



Hanford Site

Groundwater/Vadose Zone Integration Project

Vadose Zone Transport Field Studies Broad Test Plan

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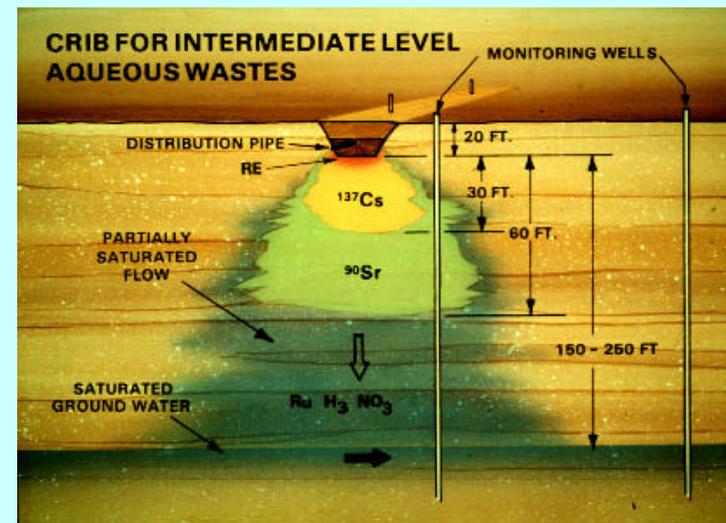
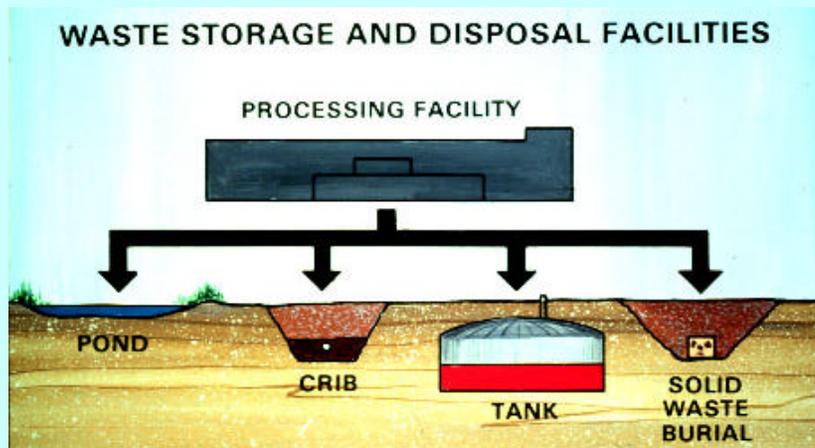
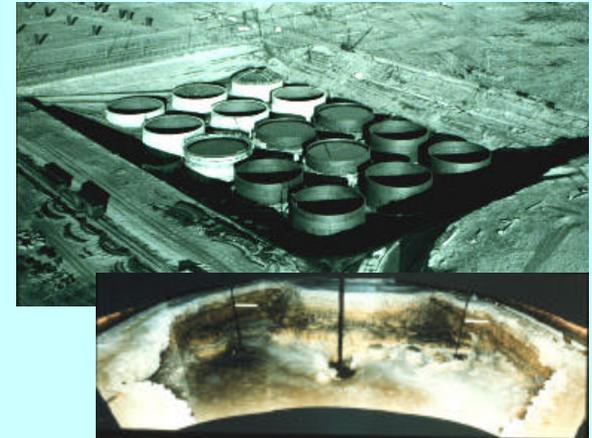


Outline

- Vadose Zone Issues
- Transport Field Study Objectives
- Scientist/User Team
- Project Focus
- Schedule

Background

- 177 High Level Waste Tanks
- 54 Million Gallons of Radioactive and Hazardous Waste-Stored in Tanks
 - Caustic, $10 < \text{pH} < 14$
 - Saline, $6 < N < 10$
 - Dense, Specific Gravity ≈ 1.4
- Tank Leaks (67 of 149 single-shell tanks have leaked a total of more than 1 million gallons)



Problem

- Time frame in which DOE needs to assess hazards and options for disposal/remediation dictates the use of models
- Traditional vadose zone transport theory and modeling approaches inadequate for explaining observed distribution of contaminants
 - variable recharge
 - small-scale variability in lithology

Hanford Vadose Zone Issues

- High Level Waste Tanks Have Leaked into the Vadose Zone-VZ Plumes Problematic
- Ground Water Beneath Tank Farms is Contaminated with Tank Waste (e.g., Tc-99)
- Current VZ Monitoring Inadequate
- Current VZ Modeling Inadequate

VZ Transport Field Study Objectives

- Focus on Tank Leak Issues
- Improve VZ Monitoring Capability
- Identify Key Transport Processes
- Provide Data for Model Verification

Scientist/User Steering Group

Hanford Site Coordinators

¹Glendon Gee-PNNL (Lead)
¹Anderson Ward-PNNL(Co-Lead)

Hanford Site User Representatives

Tony Knepp- (RPP, Tank Farm Characterization)
Fred Mann- (ILAW)
George Last- PNNL (SAC)
Bruce Ford- (200 Area Sites)
Vern Johnson-PNNL (RCRA GW)
Rob Yasek- DOE-RL (RPP Rep)
David Olson-DOE-RL (GW Rep)
Jim Hanson-DOE-RL (S&T Lead)

National Laboratory Representatives

¹Everett Springer- LANL
¹Don DePaolo- LBNL (also Vadose Zone Transport Model Representative)
¹JB Sisson- INEEL
Ken Jackson-LLNL
John Zachara-PNNL (Vadose Zone Representative Sites Interface)

EMSP Representatives

Phil Meyer- Project 70187 (PNNL_
Phil Jardine- Project 70219 (ORNL)
Charles Carrigan- Project (LLNL)
Chris Murray-Project 70193 (PNNL)
Greg Newman-Project 70220 (SNL)

Project Focus

- Tank Leak Issues-Accelerated Leaching
- Plume Detection using Existing Wells
- Effects of Flow Induced Anisotropy
- Solution /Sediment Interaction on Transport

Project Schedule

- FY2000
 - Nov.- Review Test Plan
 - Jan.- Advanced Characterization Workshop
 - Apr- Detailed Test Plan for Field Test
 - May- First Tracer Test (Simulated Tank Site)
 - Sept- Analyze Data from First Test
 - Sept- Prepare Detailed FY01 Test Plan

Project Schedule (cont.)

- FY 2001
 - Oct.-2nd Field Test Workshop
 - Nov.- Finalize 2nd Tracer Test Plan
 - Jan.- Select Advanced Characterization Tools
 - Feb.-Begin 2nd Tracer Test (Simulated Tank)
 - Aug.-Complete Leak Simulation Report
 - Sept.-Prepare Detailed FY 02 Test Plan

Project Schedule (cont.)

- FY 2002
 - Oct.- Third TM and Field Test Workshop
 - Nov.- Finalize Deep Sediment Tracer Test Plan
 - Feb.- Begin Deep Sediment Tracer Test
 - Aug.- Complete Deep Transport Report
 - Sept.- Prepare Detailed FY 03 Test Plan

Project Schedule (cont.)

- FY 2003
 - Oct.- Fourth Field Test Workshop
 - Nov.- Finalize 2nd Deep Tracer Test Plan
 - Feb.- Begin 2nd Deep Sediment Tracer Test
 - Aug.- Complete 2nd Deep Transport Report
 - Sept.- Prepare Detailed FY 04 Test Plan