

**FY2001 EMSP VADOSE ZONE PRINCIPAL INVESTIGATOR WORKSHOP
NOVEMBER 28-30, 2000**

FINAL PROGRAM AGENDA

WR Wiley Environmental Molecular Sciences Laboratory
Pacific Northwest National Laboratory, Richland, WA

TUESDAY, NOVEMBER 28 – *Battelle Auditorium*

8:00 - 8:30 Registration

INTRODUCTION (For All Investigators)

8:30 - 8:45 Welcome from the Groundwater Vadose Zone Integration Team
(Mike Graham, BHI and John Zachara, PNNL)

8:45 - 9:00 Workshop Goal (Chet Miller, DOE)

9:00 - 9:30 EMSP Program and Hanford Site Linkages (Mark Gilbertson, DOE)

9:30 - 10:00 Extending EMSP Research to DOE Sites: Subcon Focus Area (Jim
Wright, SRTC)

10:00 - 10:15 BREAK

TANK WASTE AND DNAPL GROUPS BREAK APART

I. CARBON TETRACHLORIDE PROGRAM

(Bob Lenhard to preside)

TUESDAY, NOVEMBER 28 -- *EMSL Auditorium*

10:15 - 10:45 Introduction and Objectives of DNAPL Working Group (Mark
Freshley, PNNL)

10:45 - 11:00 CCl₄ Contamination History at Hanford (Craig Swanson, CH2M Hill)

11:00 - 11:45 Current Knowledge and Conceptual Models of the Hanford CCl₄
Plume (Craig Swanson, CH2M Hill)

11:45 - 12:00 Discussion

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12:00 - 1:00	LUNCH
1:00 - 1:30	Project 55395, Steve Conrad, "Physics of DNAPL Migration and Remediation in the Presence of Heterogeneities"
1:30 - 2:00	Project 70035, Susan Powers (Stefan Grimberg to present), "DNAPL Surface Chemistry: Its Impact on DNAPL Distribution in the Vadose Zone and its Manipulation to Enhance Remediation"
2:00 - 2:30	Project 70045, Al Valocchi (Charles Werth to present), "Investigation of Pore-Scale Processes which Affect Soil Vapor Extraction"
2:30 - 3:00	Project 70052, John Bradford, "Material Property Estimation for Direct Detection of DNAPL Using Integrated Ground-Penetrating Radar Velocity, Imaging, and Attribute Analysis"
3:00 - 3:15	BREAK
3:15 - 3:45	Project 70165, Fred Brockman, "Integrated Field, Laboratory, and Modeling Studies to Determine the Effects of Linked Microbial and Physical Spatial Heterogeneity on Engineered Vadose Zone Bioremediation"
3:45 - 4:15	Project 54585, Frank Schwartz (Yongkoo Seol to present), "Permanganate Treatment of DNAPLs in Reactive Barriers and Source Zone Flooding Schemes"
4:15 - 4:45	Project 70050, S. Michael Angel (David Gold to present), "Novel Optical Detection Schemes for In-Situ Mapping of Volatile Organochlorides in the Vadose Zone"
4:45 - 5:00	Discussion

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I. CARBON TETRACHLORIDE PROGRAM – Cont’d

WEDNESDAY, NOVEMBER 29 -- *EMSL Auditorium*

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|---------------|--|
| 8:25 - 8:30 | Outline of Schedule for the Day |
| | Other Relevant Scientific Investigations |
| 8:30 - 8:50 | Bob Lenhard, “Density-Driven Vapor Flow of Chlorinated Solvents” |
| 8:50 - 9:10 | Mart Oostrom, “Carbon Tetrachloride Movement in Unsaturated Heterogeneous Porous Media: Flow Cell Experiment Observations” |
| | Future Activities and Current Needs |
| 9:10 - 9:40 | Future Plans for DNAPL Characterization and Remediation at Hanford (Arlene Tortoso, DOE) |
| 9:40 - 10:00 | BREAK |
| 10:00 - 10:30 | DNAPL Critical Science & Technology Needs (Scott Petersen, BHI) <ul style="list-style-type: none">➤ Characterization➤ Modeling➤ Corrective/Remedial Technologies |
| 10:30 - 12:00 | Discussion <ul style="list-style-type: none">➤ How can the current scientific work by EMSP investigators be used toward addressing the CCl₄ contamination problems at Hanford in the vadose zone and groundwater? |
| 12:00 - 1:00 | LUNCH |
| 1:00 - 3:00 | Discussion – Cont’d |
| 3:00 | Adjourn |

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**II. TANK WASTE IN THE VADOSE ZONE PROGRAM
SESSIONS A and B
(John Zachara to preside)**

TUESDAY, NOVEMBER 28 -- EMSL/Room 1075

BACKGROUND

- 10:15 - 10:45 1) Tank Waste Release in the Tank Farms (Vern Johnson, PNNL)
- Monitoring Program and Trigger for Evaluation of Corrective Measures
 - Monitoring Data Driving RCRA Assessment and Preliminary
- S-SX, B-BX-BY, T-TX-TY, U
- 10:45 - 11:15 2) Current Regulatory Mandates (Phil Rogers, Jacobs Engineering)
- Characterization
 - Assessment of Potential future Migration
 - Potential Corrective Measures (e.g., barriers)
 - The Communication Vehicle (FIR)
- 11:15 - 11:45 3) Retrieval Plans (Jerry Cammann, CH2M Hill)
- Baseline and State of Planning
 - Schedule
- 11:45 - 12:00 Discussion – Background Issues
- 12:00 - 1:00 LUNCH

SESSION A – GEOCHEMISTRY (John Zachara to preside)

- 1:00 - 1:30 Project 70163, Andy Felmy, “The Aqueous Thermodynamics and Complexation Reactions of Anionic Silica Species to High Concentration: Effects on Neutralization of Leaked Tank Wastes and Migration of Radionuclides in the Subsurface”
- 1:30 - 2:00 Project 70070, Kathryn Nagy, “Reactivity of Primary Soil Minerals and Secondary Precipitates Beneath Leaking Hanford Waste Tanks”

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- 2:00 - 2:30 Project 70081, Sam Traina (Cal Ainsworth to present),
“Immobilization of Radionuclides in the Hanford Vadose Zone by
Incorporation in Solid Phases”
- 2:30 - 3:00 Project 70126, Jon Chorover, “Collaboration: Interfacial Soil
Chemistry of Radionuclides in the Unsaturated Zone”
- 3:00 - 3:15 BREAK
- 3:15 - 3:45 Project 73758, John Zachara, “Fixation Mechanisms and Desorption
Rates of Sorbed Cs in High Level Waste Contaminated Subsurface
Sediments: Implications to Future Behavior and In-Ground Stability”
- 3:45 - 4:15 Project 70146, Richard Reeder, “Spectroscopic and Microscopic
Characterization of Contaminant Uptake and Retention by Carbonates
in Soils and Vadose Zone Sediments”
- 4:15 - 4:45 Project 70121, Scott Chambers, “The Influence of Calcium Carbonate
Grain Coatings on Contaminant Reactivity in Vadose Zone
Sediments”
- 4:45 - 5:00 Discussion

II. TANK WASTE IN THE VADOSE ZONE PROGRAM – Cont’d

WEDNESDAY, NOVEMBER 29 -- EMSL/Room 1075

SESSION A – GEOCHEMISTRY - Cont’d (John Zachara to preside)

- 8:00 - 8:30 Project 70177, Nancy Hess, “Technetium Attenuation in the Vadose
Zone: Role of Mineral Interactions”
- 8:30 - 9:00 Project 70176, Heino Nitsche (Dawn Shaughnessy to present),
“Transuranic Interfacial Reaction Studies on Manganese Oxide
Hydroxide Mineral Surfaces”
- 9:00 - 9:30 Project 73819, Mary Neu, “Plutonium Speciation, Solubilization, and
Migration in Soils”

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- 9:30 - 10:00 Project 70132. Ken Buesseler (Jim Kelley to present), "Speciation, Mobility, and Fate of Actinides in the Groundwater at the Hanford Site"
- 10:00 - 10:15 Discussion
- 10:15 - 10:30 BREAK

SESSION B – WATER AND WASTE MIGRATION (Glendon Gee to preside)

- 10:30 - 11:00 Project 70267, David Alumbaugh, "A Hydrologic-Geophysical Method for Characterizing Flow and Transport Processes within the Vadose Zone"
- 11:00 - 11:30 Project 70135, Markus Flury, "Colloid-Facilitated Transport of Radionuclides Through the Vadose Zone"
- 11:30 - 12:00 Project 70069, Tetsu Tokunaga, "Fast Flow in Unsaturated Coarse Sediments"
- 12:00 - 1:00 LUNCH
- 1:00 - 1:30 Project 70108, Patricia Berge, "Effects of Fluid Distribution on Measured Geophysical Properties for Partially Saturated, Shallow Subsurface Conditions"
- 1:30 - 2:00 Project 70219, Philip Jardine, "Fate and Transport of Radionuclides Beneath the Hanford Tank-Farms: Unraveling Coupled Geochemical and Hydrological Processes in the Vadose Zone"
- 2:00 - 2:30 Project 73773, Don DePaolo (Mark Conrad to present), "Isotopic Tracers for Waste Fluid Tracking and Fluid-Soil Interactions: Hanford, Washington"
- 2:30 - 3:00 Project 70149, Charles Carrigan, "The Dynamics of Vadose Zone Transport: A Field and Modeling Study Using the Vadose Zone Observatory"
- 3:00 - 3:15 BREAK

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WEDNESDAY, NOVEMBER 29

- 3:15 - 3:45 Vadose Zone Test Facility, Glendon Gee
- 3:45 - 4:15 Project 65410, Andy Ward, "Rapid Migration of Radionuclides
Leaked from High-Level Waste Tanks: A Study of Salinity
Gradients, Wetted path Geometry and Water Vapor Transport"
- 4:15 - 4:45 Project 70187, Philip Meyer, "Quantifying Vadose Zone Flow and
Transport Uncertainties Using a Unified, Hierarchical Approach"
- 4:45 - 5:15 Project 70220, Greg Newman (Michael Hoversten to present), "High
Frequency Electromagnetic Impedance Imaging for Vadose Zone and
Groundwater Characterization"

II. TANK WASTE IN THE VADOSE ZONE PROGRAM – Cont'd

THURSDAY, NOVEMBER 30 -- EMSL/Room 1075

SESSION B – WATER AND WASTE MIGRATION (Glendon Gee to preside)

- 8:00 - 8:30 Project 70193, Chris Murray, "Influence of Clastic Dikes on Vertical
Migration of Contaminants in the Vadose Zone at Hanford"
- 8:30 - 9:00 Project 70115, Rosemary Knight, "The Use of Radar Methods to
Determine Moisture Content in the Vadose Zone"
- 9:00 - 9:15 Discussion
- 9:15 - 9:30 BREAK

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**III. NEW CONCEPTUAL MODELS AND RESULTS INTEGRATION
CHARACTERIZATION RESULTS FROM S-SX**

THURSDAY, NOVEMBER 30

- 9:30 - 10:15 Characterization Results from the S-SX Tank Farms (Jeff Serne, PNNL)
- Core Collection
 - Analytical Data from 3 Subtank Cores
 - New/Revised Conceptual Models
- 10:15 - 11:00 Discussion

IV. NEAR-TERM PLANS AND OPPORTUNITIES

- 11:00 - 11:30 FY01 Characterization Plans in B-BX-BY and T-TX-TY Tank Farms (Marc Wood, Fluor Hanford)
- BX-102, B-112
 - Scientific/contaminant issues
 - Sampling plan/schedule
- 11:30 - 11:45 Discussion
- 11:45 - 12:15 200 Area Soil Site Assessment (Curt Wittreich, CH2M Hill)
- Scavenged waste sites
 - PW-1/PW-2
- 12:15 - 12:30 Discussion
- 12:30 - 1:00 Concluding Remarks/Path Forward
- 1:00 Adjourn