



**200-CW-5,
200-PW-1,
200-PW-3, and
200-PW-6
Operable Units
Proposed Plan**

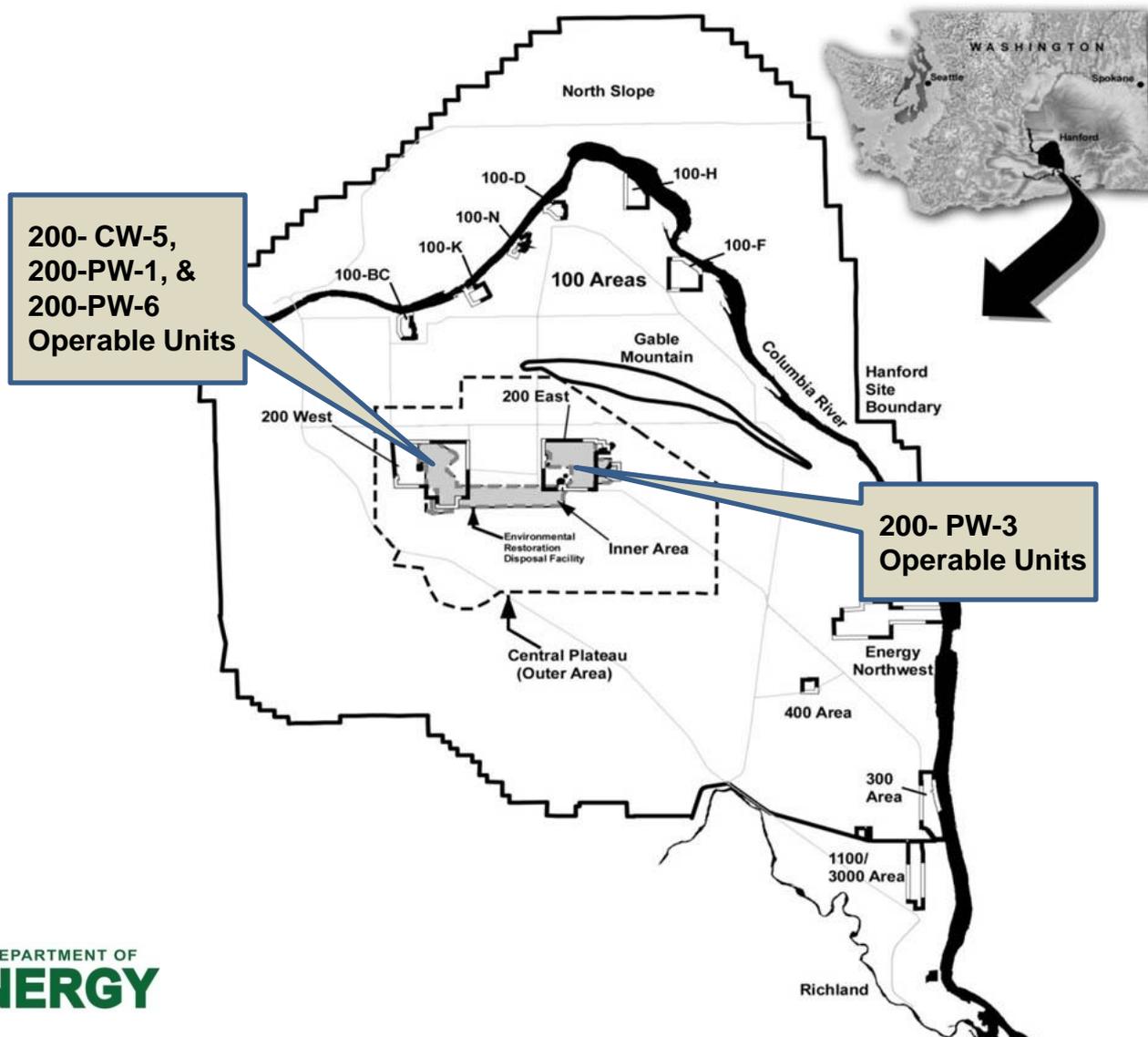
**Presented to:
Hanford Advisory Board
River and Plateau Committee**

May 11, 2011

Agenda

- **Overview**
- **200-CW-5 Operable Unit (OU)**
 - Background
 - Remedial alternatives
 - Preferred alternative
- **200-PW-1, 200-PW-3, and 200-PW-6 OU**
 - Background
 - Remedial alternatives
 - Preferred alternatives
- **Next steps**

Hanford's Central Plateau



Overview

- **Today's presentation is a preview of the Proposed Plan for 200-CW-5, 200-PW-1, 200-PW-3, and 200-PW-6 Operable Units**
- **The Tri Party Agreement (TPA) agencies held a workshop in 2008 and received input from Tribal Nations, the state of Oregon, and the Hanford Advisory Board**
- **Input influenced the selection of preferred alternatives in this Proposed Plan**

Overview, continued

What we heard:	What we've done:
Commit to adequate characterization	Evaluated data, concluded that we had adequate information for decision making. Will conduct confirmatory sampling during remedial design
Commit to removal, treatment, and disposal (RTD) to the extent practicable	Developed additional RTD scenarios to excavate to different target depths for the PW-1 (plutonium) sites
Retrieve soils contaminated with transuranics and have a pathway for disposal at the Waste Isolation Pilot Plant (WIPP)	Chose an RTD alternative over a lower-cost barrier alternative that ranks the same or better on the threshold and balancing criteria
Consider evapotranspiration (ET) barrier	ET barriers are being used for many of the waste sites
Consider In Situ Vitrification (ISV)	ISV evaluated as part of Feasibility Study (FS)
Integrate remedial actions with neighboring sites and utilizing zone closure concept	Remediation will be coordinated with 200 West and 200 East Operable Units implementation

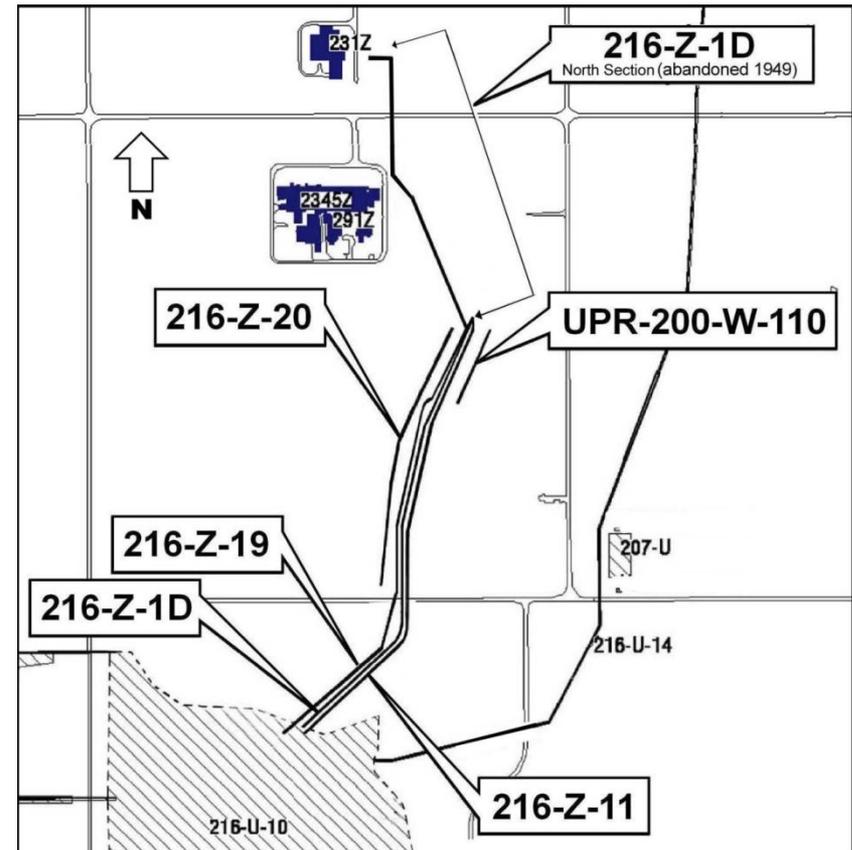
200-CW-5 Operable Unit Section

200-CW-5 Background

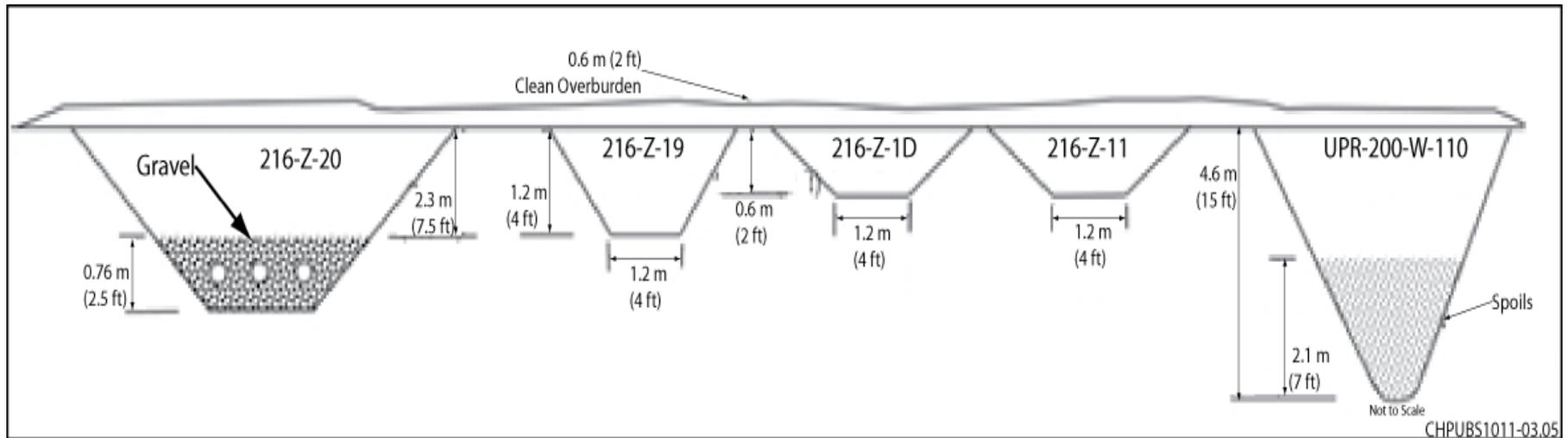
- **Draft B FS/Proposed Plan (PP) issued Fall 2008 (CW-5 only)**
 - Preferred alternative: RTD ends of trenches and place barrier over more contaminated center portion
- **2010 Central Plateau Strategy**
 - RI/FS process “near completion” for CW-5: EPA and DOE agreed to continue with current FS documents,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

200-CW-5 Operable Unit Background

- **200-CW-5 Operable Unit**
 - Three shallow open ditches, one tile field, and one unplanned release site -- collectively called “Z-Ditches”
 - Waste sites 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



200-CW-5 Diagram



200-CW-5 Operable Unit Remedial Alternatives

	Threshold Criteria		Balancing Criteria				
	Overall Protectiveness of Human Health	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
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
○ 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		

200 CW-5 Operable Unit Preferred Alternative

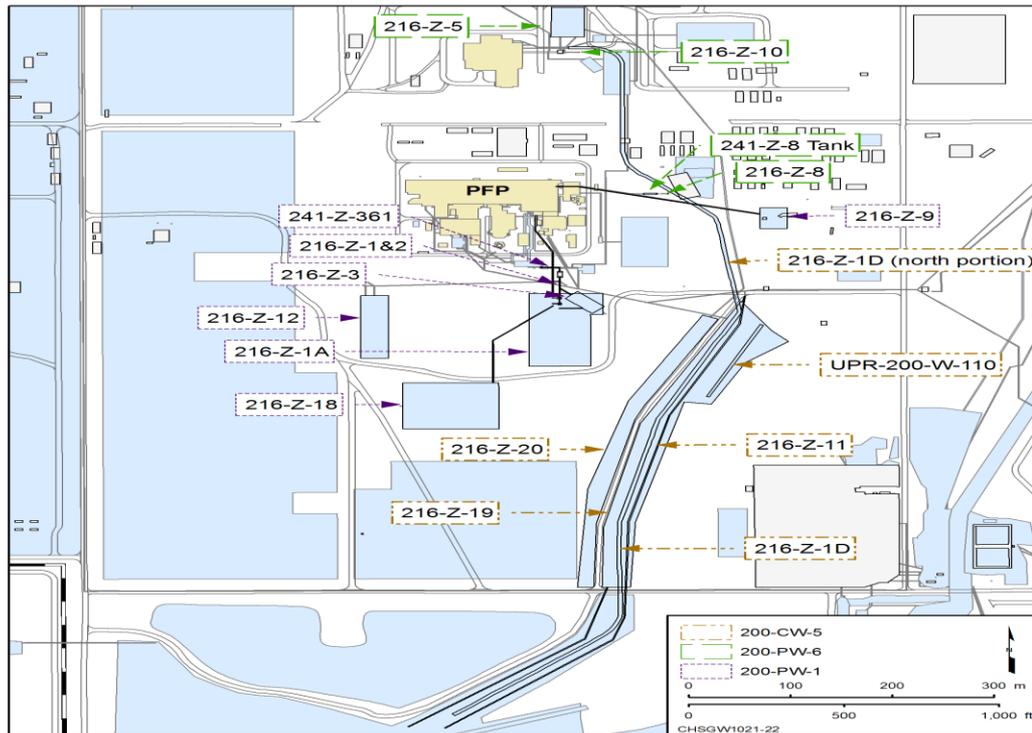
- **Removal, Treatment (as needed) and Disposal (RTD)**
 - Reduces risk from the sites through removal of the contamination
 - Cost effective balance between long-term effectiveness and permanence and short-term risk
 - Shallow excavation with on-site Environmental Remediation Disposal Facility (ERDF) disposal is readily implementable

200-PW-1, 200-PW-3, and 200-PW-6 Operable Unit Section

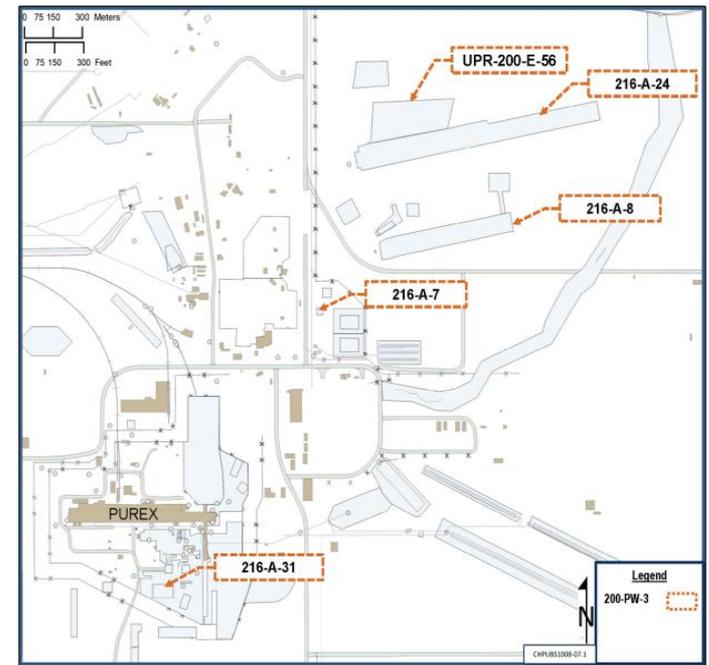
200-PW-1, 200-PW-3, and 200-PW-6 Operable Unit Background

- **200-PW-1, 200-PW-3, and 200-PW-6 Operable Unit**
 - 16 subsurface engineered waste disposal sites used for disposal of liquid waste
 - Organized into five waste groups (High-Salt, Low-Salt, Settling Tanks, Cesium-137, and Other Sites)
- **200-PW-1 and 200-PW-6 Operable Units represent the majority of Hanford's plutonium production wastewater disposal sites**
 - During operations the standard practice was to dispose of process wastewater contaminated with plutonium into these waste sites
- **200-PW-3 sites contain cesium-137 and other contaminants**

200-PW-1, 200-PW-3, and 200-PW-6 Operable Unit Background, continued



*200-PW-1 and 200-PW-6
OU waste sites are in the
200 West Area. 200-PW-3
OU waste sites are in the
200 East Area*



200-PW-1, 200-PW-3, and 200-PW-6 Operable Unit Background, continued

- **200-PW-1 OU: High-Salt Waste Group (216-Z-1A Tile Field, 216-Z-9-Trench, 216-Z-18 Crib)**
 - Three subsurface engineered waste sites
 - 216-Z-9 Trench, 216-Z-1A Tile Field, and 216-Z-18 Crib received highly acidic aqueous waste streams from Recovery of Uranium and Plutonium by Extraction (RECUPLEX) facility or the Plutonium Reclamation Facility solvent extraction systems
 - Contamination remains in the subsurface, radionuclide concentration decreases with depth, organics remain in the soil column beneath waste sites and have contaminated groundwater
 - Major risk-based contaminants: plutonium, americium, and carbon tetrachloride

200-PW-1, 200-PW-3, and 200-PW-6 Operable Unit Background, continued

- **200-PW-1 and 200-PW-6 OU: Low-Salt Waste and Tanks Groups (216-Z-1&2 Crib, 216-Z-3 Crib, 216-Z-12 Crib, 216-Z-5 Crib)**
 - **Four cribs and two settling tanks**
 - **Neutral to basic aqueous waste streams from the Plutonium Isolation Facility**
 - **Contamination remains near bottom of the waste sites, contamination concentrations decrease rapidly with depth**
 - **Major risk-based contaminants: Plutonium and americium**
 - **Settling tanks contain sludge contaminated with plutonium**

200-PW-1, 200-PW-3, and 200-PW-6 Operable Unit Background, continued

- **200-PW-6 OU: Other Sites Waste Group (216-Z-8 French Drain 216-Z-10 Injection/Reverse Well)**
 - One French drain and one injection/reverse well
 - Liquid waste discharged into the soil in the injection/reverse well; overflow from the settling tank emptied into the French drain
 - Limited contamination, requiring no action under CERCLA

200-PW-1, 200-PW-3, and 200-PW-6 Operable Unit Background, continued

- **200-PW-3 OU: Cesium-137 Waste Group (216-A-7 Crib, 216-A-8 Crib, 216-A-24 Crib, 216-A-31 Crib, UPR-200-E-56 Unplanned Release)**
 - Four cribs and one unplanned release site
 - Received process water from Plutonium and Uranium Extraction (PUREX) Plant operations
 - Majority of contaminants located in the sediment near the bottom of the waste sites
 - Major risk-based contaminant: Cesium-137

200-PW-1, 200-PW-3, and 200-PW-6 Operable Unit Remedial Alternatives

- **No action**
- **Maintain or Enhance Existing Soil Cover (MEESC)**
- **Engineered Surface Barrier (Barrier alternative)**
- **In-Situ Vitrification (ISV)**
- **Removal, Treatment, and Disposal (RTD)**
- **Soil Vapor Extraction**
- **Combination of Alternatives**

200-PW-1 and 200-PW-6 Operable Unit RTD Alternative Options

Waste Site	Removal Depth for RTD Options, m (ft) Below Current Ground Surface			
	A	B	C	D
High-Salt Waste Group (200-PW-1 OU)				
216-Z-1A	6.1 (20)	7 (23)	11 (36)	27.4 (90)
216-Z-9	7 (23)	NA*	11 (36)	27.4 (90)
216-Z-18	6.1 (20)	NA*	11 (36)	27.4 (90)
Low-Salt Waste Group (200-PW-1 and 200-PW-6 OUs)				
216-Z-1	7 (23)	NA*	7.6 (25)	7.6 (25)
216-Z-2	7 (23)	NA*	7.6 (25)	7.6 (25)
216-Z-3	9.5 (31)	NA*	10.1 (33)	10.1 (33)
216-Z-5	6.1 (20)	NA*	6.7 (22)	6.7 (22)
216-Z-12	6.7 (22)	NA*	7.3 (24)	7.3 (24)

200-PW-1, 200-PW-3, and 200-PW-6 Operable Unit Preferred Alternatives

- **High-Salt Waste Group: Combination of Alternatives**
 - Continue operating system that treats the carbon tetrachloride soil contamination
 - Excavate highest concentrations of contaminated soils and dispose at WIPP
 - Remove associated structures
 - Backfill excavation with clean fill
 - Construct physical ET barrier over sites
 - Use institutional controls

200-PW-1, 200-PW-3, and 200-PW-6 Operable Unit Preferred Alternatives, continued

- **Low-Salt Waste Group:**
 - Remove significant portion of plutonium contamination
 - Use ET barriers and institutional controls
 - Disposal onsite at Hanford's ERDF and offsite at WIPP
- **Cesium-137 Waste Group:**
 - Maintain or enhance existing soil cover (MEESC) to assure coverage of at least 15 feet
- **Settling Tanks Waste Group**
 - Remove sludge and liquid containing plutonium and americium
 - Stabilize and dispose of sludge at WIPP
 - Grout tanks in place

200-PW-1, 200-PW-3, and 200-PW-6 Operable Unit Preferred Alternatives, continued

- **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 considered protective of human health and the environment
- **Pipelines: RTD**
 - Pipelines and associated soils impacted by pipeline leaks would be excavated and disposed of onsite in ERDF
 - Pipelines at deeper levels will be excavated as part of the layback to remove the contamination beneath the waste site

High-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				–
Barrier	Yes	Yes	⊖	⊖	○	○	\$19.1
ISV	Yes	Yes	⊖	⊖	⊖	●	\$94.0
RTD (Option A)	Yes	Yes	⊖	⊖	⊖	⊖	\$112
RTD (Option B)	Yes	Yes	⊖	⊖	⊖	⊖	\$77.5
RTD (Option C)	Yes	Yes	⊖	⊖	⊖	⊖	\$642
RTD (Option D)	Yes	Yes	○	⊖	⊖	●	\$896

Low-Salt Waste Sites Preferred Alternatives

	Threshold Criteria		Balancing Criteria				Cost (Net Present Worth in \$ Millions)
	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	
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

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				\$0
Barrier (Original)	Yes	Yes	⊖	●	○	○	\$12.2
Barrier (MEESC)	Yes	Yes	⊖	●	○	○	\$11.1
RTD (Option B)	Yes	Yes	⊖	●	⊖	⊖	\$19.6
RTD (Option C)	Yes	Yes	⊖	●	⊖	⊖	\$29.1

Next Steps

- **DOE and EPA are planning meetings with Native American Tribes on this proposed action.**
- **The Proposed Plan will be released for a 30-day public comment period in mid-June 2011**
- **The TPA agencies will consider all comments before making a final decision**
- **The TPA agencies expect to issue a Record of Decision by the end of Fiscal Year 2011**