



# Information Exchange for Deep Vadose Zone Remediation Technologies

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Location: Shilo Inn, Richland, Washington

Date: June 7, 2011

# Agenda

- Information Exchange Purpose
- Deep Vadose Zone Contamination in the Central Plateau
- Remediation Challenges
- Deep Vadose Zone Program
  - Regulatory operable unit and decision-making schedule
  - On-going treatability testing
  - Applied Field Research Initiative
- Technology Evaluation and Screening

# Information Exchange Purpose

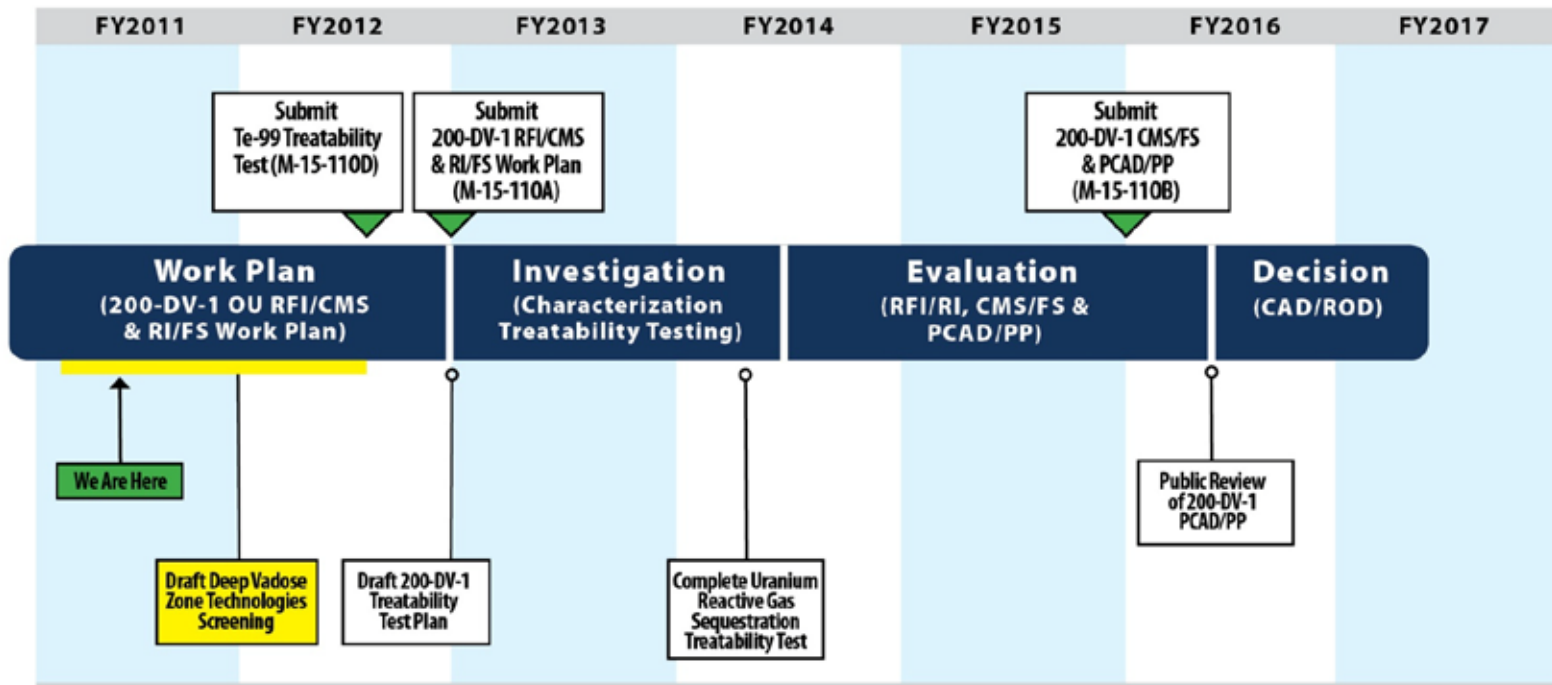
Supports development of a list of potential technologies to support the Deep Vadose Zone (200-DV-1) Operable Unit Work Plan and be applicable across Central Plateau

## Today's Goals:

- Obtain feedback on the initial list of potential remediation technologies
- Gather suggestions about other remediation technologies that should be considered



# Deep Vadose Zone (200-DV-1) OU Timeline



**LEGEND**

RFI - RCRA Facility Investigation  
 RI - Remedial Investigation  
 CMS - Corrective Measures Study  
 FS - Feasibility Study

PCAD - Proposed Corrective Action Decision  
 PP - Proposed Plan  
 CAD - Corrective Action Decision  
 ROD - Record of Decision

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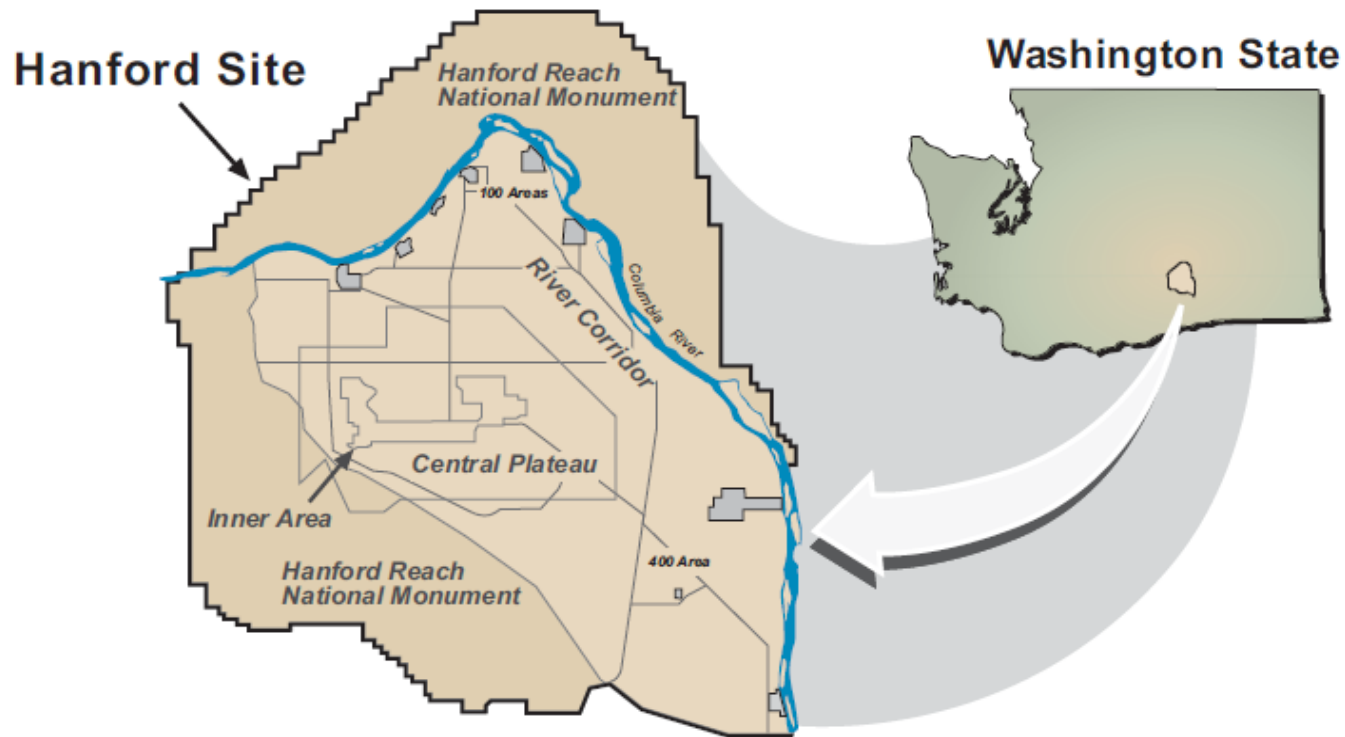
# Why during Deep Vadose Zone Work Plan?

## Expand the deep vadose zone toolbox

- Existing, proven technologies will be carried forward in feasibility study
- Identify and test promising technologies for dealing with deep, mobile contamination
- Collect or evaluate additional performance or cost data to support future remedy selection in the feasibility study
- Identify data needs for the 200-DV-1 OU Work Plan

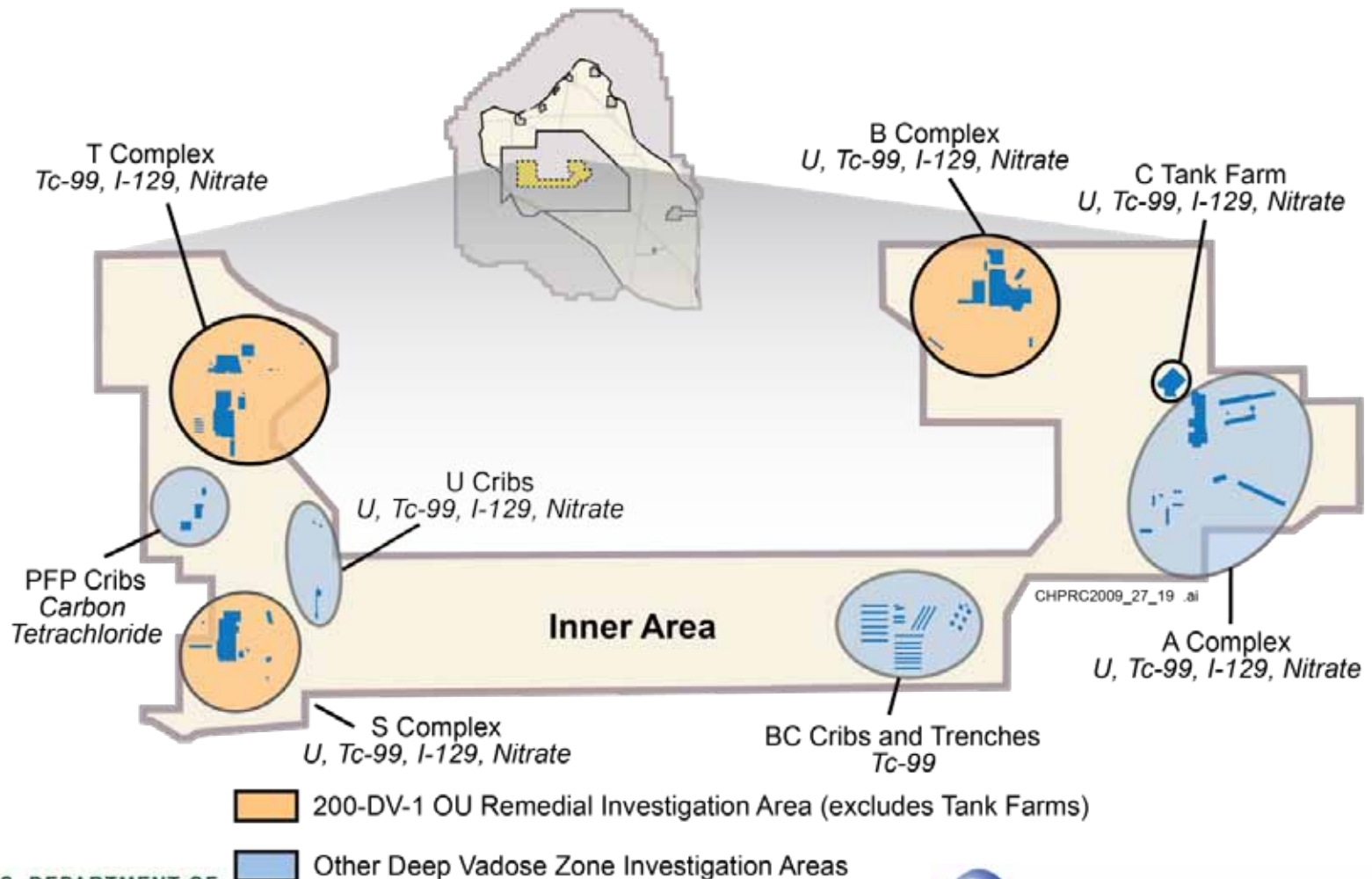


# Where is the Hanford deep vadose zone?

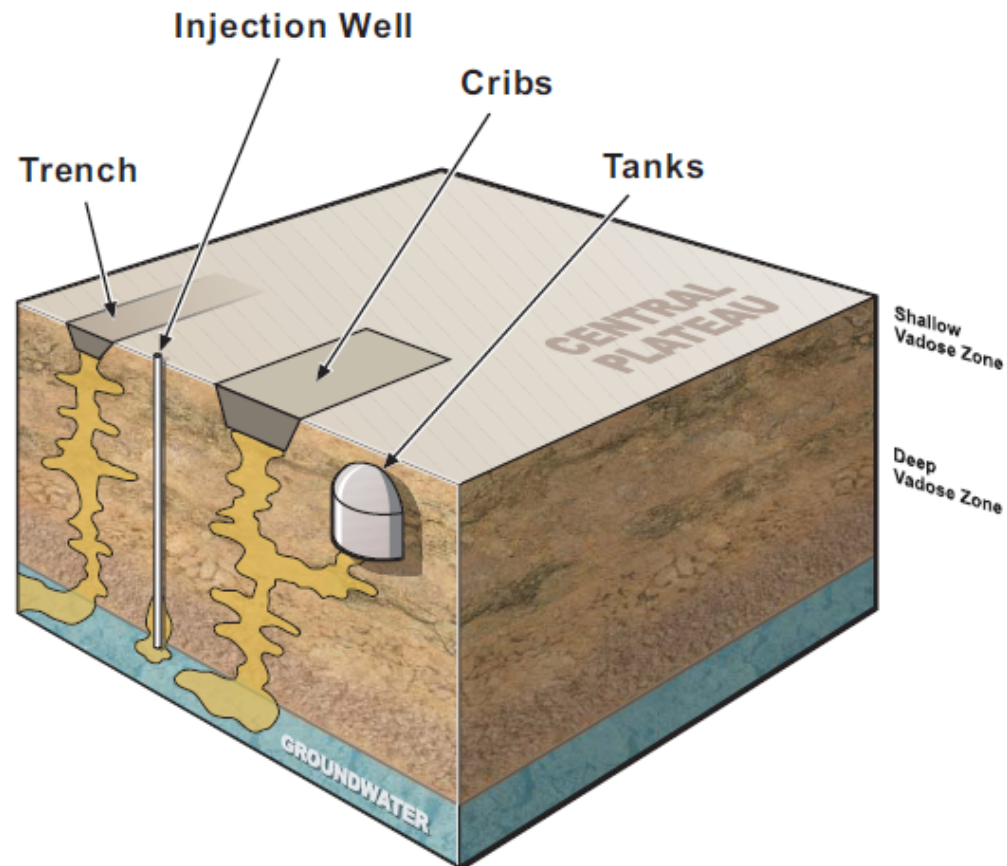


At the Hanford Site in southeast Washington, the U.S. Department of Energy (DOE) is addressing contamination deep in the soil of the Central Plateau, a 75-square-mile area at the center of the site.

# Deep Vadose Zone Contamination in Hanford's Central Plateau



# How was it contaminated?

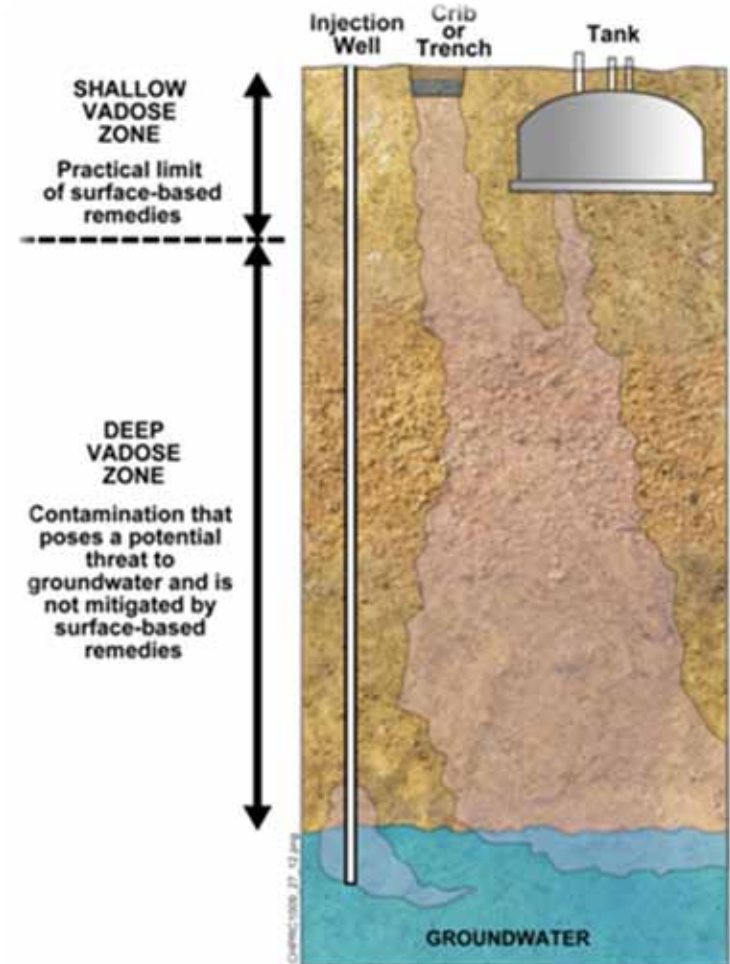


The vadose zone was contaminated during Hanford's plutonium production operations from the 1940s to 1980s. Liquid wastes were intentionally stored in underground tanks and disposed in engineered disposal structures such as cribs, trenches, and injection wells. Waste was also released unintentionally.



# Deep Vadose Zone Cleanup Challenges

- Some conventional methods may have limited effectiveness
- Deep contamination is difficult to access and characterize
- Different contaminants occur in different depths and soil types and may require multiple methods to address
- Deep vadose zone remedies are challenging to monitor





**What's Being Done?**

# Deep Vadose Zone Program

**Deep Vadose Zone  
Treatability Tests**

**Field testing deep vadose zone technologies for possible full-scale implementation.**

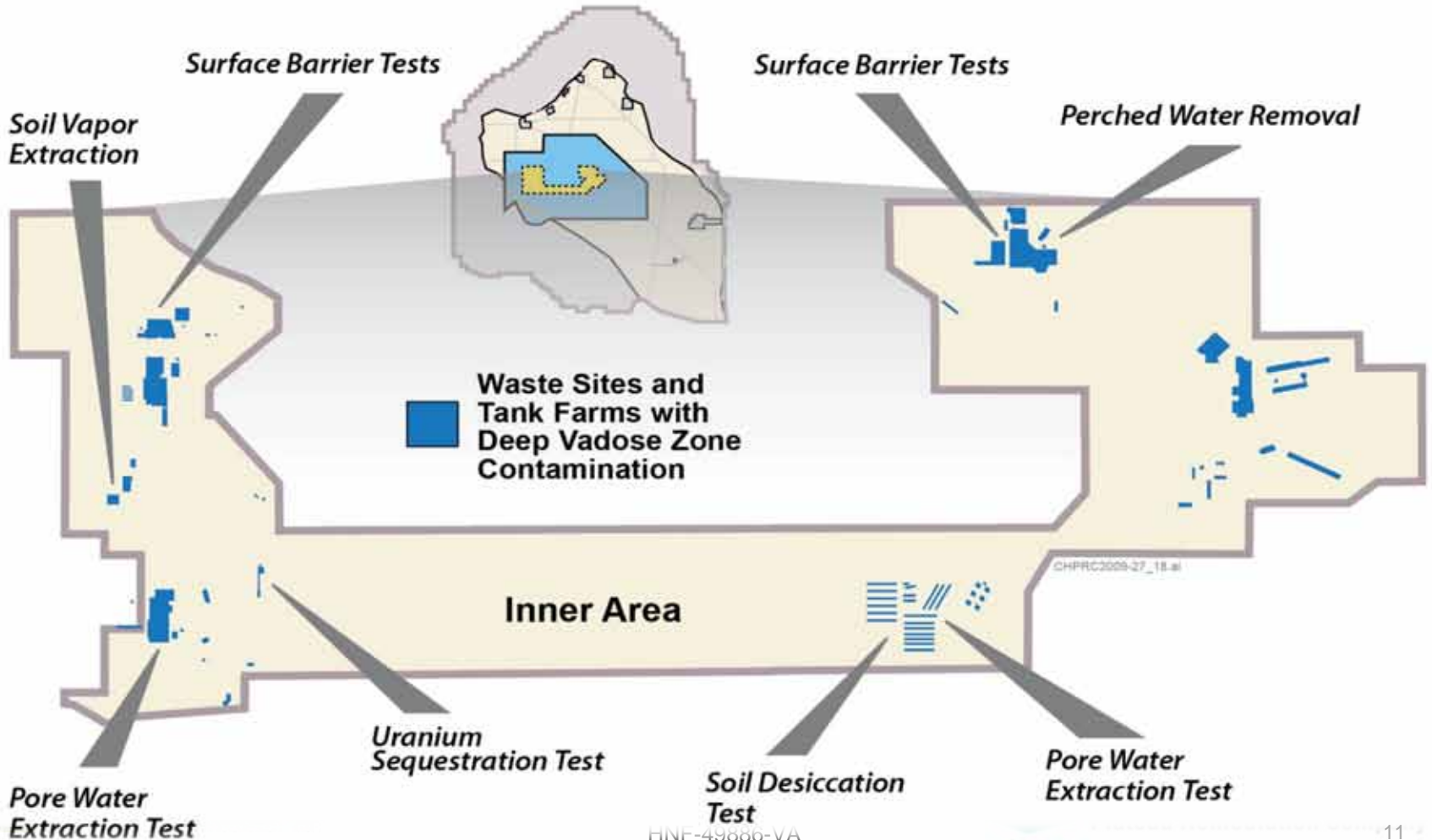
**200-DV-1 and Other Operable Units with Deep Vadose Zone Contamination**

**Systematic approach and milestones for making decisions on remediation of the deep vadose zone.**

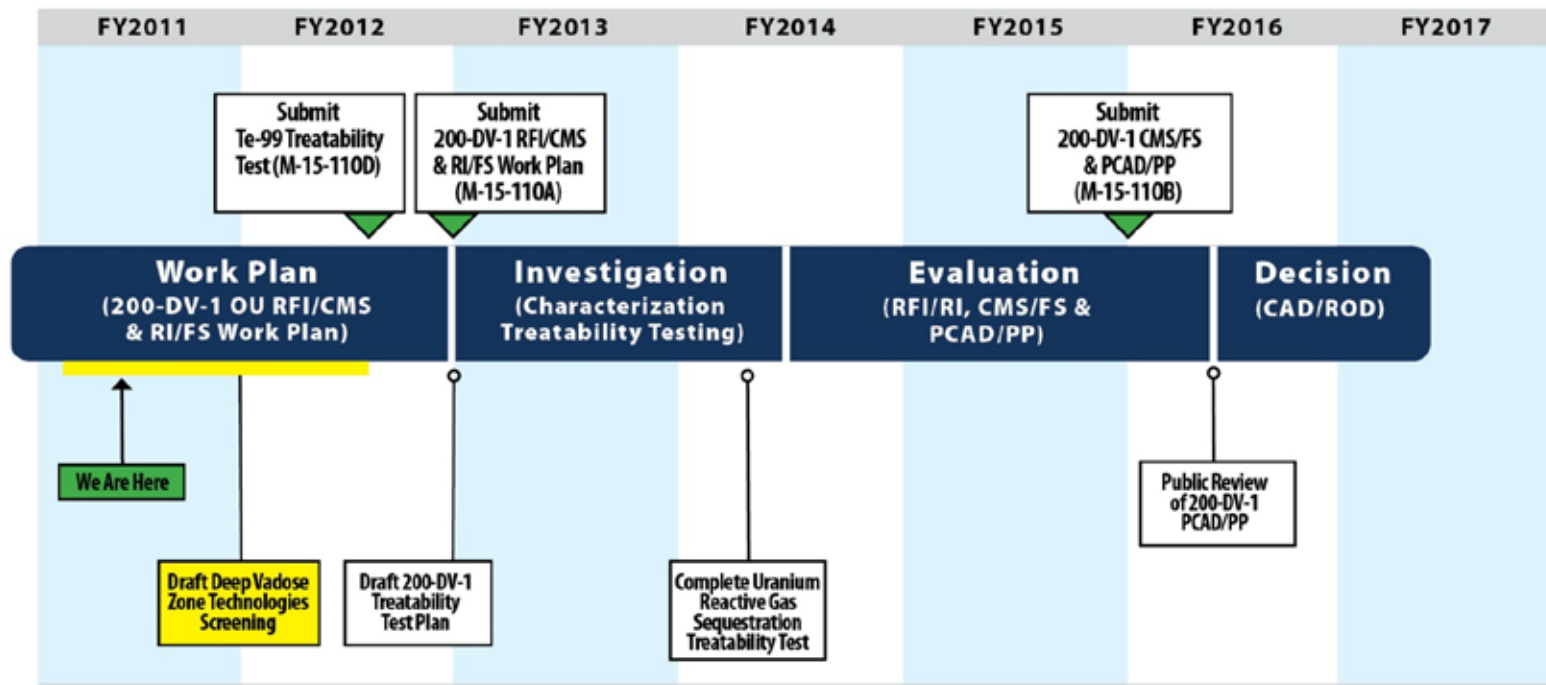
**Applied Field Research Initiative**

**Coordinated and integrated research and technology development initiative for the deep vadose zone.**

# On-going and Planned Remediation and Testing



# Deep Vadose Zone (200-DV-1) OU Timeline



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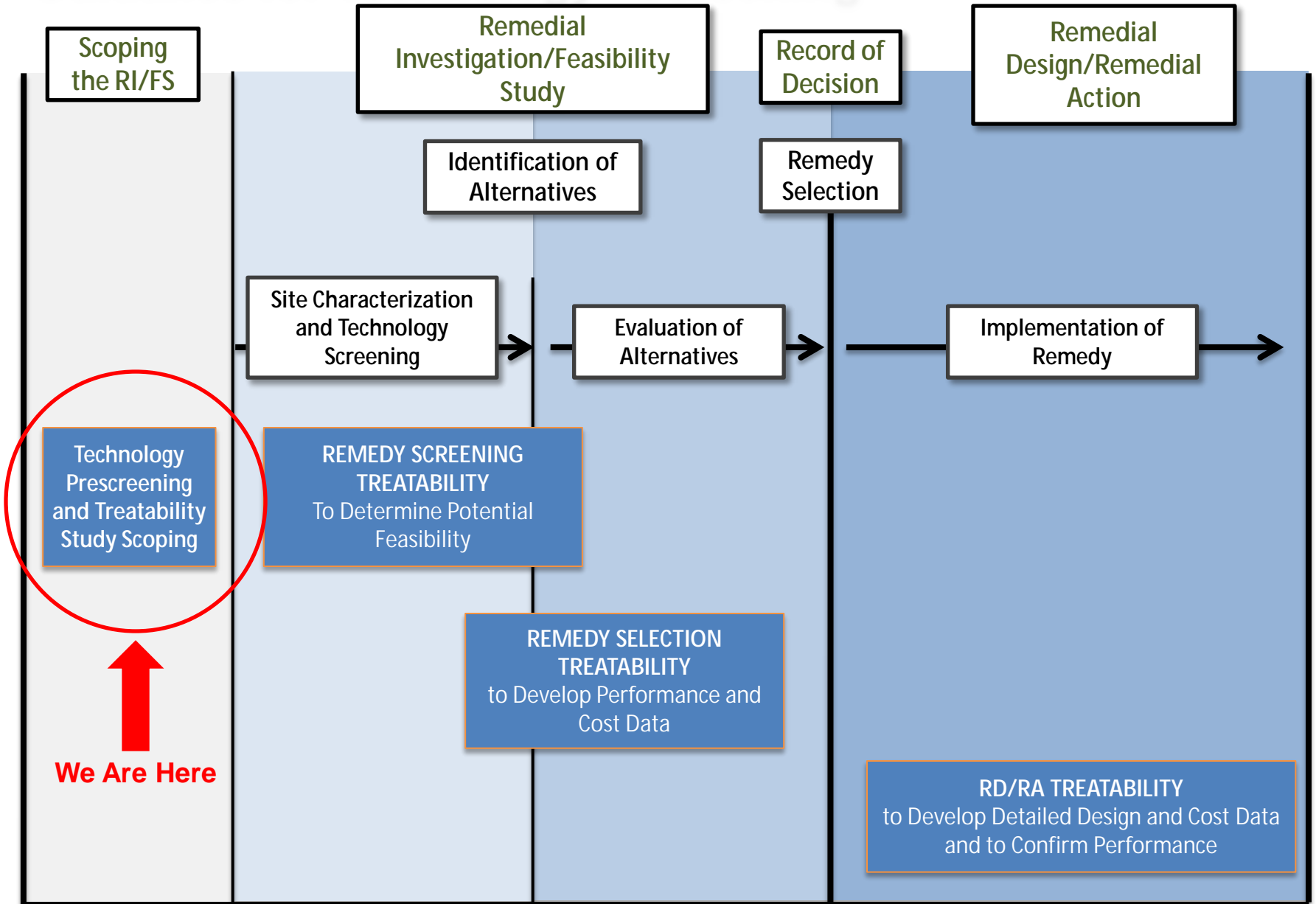
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# Setting the Stage

- Regulatory Guidance
- Evaluation Process
- Technologies



# Guidance for Technology “Screening”



Reference: Guidance For Conducting Treatability Studies Under CERCLA (EPA/540/R-92/071a)



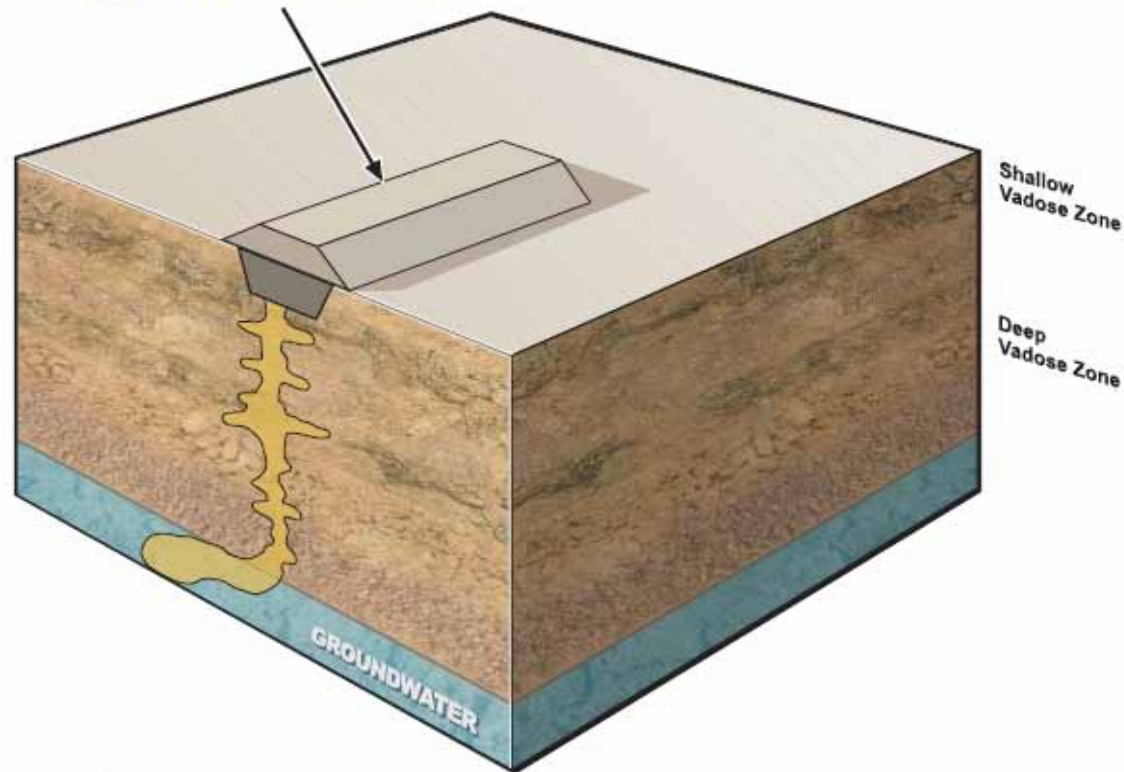
# Technologies Identification

- Utilized previous evaluations at Hanford (e.g., DVZ Treatability Test Plan, DOE/RL-2007-56)
- Integrated with other technology screening efforts (e.g., River Corridor FS, 300 Area FS)
- Identified technologies from sites across the country with similar deep vadose zone contamination
- Incorporated knowledge from Deep Vadose Zone Applied Field Research Initiative



# Containment Technologies

## Engineered Barriers



## Containment

Surface-based remedies impede moisture from entering the soil where it can force contamination downward to the groundwater.

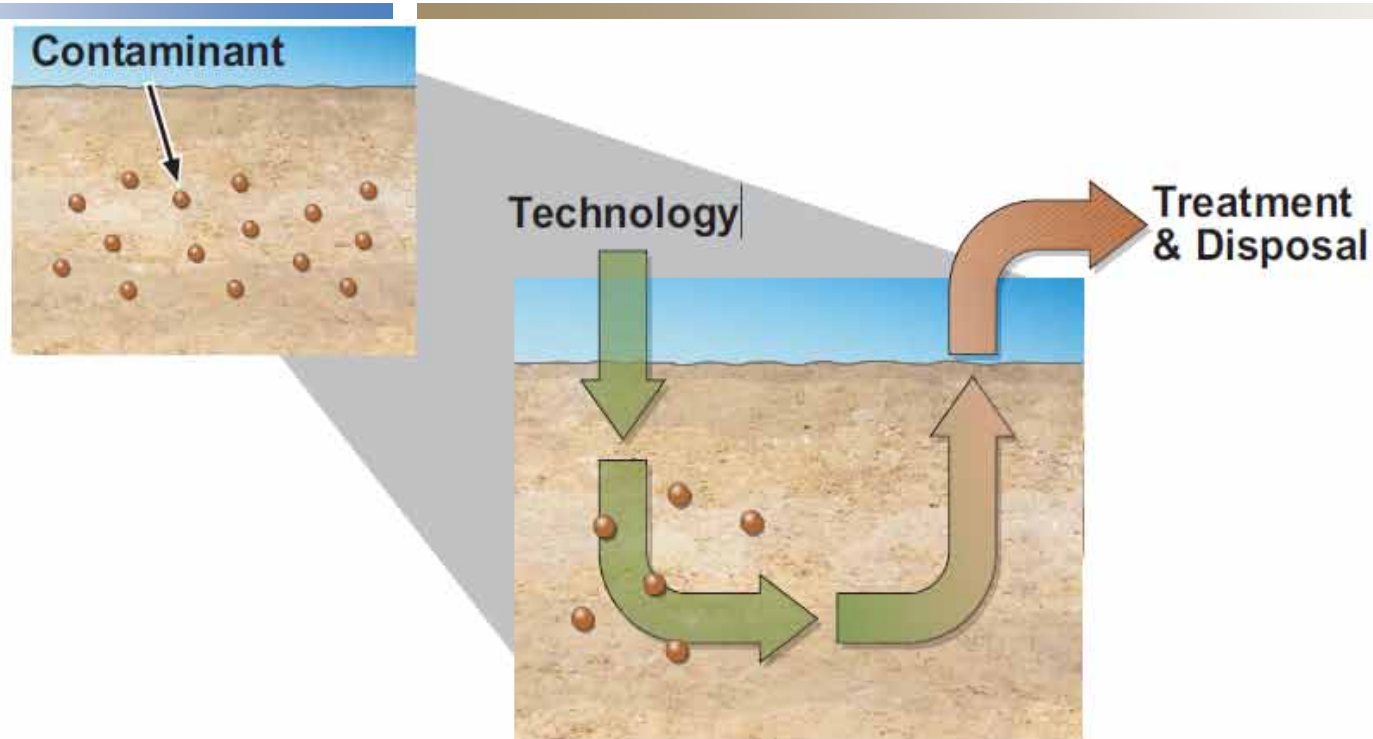
# Removal Technologies



## Removal

An action or technology is applied to remove the contamination for disposal.

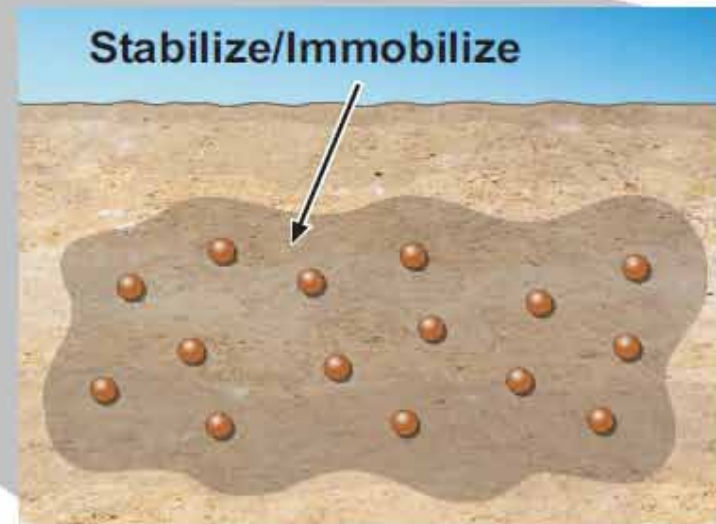
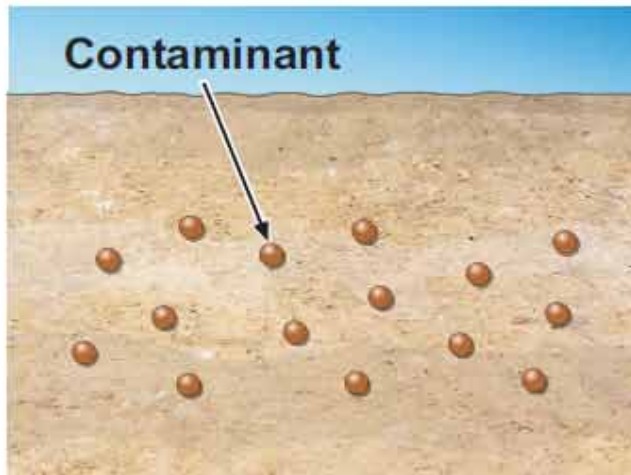
# Ex-situ Treatment and Disposal Technologies



## Ex-situ treatment and disposal

An action or technology is applied that removes the contaminant from its current location to be treated elsewhere and then disposed.

# In-situ Treatment Technologies



## In-situ treatment

An action of technology is applied to contaminants where they reside, stabilizing and/or immobilizing the contaminant to decay or altering the contaminant to a less hazardous form.

# Today's Information Exchange

- Share our progress on deep vadose zone technology identification
- Receive feedback on the technologies and path forward
- Agenda for the remainder of the day:

Time	Group 1	Group 2
9:30	Containment In-Situ Treatment	Removal Ex-situ Treatment and Disposal
11:30	Lunch	Lunch
12:30	Removal Ex-situ Treatment and Disposal	Containment In-Situ Treatment
2:30 - 4:00	Reassemble for large group discussion	
4:00 - 4:30	Next steps	