

**CCN: 075953**

**SUBJECT** GROUNDWATER/VADOSE ZONE INTEGRATION OPEN PROJECT MEETING -  
JANUARY 3, 2000

**TO** Distribution

**FROM** Michael J. Graham, Groundwater/Vadose Zone Integration Project Manager

**DATE** January 12, 2000

**ATTENDEES**

See Attached List

**DISTRIBUTION**

Attendees  
Attendees  
GW/VZ Distribution List  
Document and Information Services H0-09

**NEXT GW/VZ INTEGRATION PROJECT OPEN MEETING:**

Next Meeting: Monday, February 7, 2000 – 1-3 p.m.  
Location: Bechtel Hanford, Inc., Assembly Room (Badging Required)  
Local Call-In Number: (509) 376-7411  
Toll Free Call-In Number: (800) 664-0771

**NOTE: The Open Project Meeting scheduled for January 17, 2000 has been canceled due to a Federal Holiday (Martin Luther King, Jr. Birthday Observance) on that date.**

**MEETING MINUTES:**

A Groundwater/Vadose Zone (GW/VZ) Integration Project Open Meeting was held on January 3, 2000 in Richland, Washington, at the Bechtel Hanford, Inc. (BHI) Assembly Room.

**PROJECT REPORT:**

◆ **RPP Assessment - Field Work Status (Tony Knepp)**

Field work status for Tank Farm is divided into two areas: 1) shallow soil collection with cone penetrometer (CPT), and 2) deep soil collection by drilling. We will do a CPT Push for Tank Farm personnel to see outside of the Tank Farm, and we will be in the field around the third week in January. We will push about 55-60 feet, exploring near surface leaks.

We will start drilling within the Tank Farm within the next 3 months. In a month we will test the drilling angle, test the sampling method, and the amount of ground acceleration caused by the driving technique. We are hoping to get going in 30-40 days. First we will get the penetrometer piece done and test the drilling work, make any changes necessary in a 30 day period, and then get back into the Tank Farm and drill under a tank.

We are also ready to initiate planning for next fiscal year in the B-BX-BY Area. We will have a subsurface characterization data report and will pull that information together to make a decision on where we will want to get new data. We will have small focus group meetings, if there is anyone who would like to be involved, please let me (Tony Knepp) know. Right now our plan is to have technical people work on individual elements. After the plan is put together, the work will be taken to Ecology and EPA for their review, but prior to that we will have internal meetings.

Regarding the Criteria Selection Document, we have six vendors showing interest. Indications of interest will close the 21<sup>st</sup> of the month. We are waiting to see what interest we can gather from outside.

◆ **200 Area Environmental Restoration** (Michael Graham)

We would like to talk about the upcoming events and investigation and assessment work in the 200 Area. Bryan Foley, can you provide an update on the 200 Area.

The 200-CS-1 Work Plan is out for public review until January 14. We are moving ahead with TW-1 and TW-2 scavenged waste groups which have been delivered to the regulators for review and should wrap up in the next few weeks.

Comment: I'm curious how the System Assessment Capability (SAC) people feel about whether there is integration and if you understand their data needs in relation to your data needs.

Response: We do have that kind of communication. Bruce Ford is crucially involved. We know where the SAC is in their work and at what point it will be appropriate to talk about data needs and how that will happen.

Comment: I have this vision of these huge data needs necessary for the SAC, and I want to be sure that you are talking to one another.

Response: The communication links are there. At this point we understand what needs we each have and through the DQO process we will pick up all the needs. We have moved a long way past communication problems.

◆ **Science and Technology** (Mark Freshley)

We have some workshops planned for the third week of January. First is a Vadose Zone Advanced Characterization Workshop on January 19-21 (now scheduled January 19-20 at the Pacific Northwest National Laboratory Environmental Molecular Sciences Laboratory (PNNL-EMSL) Facility). We are intending to bring together some of the Principal Investigators (PIs) for the Environmental Management Science Program (EMSP) awards who were here in November and discuss specifically how their projects and technologies fit into what we are planning for the vadose zone test facility. We have invited industry representatives and people from other national labs. The emphasis is on having people come and present their technology and methods and have a discussion on how that can fit into our plans. They are working on finalization of the agenda this week. The holidays have slowed things down, but by the end of the week we should have a final agenda. If you want more information, you can go through the GW/VZ Integration Project Home Page, select Science and Technology at the

bottom which is linked to the Hydrology Group Home Page which has the invitation letter posted. When we get the agenda and location at the end of the week we will post it there as well.

Question: What is the correct date of this workshop?

Answer: It is correct on the Look Ahead Calendar (January 19-20).

Question: Is this tied into the DOE Low Dose Program or principles?

Answer: I don't know that answer, I can get back with you.

◆ **System Assessment Capability Workgroup** (Bob Bryce)

On December 15, 1999 we held a work group meeting to discuss technical issues and get input on which we should attack first. Bruce Ford and Rich Pawlowicz discussed the process for addressing issues and the protocol that is being developed for the GW/VZ Integration Project. We got good feedback and are reworking some things from that feedback. As part of this meeting we reviewed issues. We looked at a table that we put together to aggregate issues into ten topics that we felt captured the highest priority activities. We discussed the list and on-going work. We talked about other issues that should be considered for an early start. The participants ranked the topics to be addressed first. The top four were: uncertainty, distribution coefficient (Kds), risk, and how barriers will deteriorate. Since Dib was unable to attend, we want to go over the information with him and then we will draft up statements of work and move forward.

Question: How is Dib doing?

Response: I (Mike Thompson) talked with him before Christmas and he is expected to be back at work today.

Comment: You presented a pretty rosy summary of the December 15<sup>th</sup> meeting. Were there any differing views?

Response: There was concern that there are not enough resources to deal with the issues that have been raised. We share that concern. The fact that the project is implementing a formal process to address the issues and that it will feed to the DWP process in the future makes me feel that we are taking a management approach. The issues that were raised and identified through the protocol will be prioritized through the DWP process, just like our other work. The small amount of work we have proposed is not the answer to the bigger issues, and we all recognize that.

Comment: It seems that you spent a lot of man hours to decide on how to spend man hours. You need to think about what size activity we want to put out on the table.

Comment: There are a number of serious concerns represented by Oregon. Timeliness of response is inadequate is one. It will be over a year before addressing these issues. Lumping them into grand categories defaces many of the issues in the comments. We expect that all comments

will be addressed in detail in a timely fashion. If the comments are not going to be addressed, there isn't any point in public involvement. Lumping them creates a sham.

Comment: There are a thousand issues. They can't all be addressed at the same time. Kds has been with us for years and that understanding will go along as we go along. What if I were to state that it becomes a high priority issue and that it has to be done right now and we should drop dose response.

Comment: That occurs at the end of the analytical process.

Comment: In your opinion.

Response: Let me talk for the project (Michael Graham). Dirk, I hear your concerns and we will need to sit down and go over some of these issues. You have had an impact on the project and public involvement has had an impact on the project. Maybe because we run an open project it is difficult to see, but they are constant. I believe that the public involvement process isn't a sham. People have their fingerprints all over this project. What is difficult is setting priorities when people have such divergent views. We have people who believe we shouldn't be doing modeling, only field work, and then we have just the opposite. We are trying to balance all these different views and that will be frustrating. Maybe lumping is a bad approach.

Comment: If we can't sort out the most important and what we know and what we don't. Unfortunately, we seem to be on a different path from the Columbia River Comprehensive Impact Assessment (CRCIA) and I don't see how we can succeed on the path that we are on.

Comment: CRCIA didn't even develop an approach other than to do everything all at once. They developed requirements, not an approach.

Comment: The CRCIA process is outlined in the first part of the document, which is looking at uncertainty and fidelity. Look at a large scale of where you are at and work your way further from that.

Response: Let's look at that. If you are going to look at uncertainty and dominance for everything, then Rev. 0 would grow to much bigger than a first cut approach. We are in a "Catch 22" here -- either we are trying to do something that evolves with time, which is the concept of SAC, or we have to look at all requirements, and we have to do them now. We need to take a deep breath and see what we are doing.

Comment: I propose that Michael Graham and Dirk Dunning sit down and propose an alternate approach.

Response: Again, this is not an easy problem, but we do need to be gathering some positive momentum. In our discussion before the holidays the consensus was that we needed to get everyone pulling together.

Comment: Dirk, will you write down an outline and share it with us?

Response: I will try to get that done in the next two weeks.

Response: I know the team of people who work on this project, and they are all trying to do the right things. When we get frustrated, Marty and Dirk, if we can figure out what we can do together we can solve this problem. Let's start the new year on a new foot.

◆ **Regulatory Path Forward Workgroup** (Moses Jarayssi)

I'm trying to figure out if it is a blessing or a curse to follow the SAC on these discussions.

On December 15 we had the third workshop on the 100 Area Groundwater Waste Group, concluding the discussion on that area. Representatives from all three Tribes were present. The workshop included a discussion on stewardship. Barbara Harper made a presentation on all the efforts that DOE is taking for stewardship. It was a brief discussion, but an eye opener on the many efforts going on that we need to pay attention to. We talked about the way the information that is generated would be put together and passed on to the end users, the SAC and the core projects. The Working Group will generate a Waste Group Report, which includes eight sections: Waste Group Description, Existing Condition of Waste Group, Cleanup Disposition and End Point Scenarios, Strategic Planning and Regulatory Integration, Stewardship, S&T Gaps, Overriding Issues, and Recommended Actions.

At the end of the workshop we asked the group members to make final recommendations. We have a list of very good recommendations that the SAC and Groundwater can use. Just to mention some of these points. Stuart Harris emphasized stewardship, which the Tribe would like to participate in discussing. The Tribe would like to discuss aggregate areas, rather than site-by-site. Barbara Harper wanted to make sure the SAC tools were useable by the tribes. Modeling should be as complex as the need, but not go too complex. Gordon Rogers said to look at comparative risk instead of absolute, which is costly and may not be able to be maintained. Dirk Dunning wanted to take into account the work by the Natural Resource Trustee Council and keep in mind innovative technology and remediation demonstration for treatment of strontium. Phil Staats believes that the optimum scenario of protecting the human health and the environment is attainable by 2018. Wayne Soper said that the only way we would get progress on Groundwater cleanup is to deploy new technologies. We will put all of these recommendations in the report and hope to have a draft completed by the 15<sup>th</sup> of this month.

Our next step is to look at the impact of cleanup of the source units and how that will link. We will meet with Vern Dronen and George Henckel and link those two up in this month, hopefully by the 27<sup>th</sup>.

Question: Sounds like your product and the SAC project are the same thing. What wasn't mentioned was specific impact metrics. What will the model calculate to provide to someone else to make a judgement?

Response: We aren't doing the same thing, what we do will feed the SAC.

Comment: Parametric analysis is a different level of cleanup and impact of downstream of the source

and the heart of what this project is all about.

Response: You are right. The Regulatory Path Forward Group is to come up with the scenario that will feed the SAC so they can do their analysis.

Comment: Cleanup option number one is dose to individual and is the easy one. I don't hear much about the others. What does it take to hurt a fish, or a crop? At what point is it harmed? We don't want to cleanup too much.

Response: We've identified a series of risk metrics that we would calculate in SAC Rev. 0. There are several we will look at for ecological, human health, cultural and economics.

Question: What are the units? That is the metric I am curious about. Is there something you will actually measure?

Answer: There are two that we will look at for Rev. 0. Others were identified, but we are applying land impact and cultural sites that would be impacted by contaminant plumes.

Comment: Barbara Harper thought that the exposure for use shouldn't exceeded 1mrem per year. That should be visual so that it can be challenged.

Response: We don't have the decision process and how this gets used to make a decision. At this point I don't know if anyone has articulated how they will use this information.

Response: What information will you provide to those who need to make the decisions. The project won't make the decision, but provide information so that others can decide.

Response: First the area of land impacts, and second, what cultural resources that are impacted with contamination.

Question: What is definition of impact? Does that mean it isn't useable, and if it is used there is a high risk of cancer? At what point is the impact that you would say, "Don't use?"

Response: If it is contaminated by Hanford, it has an impact on the cultural value. We can only provide the data for their ability to make the assessment. We will provide information of future contamination and they can then work with the decision-makers on how that information will be used.

Response: Bob Bryce is creating a tool.

Response: When it comes to tribal things, it is the tribes that will have to assess what the impact is. I can't judge, the people who are impacted will have to decide.

Response: Moses is leading a good group to determine the areas that we need to address. When his report comes out he will invite everyone to review it.

Question: How long will we have?

Response: I don't have a specific time, but let's say 45 days.

◆ **Integration Project Expert Panel** (Michael Graham)

We have attached a Draft Agenda for the Expert Panel Meeting on January 26-28. This agenda is based on discussions we had with Dr. Berkey early last month. It was drafted on December 9. We are working with Dr. Berkey. The panel is independent and not necessarily focused to our schedule.

The high points of the agenda are that we want to start with. First will be an update since the last meeting. Here's what we said we would do, this is what we have done and where we are. Also, we want to provide the panel with a written response to their recommendations so that they can see what we are doing with them, and whether we are on track and if they agree.

The panel has focus areas, one is the SAC. There is draft material that is going out today for their review. We will get that on the web for those who would like to see it.

The panel also wants to focus on modeling and transport. Also, we have an extended period of time for stakeholder, Tribal Nations, and regulator input. We have put that at the end of the day, that way we can go longer if necessary. Ecology wanted some extended time, however, with Dib being out we haven't closed the loop yet on that.

The panel will be here for three full days. Dr. Berkey wanted to work at ways to be more effective and not result in much of an increase in cost. We will talk about S&T in an overview in the morning session. Kevin Crowley from the National Academy of Science will be here and give a status of what their plans are so that they and the Expert Panel don't overlap. We will also cover some of the EMSP efforts.

In the afternoon will be field work in the 200 Area and Tank Farms. We will talk about new information and what it means.

The panel wants more time to work on their own as a panel, so they will work Friday morning and have a closeout session from 1-3 p.m.

Comment: If Ed is looking for a way to be more effective, it would be helpful to get as much material as soon as possible to them so they can get through it before they get here.

Response: These panel meetings are not established around our deliverables, so we have a balancing act of due process, and we are trying to get things out as soon as possible.

Question: Can you send the information sent to the panel to the State of Oregon as well?

Response: We will take care of that.

Please keep in mind that we have not heard back from the panel, so treat this agenda as a draft. We will put updates on the web.

◆ **TPA Milestone M-24 and Well Decommissioning** (Mike Thompson)

We have a capital line item for funding Resource Conservation and Recovery Act of 1976 (RCRA) wells. The eight wells we are putting in will be done next month and will deplete the funding from Congress. That puts out-year planning with no above the line funding for additional RCRA wells. DOE has been in contact with Ecology. We told them that we agree that they are important, but to meet the budget we had to put it below the line and we would put it on the table and reprioritize. We have asked for cost efficiencies, but that won't fund M-24 and well decommissioning at full level funding. With Dib out we haven't made much progress. We expect it will progress at the Brown Bags with Ecology. Also, we expect it will be a compliance issue with Fiscal Year 2001.

◆ **CRCIA Team/Integration Project Meeting Update** (Mike Thompson)

We have a meeting with the CRCIA Team in a couple of weeks, which will serve as a pre-meeting before the technical workshop.

Question: Will it be an open meeting?

Response: No, but agreements will be documented and shared.

Question: Why a special relationship with one set of stakeholders?

Comment: I think this needs attention. I'm curious if the CRCIA Team is viewed as more than a group of individuals, including Tribes. Does management feel that they are entitled to special consideration that is not due to all stakeholders?

Response: There is suppose to be an agenda, and we will share it when received. The idea is that this is a planning meeting for a workshop and that is all we know.

Response: I will take your concerns back to senior management (Mike Thompson)

Comment: The Tri-Cities has the strongest concern of all the stakeholders and if we are safe then everybody is safe.

On the calendar the proposed CRCIA meeting is shown on the 19<sup>th</sup>. Again, there isn't a lot of information to share, we don't have a lot of details. Because this is the only Open Project Meeting we are having this month, we felt it was important to share what we know.

I would like to introduce a new key player on the Integration Project Team. Greg Mitchem is the Project Engineer. He looks at the entire project to ensure the integration. He joined us the first part of November. I've given him a two months reprieve from the real project, but now it's time to roll up his sleeves. Greg has a lot of good experience that he is bringing to the table. He has 18 years of experience with Bechtel and has worked at 200 Area jobs. He was part of the early pump-and-treat

work, as well as out at the Environmental Restoration Disposal Facility. Greg is a real asset to the Hanford Site, and we welcome you.

Is there anything else?

Question: On the calendar, Waste Management 2000 in Tucson, what is that?

Answer: A national conference. There have been a few Integration Project papers accepted. At this point we aren't clear who will attend due to the travel budget, that is something we still need to determine.

**UPCOMING EVENTS AND OPPORTUNITIES FOR PARTICIPATION:**

See attached calendar (Attachment 3).

**NOTES:**

GW/VZ Web Site location: <http://www.bhi-erc.com/vadose>

If you have questions or comments please contact Dru Butler (509-375-4669), Gary Jewell (509-372-9192), or Karen Strickland (509-372-9236)

**ATTACHMENTS:**

- 1) Groundwater/Vadose Zone Integration Project Expert Panel Meeting - Draft Agenda
- 2) Vadose Zone Advanced Characterization Workshop - Draft Agenda
- 3) GW/VZ Integration Project Two Month Look Ahead Calendar

**ATTENDEES:**

Carol Babel – DOE-RL

Marty Bensky – Tri-Cities Caucus

Bob Bryce – PNNL

Dru Butler – BHI

Don Clarke – JAI

Dirk Dunning – OOOE

Bryan Foley – DOE-RL

Mark Freshley – PNNL

Michael Graham – BHI

Jim Hanson – DOE-RL

Mary Harmon – DOE-HQ

Doug Hildebrand – DOE-RL

Kathy Huss – SAIC

Moses Jarayssi – BHI

Tony Knepp – RPP

Katy Makeig – SMS

Fred Mann – FDNW

Gary McNair – PNNL

Gordon Rogers – Tri-Cities Caucus

Karen Strickland – BHI

Dan Tano – DOE-RL

Mike Thompson – DOE-RL

**ATTACHMENT 1**  
***Groundwater/Vadose Zone Integration Project***  
***Integration Project Expert Panel Meeting***  
**January 26-28, 2000 Meeting**  
**3350 George Washington Way**  
**Richland, Washington**

**- DRAFT AGENDA -**

**BECHTEL BUILDING ASSEMBLY ROOM**  
**WEDNESDAY, January 26**

**Moderator**

<b>7:30 – 8:00 am</b>	<b>On Your Own Coffee From Columbia River Coffee House</b>	
<b>8:00 – 8:15 am</b>	<b>Welcome and Introduction</b>	<b>E Berkey</b>
<b>8:15 – 8:45 am</b>	<b>Hanford/DOE Update</b>	<b>TBD</b>
<b>8:45 – 10:15 am</b>	<b>Groundwater/Vadose Zone Integration Project Accomplishments and Status (since 9/99) Response to Integration Project Expert Panel Recommendations in 9/99 Closeout Report</b>	<b>TBD</b>
<b>10:15 – 10:30 am</b>	<b>Break</b>	
<b>10:30 – 12:15 pm</b>	<b>Science and Technology: Discussion/Dialogue on Progress and Plans</b>	<b>M Freshley</b>
<b>12:15 – 1:00 pm</b>	<b>On Your Own Lunch</b>	
<b>1:00 – 2:30 pm</b>	<b>Project Management Focus Area: Discussion/Dialogue on System Assessment Capability Rev. 0 Concepts Report and Requirements Specification</b>	<b>R Bryce, C Kincaid</b>
<b>2:30 – 2:45 pm</b>	<b>Break</b>	
<b>2:45 – 5:00 pm</b>	<b>Opportunity for Stakeholder, Tribal Nation, and Regulator Input and Comments</b>	<b>E Berkey</b>
<b>Evening</b>	<b>Panel Only: Working Session #1</b>	

**ATTACHMENT 1**  
***Groundwater/Vadose Zone Integration Project***  
***Integration Project Expert Panel Meeting***  
**January 26-28, 2000 Meeting**  
**3350 George Washington Way**  
**Richland, Washington**

**- DRAFT AGENDA -**

**BECHTEL BUILDING ASSEMBLY ROOM**  
**THURSDAY, January 27**

**Moderator**

<b>7:30 – 8:00 am</b>	<b>On Your Own Coffee From Columbia River Coffee House</b>	
<b>8:00 – 9:00 am</b>	<b>Project Management Focus Area: Discussion/Dialogue on System Assessment Capability Rev. 0 Concepts Report and Requirements Specification (continued)</b>	<b>R Bryce, C Kincaid</b>
<b>9:00 – 10:00 am</b>	<b>Modeling and Transport Focus Area: Discussion/Dialogue on Status and Plans for Modeling Vadose Zone and Groundwater</b>	
<b>10:00 – 10:15 am</b>	<b>Break</b>	
<b>10:15 – 12:00 pm</b>	<b>Modeling and Transport Focus Area: Discussion/Dialogue on Status and Plans for Modeling Vadose Zone and Groundwater (continued)</b>	
<b>12:00 – 12:45 pm</b>	<b>On your own lunch</b>	
<b>12:45 – 2:15 pm</b>	<b>Subsurface Investigations Focus Area: Discussion/Dialogue on Progress and Plans</b>	<b>A Knepp, B Ford</b>
<b>2:15 – 2:30 pm</b>	<b>Break</b>	
<b>2:30 – 4:00 pm</b>	<b>Subsurface Investigations Focus Area: Discussion/Dialogue on Progress and Plans (continued)</b>	<b>A Knepp, B Ford</b>
<b>4:00 – 5:00 pm</b>	<b>Panel Only: Working Session #2</b>	
<b>Evening</b>	<b>Panel Only: Working Session #3</b>	

**ATTACHMENT 1**  
***Groundwater/Vadose Zone Integration Project***  
***Integration Project Expert Panel Meeting***  
**January 26-28, 2000 Meeting**  
**3350 George Washington Way**  
**Richland, Washington**

**- DRAFT AGENDA -**

**BECHTEL BUILDING ASSEMBLY ROOM**  
**FRIDAY, January 28**

**Moderator**

<b>8:00 – 12:00 pm</b>	<b>Panel Only: Working session #4</b>
<b>12:00 – 1:00 pm</b>	<b>Lunch</b>
<b>1:00 – 3:00 pm</b>	<b>Closing remarks</b>
<b>3:00 – 4:00 pm</b>	<b>Panel Only: Wrap-up session</b>

E Berkey

**ATTACHMENT 2  
DRAFT AGENDA**

Groundwater/Vadose Zone Integration Project  
Advanced Vadose Zone Characterization Workshop  
Richland, Washington

*January 19-20, 1999*

Wednesday, January 19, EMSL Auditorium  
Session 1- Purpose and Focus of Workshop, Characterization Needs

PRESIDING: Andy Ward, Pacific Northwest National Laboratory (PNNL)

7:30 **COFFEE, TEA, JUICES/ BREAKFAST BREADS in Training Room**

7:55 **Welcome and Introductory Remarks (Purpose and Objectives).**  
Andy Ward, Pacific Northwest National Laboratory (PNNL)

8:10 **Hanford Site Science and Technology Initiative.** Jim Hanson, Department  
of Energy, Richland Operations (DOE-RL)

8:15 **Office of River Protection.** Rob Yasek, Department of Energy, Office of River Protection  
(DOE-ORP)

8:20 **Groundwater/Vadose Zone Science and Technology Initiatives.** Mark  
Freshley, Pacific Northwest National Laboratory (PNNL)

8:25 **200 Area Soil Sites.** Bruce Ford, Bechtel Hanford, Inc. (BHI)

8:30 **Time Form Vadose Zone (TFVZ) and Immobilized Low-activity Waste (ILAW).** Fred  
Mann, River Protection Program (RPP) and Immobilized Low Activity Waste (ILAW)  
Projects, Fluor Federal Services (FFS)

8:50 **Overview of Vadose Zone Test Facility and Broad Test Plan.** Glendon  
Gee, Pacific Northwest National Laboratory (PNNL)

9:00 **Review of Geophysical Characterization Methods Used at the Hanford Site.** George Last  
and Duane Horton, Pacific Northwest National Laboratory (PNNL)

9:15 **Review of Hydraulic Properties for Sediments in the 200 Areas.** Raz Khaleel, Fluor  
Federal Services (FFS)

9:30 **Review of the Sisson and Lu Experiment.** Buck Sisson, Idaho National  
Environmental and Engineering Laboratory (INEEL)

9:45      **BREAK – Snacks Provided in Training Room**

Wednesday, January 19, EMSL Auditorium  
Session 2- Field-Scale Tracer Techniques

PRESIDING: Everett Springer, Los Alamos National Laboratory (LANL)

10:00      **Tracer Technology for Field Testing**, Everett Springer, (LANL)

10:15      **Isotopic Tracers for Quantifying Chemical Processes During Transport**,  
Don DePaolo, Geology and Geophysics Dept., Berkeley

10:30      **Field Scale Dye Tracer Experiments: A Method for Delineating Vadose Zone Flow Processes**. Jim.Brainard, Sandia National Laboratories (SNL)

10:45      **Monitoring Preferential Flow in the Vadose Zone**. Sunnie Aburime, Clark Atlanta University, and Tammo Steenhuis, Cornell University

11:00      **Field Tracer Tests To Characterize the Vadose Zone Geochemical and Hydrologic Properties**, Prasad Saripalli, Amy Gamerdinger, Tyler Gilmore, and Jeff Serne, Pacific Northwest National Laboratory (PNNL)

11:15      **In-Situ, Real Time Characterization of Soil Processes with Fiber Optic Mini-Probes**, Masoud Ghodrati, Ecosystem Sci. Div., UC Berkeley

11:30      **Discussion of Tracer and Transport Monitoring Techniques**

12:00      **LUNCH – Buffet Provided in Training Room**

Wednesday, January 19, EMSL Auditorium  
**Session 3- Physical Characterization Methods**

PRESIDING: Buck Sisson, Idaho National Environmental and Engineering Laboratory (INEEL)

1:00      **Core- and Outcrop-Scale Permeability Mapping Using IR Imaging**.  
Philip Long, Pacific Northwest National Laboratory (PNNL)

1:15      **Monitoring and Characterization Equipment Development at INEEL**.  
Earl Mattson, Idaho National Engineering Laboratory (INEEL)

1:30      **Comparison of Methods for Measuring Unsaturated Hydraulic Properties**. Bob Lenhard, Pacific Northwest National Laboratory (PNNL)

1:45      **Viability of Rapid In-Situ Measurement of Hydraulic Properties**,  
John Wilson, New Mexico Inst. Minim and Technology, Socorro, NM

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2:00 **Uncertainty and Upscaling.** Philip Meyer, Pacific Northwest National Laboratory (PNNL)

2:15 **Discussion on Soil Physical Characterization Methods**

2:45 **BREAK – Snacks Provided in Training Room**

### Session 4- Subsurface Geophysical Methods

PRESIDING: Phil Long, Pacific Northwest National Laboratory (PNNL)

3:00 **Application of Geophysical Methods for Characterization and Monitoring of Properties Controlling Flow and Transport in the Vadose Zone at the Hanford Site.** Ernie Majer, Lawrence Berkeley National Laboratory, (LBNL)

3:15 **In Situ Characterization of Flow and Transport in the Vadose Zone.** Charles Carrigan, Lawrence Livermore National Laboratory (LLNL)

3:30 **Fluid Distribution on Measured Geophysical Properties for Partially Saturated, Shallow Subsurface Conditions.** Patricia Berge, Lawrence Livermore National Laboratory (LLNL)

3:45 **Use of Radar Methods to Determine Moisture Content in the Vadose Zone.** Rosemary Knight, University of British Columbia

4:00 **Cross-Hole Radar Tomography in an Alluvial Gravel Deposit,** William Clement, Boise State University

4:15 **Hydraulic/Pneumatic Tomography: A Site Characterization Method.** T –C. Jim Yeh, University of Arizona, Tucson, AZ

4:30 **General Discussion Near Surface Geophysical Methods: Limitations for the Hanford Site.**

5:00 **ADJOURN**

Thursday, January 20, EMSL Auditorium  
Session 5- Minimally Invasive Techniques

PRESIDING: Andy Ward, Pacific Northwest National Laboratory (PNNL)

7:30 **COFFEE, TEA, JUICES / BREAKFAST BREADS in Training Room**

7:55 **Session Introductory Remarks** Andy Ward (PNNL)

8:00 **Microhole Drilling and Instrumentation Technology,** Jim Albright, Los Alamos National Laboratory (LANL)

- 8:15     **Estimation of Soil Hydraulic Properties with the Cone Permeameter.**  
Molly Gribb, University of South Carolina
- 8:30     **CPT Vadose Zone Characterization and Monitoring Tools.** Wes Bratton,  
Applied Research Associates, Richland, WA
- 8:45     **Direct-push Spectroscopic and Imaging Based Sensor Systems for  
Characterization of Vadose Zone Hydrologic Conditions and  
Contaminant Distributions.** Steve Lieberman, Space and Naval  
Warfare Systems Center, San Diego, CA
- 9:00     **Development of a Miniaturized In Situ X-Ray Diffraction/L-Ray  
Fluorescence Instrument for Vadose Zone Characterization,**  
David Bish, David Vaniman, Steve Chipera, LANL
- 9:15     **Discussion of Minimally Invasive Techniques**
- 9:45     **BREAK – Snacks Provided in Training Room**

Thursday, January 20, EMSL Auditorium  
Session 6- Borehole Geophysics

PRESIDING: Ernie Major, Lawrence Berkeley National Laboratory

- 10:00    **An Integrated Approach for Characterizing and Monitoring the Vadose  
Zone and Aquifer.** T.–C. Jim Yeh, University of Arizona, Tucson, AZ
- 10:15    **Application of Oilfield Drilling and Borehole Geophysical Technologies  
to Vadose Zone Characterization.** Richard E. Lewis, Schlumberger, HydroGeological  
Technologies and John Ullo, Schlumberger-Doll Research
- 10:30    **Electrical Resistance Tomography- 4D Underground Imaging.** Bill  
Daily, Abe Ramirez, and Robin Newmark, Lawrence Livermore National Laboratory (LLNL)
- 10:45    **High Resolution Resistivity: Applications and Case History.** Jim Fink,  
Hydrogeophysics, Tucson, AZ
- 11:00    **Crosswell Electromagnetic Imaging for Characterizing the Vadose  
Zone.** Gregory Newman, Sandia National Laboratory (SNL) and Mike Hoversten, Lawrence  
Berkeley National Laboratory (LBNL)
- 11:15    **Towards Efficient E-M Imaging of 3-D Electrical Resistivity Structure Imaging .** Mike  
Ritzwoller, University of Colorado
- 11:30    **Magnetic Resonance Dousing.** Peter Weichman, BlackHawk Geometrics, Boulder,  
Colorado.

11:45     **Open Discussion of Subsurface Techniques for Hanford Site: Limitations for Plume Identification**

12:15     **LUNCH – Buffet Provided in Training Room**

Thursday, January 20, EMSL Auditorium  
Session 7- VZTF Data Needs and Experimental Design

**PRESIDING:** Glendon Gee, Pacific Northwest National Laboratory (PNNL)

1:30     **Field Experiments and Characterization for Reactive Radionuclide Transport.** Peter Lichtner, Los Alamos National Laboratory (LANL)

1:50     **Experimental Design Issues-General Discussion, Group**

3:10     **BREAK – Snacks Provided in Training Room**

3:30     **Wrap Up**

4:00     **ADJOURN**

ATTACHMENT 3  
GW/VZ INTEGRATION PROJECT  
**JANUARY 3, 2000 - MARCH 6, 2000**  
*TWO MONTH LOOK AHEAD CALENDAR*

<b>January 3</b>	GW/VZ Open Project Team Meeting BHI Assembly Room – 1-3 p.m. (Contact: Dru Butler )
<b>January 17</b>	CANCELED DUE TO FEDERAL HOLIDAY GW/VZ Open Project Team Meeting BHI Assembly Room – 1-3 p.m. (Contact: Dru Butler )
January 18	HAB-ER - BHI Assembly Room (Contact: Nancy Myers)
<b>January 18</b>	S&T Risk Roadmapping Workshop (Contact: Amoret Bunn)
<i>January 19</i>	<i>Proposed CRCIA Meeting (Contact: Michael Thompson)</i>
<b>January 19-20</b>	Vadose Zone Advanced Characterization Workshop (Contact: Glendon Gee) <b>(Revised Dates)</b>
<b>January 26-28</b>	GW/VZ Integration Project Expert Panel (IPEP) Meeting BHI Assembly Room (Contact: Virginia Rohay)
<b>January 27</b>	Regulatory Path Forward Work Group Meeting (Contact: Moses Jarayssi)
February 2	HAB-PI Meeting
February 3-4	HAB Meeting (Kennewick, Cavanaugh's)
<b>February 7</b>	GW/VZ Open Project Team Meeting BHI Assembly Room – 1-3 p.m. (Contact: Dru Butler )
February 8	HAB-ER Meeting (Contact: Nancy Myers)
<b>February 21</b>	CANCELED DUE TO FEDERAL HOLIDAY GW/VZ Open Project Team Meeting BHI Assembly Room – 1-3 p.m. (Contact: Dru Butler )
February 28-29	Waste Management Workshop (Tucson, AZ)
March 1-2	Waste Management Workshop (Tucson, AZ)
<b>March 6</b>	GW/VZ Open Project Team Meeting BHI Assembly Room – 1-3 p.m. (Contact: Dru Butler )

**PUBLIC COMMENT PERIODS**

**December 13, 1999 – January 14, 2000**

200-CS-1 Operable Unit RI/FS Work Plan and RCRA TSD Unit Sampling Plan (DOE/RL-99-44, Draft B)