ranked				\$0
RTD	Yes	Yes	○	●	⊖	⊖	\$58.1
Engineered Surface Barriers	Yes	Yes	⊖	●	○	○	\$19.6
ISV/RTD/Barrier	Yes	Yes	○	⊖	⊖	●	\$318
ISV/Barrier	Yes	Yes	⊖	⊖	⊖	●	\$287

Key:



performs very well against the criterion relative to the other alternatives with minor disadvantages or uncertainty



performs moderately well against the criterion relative to the other alternatives with some disadvantages or uncertainty



performs less well against the criterion relative to the other alternatives with significant disadvantages or uncertainty



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High-Salt Waste Sites Preferred Alternatives

	Threshold Criteria		Balancing Criteria				Cost ^a (Net Present Worth in \$ Millions)
	Overall Protectiveness of Humans and Health and Compliance with Environmental Regulations		Long-Term Effectiveness and Permanence	Reduction in Toxicity, Mobility, and Volume Through Treatment	Short-Term Effectiveness	Implementability	
No Action	No	No	Not Ranked				-
Barrier	Yes	Yes	⊕	⊕	○	○	\$19.1
ISV	Yes	Yes	⊕	⊕	⊕	●	\$94.0
RTD (Option A)	Yes	Yes	⊕	⊕	⊕	⊕	\$107.2
RTD (Option B)	Yes	Yes	⊕	⊕	⊕	⊕	\$77.5
RTD (Option C)	Yes	Yes	⊕	⊕	⊕	⊕	\$577.0
RTD (Option D)	Yes	Yes	○	⊕	⊕	●	\$786.3

Key:



performs very well against the criterion relative to the other alternatives with minor disadvantages or uncertainty



performs moderately well against the criterion relative to the other alternatives with some disadvantages or uncertainty



performs less well against the criterion relative to the other alternatives with significant disadvantages or uncertainty

Low-Salt Waste Sites Preferred Alternatives

	Threshold Criteria		Balancing Criteria				
	Overall Protectiveness of Human Health and the Environment	Compliance with ARARs	Long-Term Effectiveness and Permanence	Reduction in Toxicity, Mobility, and Volume Through Treatment	Short-Term Effectiveness	Implementability	Cost (Net Present Worth in \$ Millions)
No Action	No	No	Not Ranked				\$0
Barrier	Yes	Yes	○	●	○	○	\$10.1
ISV	Yes	Yes	○	●	○	●	\$23.7
RTD (Option A)	Yes	Yes	○	●	○	○	\$61.8
RTD (Option C)	Yes	Yes	○	●	○	○	\$81.4
RTD (Option E)	Yes	Yes	○	●	○	○	\$81.4

Key:



performs very well against the criterion relative to the other alternatives with minor disadvantages or uncertainty



performs moderately well against the criterion relative to the other alternatives with some disadvantages or uncertainty



performs less well against the criterion relative to the other alternatives with significant disadvantages or uncertainty

Cesium-137 Preferred Alternatives

	Threshold Criteria		Balancing Criteria				
	Overall Protectiveness of Human Health and the Environment	Compliance with ARARs	Long-Term Effectiveness and Permanence	Reduction in Toxicity, Mobility, and Volume Through Treatment	Short-Term Effectiveness	Implementability	Cost (Net Present Worth in \$ Millions)
No Action	No	No	Not Ranked				
Barrier (MSEEC)	Yes	Yes	○	●	○	○	\$11.1
RTD (Option B)	Yes	Yes	○	●	○	○	\$19.6
RTD (Option C)	Yes	Yes	○	●	○	○	\$29.1

Key:



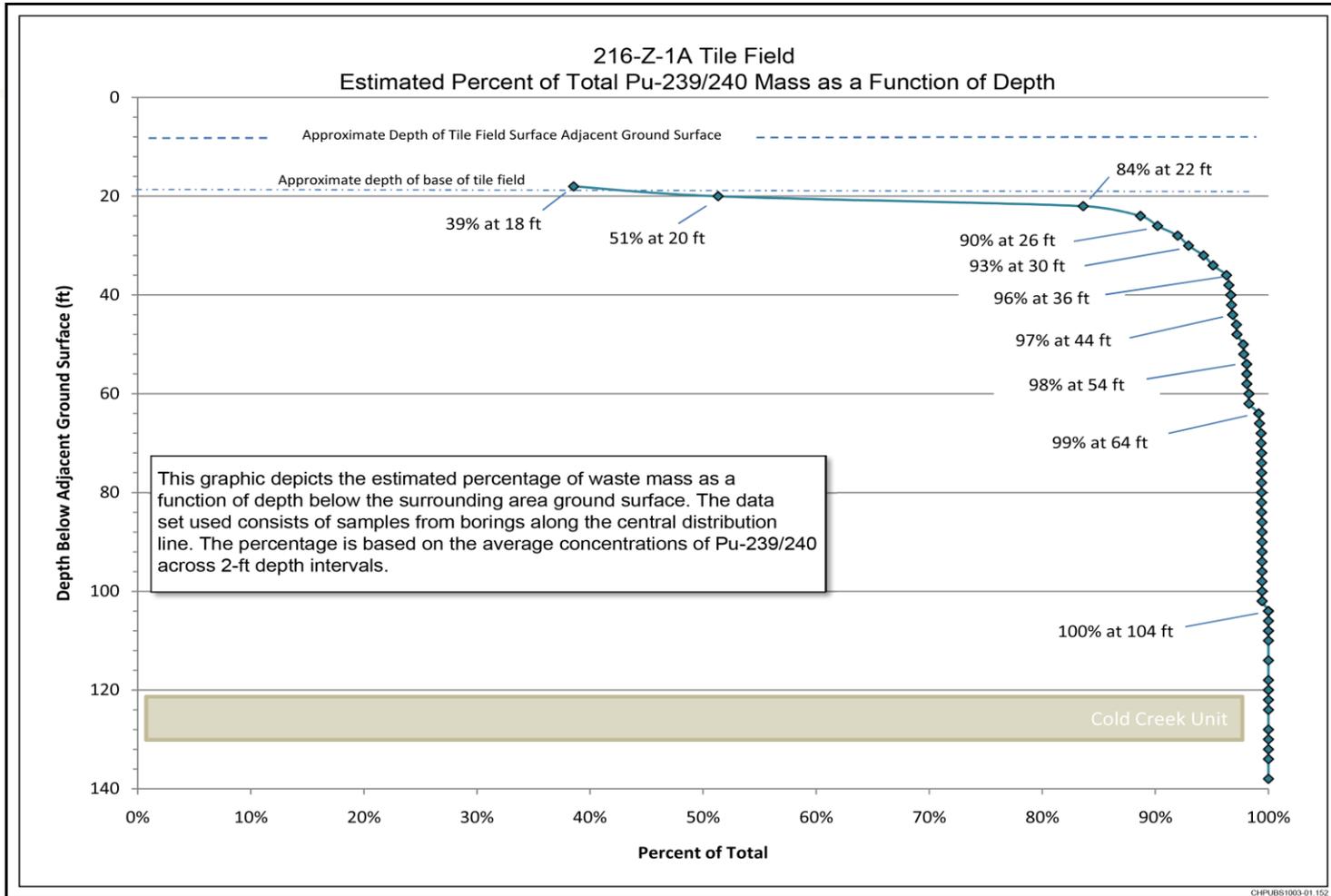
performs very well against the criterion relative to the other alternatives with minor disadvantages or uncertainty



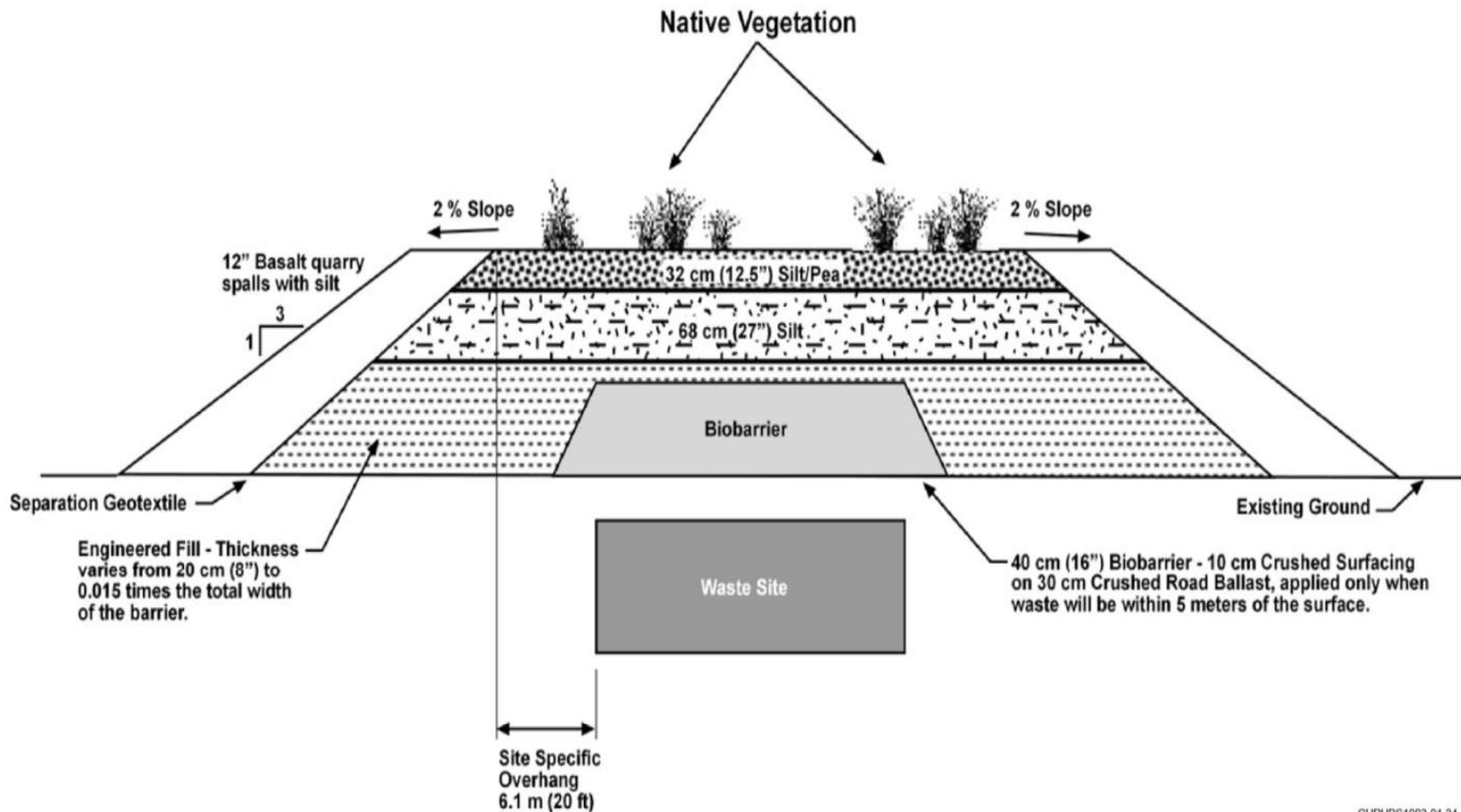
performs moderately well against the criterion relative to the other alternatives with some disadvantages or uncertainty



performs less well against the criterion relative to the other alternatives with significant disadvantages or uncertainty



Plutonium Mass with Depth Beneath the 216-Z-1A Tile Field (High-Salt Waste Group)



CHPUBS1003-01.34

Conceptual Design of Monofill Evapotranspiration Barrier



Figure 6. The 216-Z-9 Trench (beneath cover)

Summary of Preferred Alternatives

Table 13. from the *“Proposed Plan for the Remediation of the 200-CE-5, 200-PW-1, 200-PW-3, and 200-PW-6 Operable Units”*

Waste Group	Preferred Alternative
Z-Ditches	RTD with disposal at ERDF.
High-Salt	RTD—Option A: Remove to 0.6 m (2 ft) below the bottom of a waste site, which contains the highest concentration of contaminants. Plutonium waste will be disposed of at WIPP.
Low-Salt	RTD—Option C: Removal of a significant portion of plutonium contamination. Plutonium waste will be disposed of at WIPP.
Cesium-137	Maintain/ Enhance Soil Cover. Reduce infiltration of precipitation by supporting natural vegetation.
Settling Tanks	Sludge Removal and Tank Stabilization.

The CERCLA Criteria

THRESHOLD CRITERIA

Threshold criteria mean that only those remedial alternatives that provide adequate protection of human health and the environment and comply with ARARs are eligible for selection:

1. **Overall Protection of Human Health and the Environment** is the primary objective of the remedial action and determines whether an alternative provides adequate overall protection of human health and the environment. This criterion must be met for all remedial actions.



2. **Compliance with Applicable or Relevant and Appropriate Requirements** addresses whether an alternative meets federal and state statutes or provides grounds for a waiver. This criterion must be met for a remedial alternative to be eligible for consideration.



BALANCING CRITERIA

Balancing criteria help describe technical and cost trade-offs among the various remedial alternatives:

3. **Long-Term Effectiveness and Permanence** refers to the ability of a remedy to protect human health and the environment over time, after remedial action objectives have been met.



4. **Reduction of Toxicity, Mobility, or Volume through Treatment** means the alternative is evaluated for its ability to reduce the toxicity, mobility, and volume of the hazards at a site.



5. **Short-Term Effectiveness** refers to an evaluation of the speed with which the remedy can be successful and also takes into consideration any adverse impacts on human health and the environment that may result during the construction and implementation phase of the remedial action.



6. **Implementability** refers to the technical and administrative feasibility of a remedial action, including the availability of materials and services needed to implement the selection.

7. **Cost** refers to an evaluation of the costs of each alternative.



MODIFYING CRITERIA

Modifying criteria can only be considered after public comment is received on the proposed remedy:

8. **State Acceptance** indicates whether the state concurs with, opposes, or has no comment on the proposed remedial action.



9. **Community Acceptance** assesses the public response to the proposed remedial action. Although public comment is an important part of the decision-making process, EPA is required by law to balance community concerns with the above criteria.