Environmental Restoration Contractor **ERC Team**

Meeting Minutes

077082

Job No. 22192
Written Response Required: NO
Due Date: N/A
Actionee: N/A
Closes CCN: N/A
OU: GW/VZ100
TSD: N/A
ERA: N/A
Subject Code: 8830/4170

SUBJECT **GROUNDWATER/VADOSE ZONE INTEGRATION OPEN PROJECT MEETING - FEBRUARY 7, 2000**

TO Distribution

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

DATE February 24, 2000

ATTENDEES
See Attached List

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NEXT GW/VZ INTEGRATION PROJECT OPEN MEETING:

Next Meeting: Monday, March 6, 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

MEETING MINUTES:

A Groundwater/Vadose Zone (GW/VZ) Integration Project Open Meeting was held on February 7, 2000 in Richland, Washington, at the Bechtel Hanford, Inc. (BHI) Assembly Room.

PROJECT REPORT:

REGULATORY PATH FORWARD WORK GROUP (Moses Jarayssi):

We distributed our Regulatory Path Forward Work Group Draft Report on 100 Area Groundwater to the members of the work group on January 28. We have requested that they review it and get any comments back by February 23. It will be used by the projects to establish consistency in the decision making process on issues related to groundwater treatment and protection. It will also be used by the System Assessment Capability (SAC) to look at the different requirements in different media in different end-point scenarios. The report will be useful to highlight science and technology (S&T) gaps relating to meeting regulatory requirements through all media, including the surface, groundwater, and soil.

On February 16, we'll be holding a workshop on both 100 Area Groundwater and Source Units. The workshop will include representatives from the Groundwater Project, Soil Remediation Project, Decontamination and Decommissioning (D&D) Project, Groundwater Monitoring, the Washington State Department of Ecology (Ecology), U.S. Environmental Protection Agency (EPA), and the U.S. Department of Energy Richland Operations Office (DOE-RL).

The workshop objectives are to identify linkages between decisions and requirements for the treatment of groundwater and source units, identify S&T gaps that need immediate attention to support groundwater and soil cleanup, and list different scenarios for cleanup end-points of source units and their impacts on groundwater contamination and the other way around.

QUESTION: When is this workshop?

ANSWER: February 16. It's the second leg of workshops concerning the source units and is just between contractors, DOE, and regulators.

GROUNDWATER MONITORING (Mike Thompson):
I'd like to start off with an update of the tritium sampling results from the well at the 618-11 Burial Ground for those of you that were not at the HAB meeting. The 618-11 Burial Ground is located immediately west of Energy Northwest, formerly Washington Public Power Supply System (WPPSS). This burial ground received waste from 300 Area, mostly R&D waste, and most of it was hot hot hot. It's the type of waste that requires shielded trucks and remote handling. The burial ground was operated from early 1960 through 1967. Early in the stages of Hanford cleanup, there were talks about an expedited response for cleanup of this particular site, since it's only about three miles from the river. An old Environmental Impact Statement (EIS) stated how this type of waste was to be exhumed, treated, and dealt with. As part of the investigation of the EIS, it was decided to monitor the Burial Ground rather than expedite cleanup. A groundwater monitoring well, 699-13-3A, was established on the east side of the 618-11 Burial Ground, and a Contaminants of Concern (COC) list was established for monitoring the burial ground, which included metals, gross alpha and beta, and total uranium. Tritium was not identified as one of the contaminants to be monitored. Between 1995 and 1998, yearly samples were taken from 699-13-3A to look for COCs. The COCs were checked for through a gross beta method. Unfortunately the process to analyze gross beta involves evaporating water from the sample, and if tritium was present at that time it just evaporated along with the water. As a result, we are unable to reanalyze those samples to check if tritium was present back then.

In January 1999, Pacific Northwest National Laboratories (PNNL) requested that the routine yearly sample from the well also be checked for tritium to support their sitewide monitoring program. That sample returned a result of 1.8 million picocuries per liter (pCi/L) of tritium. For a point of reference, regulatory drinking water standards are less than 20,000 pCi/L. The 1.8 million pCi/L data was entered into the Hanford Environmental Information System (HEIS) database in May of 1999.

A new sample was collected on January 27, 2000. The field total activity screening on that sample returned a value of over 4 million pCi/L, and a rush was put on the processing of the sample by the lab. The lab result came back on February 2 and indicated a tritium level of just over 8 million pCi/L.

Also, the January 1999 sample was pulled from the archives and reanalyzed. That sample reanalysis confirmed the accuracy of the 1.8 million pCi/L reading shown in the HEIS database. That 1.8 million pCi/L reading is reflected in a plume map contained in the Draft Hanford Site Groundwater Monitoring Report for Fiscal Year 1999 (FY99). That report will be circulated in its final version in March 2000.

The unfortunate thing here is that the reading of 1.8 million pCi/L of tritium entered into the HEIS database in May of 1999 didn't trigger any flags for those looking for contaminants of concern. That's been identified as a deficiency in our program. We asked PNNL to provide a critique of why it didn't trigger a

level of concern or reporting criteria flag. As it turns out, it would have triggered a flag on a value of over 2 million, but not 1.8 million. Additionally, 1999 was the first time there was any data on tritium in the system for that particular well, so there was no trend information with which to compare it. That's why it wasn't identified as a problem before now.

It can't be denied that management should have been alerted to the issue. In response, DOE-RL asked the Integration Project to develop a Sampling and Analysis Plan. Phase 1 of the plan is to sample the wells in the immediate vicinity of the 618-11 Burial Ground for tritium and other contaminants, analyze the samples, and determine the extent of any plume. You can't show risk without knowing the plume extent. If the source of the contamination found in Well 699-13-3A is indeed from the 618-11 Burial Ground, then it's entirely possible that the contaminants could have been being released for a number of years.

QUESTION: You say "if the burial ground is the source." Where else could it be coming from?

ANSWER: We're looking at a couple things. We don't want to leave any stone unturned. One possibility is that the tritium is coming from the 200 Area. It's possible that the contamination went through a deep channel of some sort and popped up here. Maybe it's from the Plutonium-Uranium Reduction and Extraction (PUREX) Facility in the 200 Area Plateau. We're also taking a look at Energy Northwest since they're right next door. They operate a boiling water reactor, and tritium would be something you'd expect to find in the condensate. We've gotten a good reaction from Energy Northwest, and they've been giving us access to their wells and data. The fact remains that this well was designed to monitor the 618-11 Burial Ground. The burial ground is downgradient of the well, and Energy Northwest is upgradient, so that points to the burial ground. I just want everyone to recognize that we're not discounting other possible sources, but the 618-11 Burial Ground is the most likely source.

We have folks out in the field today doing sampling work based on the Sampling and Analysis Plan developed by PNNL and the Integration Project. We will get the plan out for review from stakeholders and regulators, but we decided not to wait for approval in this case. The situation calls for a quick response.

There are two separate turnaround times for the lab on analyzing samples. We're asking for a quick turnaround of only 7 days for the tritium data, but not on the other analytes. It's more cost effective that way, since there haven't been signs of other contaminants from previous samples. We should have some tritium data in a couple of weeks.

QUESTION: What is the normal turnaround on tritium analysis?

ANSWER: I'm not sure of the usual practical turnaround, but it's 45 days by contract.

QUESTION: Can't it cause problems putting together a plan that quickly?

ANSWER: There was a quick Data Quality Objective (DQO) process put into effect by the team to make sure that the Sampling and Analysis Plan was arrived at by a disciplined route. The Washington State Department of Health (DOH) and Ecology participated in the process. It was reviewed independently, approved, and sent to Michael [Graham] to implement. We started going to the wells this weekend to check them out. Just because a well location

shows up on a map, that doesn't necessarily mean that it's ready to be sampled in the field. We're checking to make sure the equipment is working properly, and we started at 9 a.m. today with sampling of the 27 existing wells in that area.

QUESTION: I (Dib Goswami) was able to verify the 1.8 million pCi/L of tritium data in HEIS, but the plume maps in the Groundwater Report doesn't show it.

ANSWER: That's because the maps you are looking at are from the FY98 Report. The FY99 Report has not yet been published. There will be a revised map that includes the 1.8 million reading in the FY99 Report. It should be available in March.

QUESTION: Will it show the recent 8 million pCi/L reading as well?

ANSWER: No, since the reading wasn't taken in the time frame that the map reflects.

COMMENT: You may want to discuss it in the text however.

RESPONSE: It's possible, but it may be difficult to accomplish before it goes to the publisher.

QUESTION: There have been statements recently that there is not enough money to carry out the monitoring required in the Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement) for Milestone 24 (M-24). One of the suggestions in order to find funding was to cut back on other groundwater monitoring. Was this well on the list for trimming?

RESPONSE: DOE made the statement that there's not enough money in the site baseline to construct new wells required for M-24. One option for finding the money was to cut back on other planned groundwater monitoring, while also looking for other places that the money could come from. It shouldn't have impacted the monitoring of this particular well though.

RESPONSE: It was more in terms of monitoring the tritium plume in the 200 East Area. Right now we're monitoring of the upper 20 feet of that plume. It's obvious that there is a real need to monitor this particular burial ground. Clearly it needs to be at least once a year, but that's not appropriate right now since we need more frequent samples to collect more data points. The really unfortunate part is that the finances are finite. Site priorities determine where to put the money. I (Mike Thompson) am fighting for more for my project, but you have to consider that other projects like K-Basin, Single Shell Tank retrieval, the Office of River Protection (ORP), and criticality are also fighting for a piece of the pie. We're competing with other site priorities. Clearly this incident has helped focus the attention of site management and give them an understanding of the need for groundwater monitoring.

QUESTION: Along those lines, my understanding was that the money was limited for installing new wells and decommissioning old wells. Was the monitoring of existing wells proposed to be cut?

ANSWER: Actually we've been cutting the monitoring budget over the years. In 1994 the groundwater monitoring budget was $13.7 million compared to $8 million this year.

QUESTION: Are those real cuts in funding or just a reflection of doing things more efficiently?

ANSWER: It's a combination of less money and doing things more efficiently, but monitoring requirements have actually increased dramatically. We had to cut scope to get within the $8 million allotted this year.

QUESTION: Is there any possibility that this could be related to the North Richland well area tritium readings?

ANSWER: It's highly unlikely.

COMMENT: (Dib Goswami) Ecology needs to sit down with DOE, PNNL, and DOH and take a better look at the data from the North Richland wells. It's in our agenda to find some time to sit down and discuss that. Regarding the groundwater sampling cut-downs, especially the 200 East Area, DOE-RL and Ecology went through a vigorous consultation process for those. I think that there was not that much cut for the wells along the river by the City of Richland, and in the 300 Area. I think there was an increase in those areas in fact. The significant reductions came in the 200 East Area.

QUESTION: The sampling in North Richland was done along with the DOH?

ANSWER: Not just DOH, but also Ecology and the Yakama Nation. Our results are in already, and we need to have discussion amongst ourselves.

QUESTION: When will that happen?

ANSWER: As soon as DOE and PNNL tell us (Ecology) they're ready.

RESPONSE: We (DOE) would like to keep the focus on the 618-11 Burial Ground for the next few days at least. What Dib is referring to are samples taken in North Richland by the well field there, not by 618-11. They are unrelated.

COMMENT: It would be a good idea to tag on some cone penetrometer work, but where you have in mind to do that would be worth discussing. Clearly adding a few more samples onto a program already in progress is more efficient than going back and doing it separately later.

QUESTION: Help me (Mary Lou Blazek) get clear on how things happened. How did PNNL get a reading of 1.8 million pCi/L of tritium back from the lab and not grasp that there was a problem.

RESPONSE: The data was requested to aid in plotting a plume map. It was entered into the HEIS database, but it didn't trigger the flag that this was an abnormal occurrence event.

QUESTION: When did DOE become aware of the problem?

ANSWER: About the middle of last week.

QUESTION: DOE only became aware of the 1999 data last week?

ANSWER: Yes. It was identified as a problem then.

COMMENT: We (Ecology) pointed it out a couple of months back to EPA.

COMMENT: I don't understand how, if you just found out about the 1999 data last week, you already have data for 2000.

RESPONSE: The January sample was taken as part of a routine scheduled sampling.

COMMENT: I thought you said it took 45 days to get results back from the lab.

RESPONSE: A field screening was performed to make sure that we're not shipping hot samples to the lab. That field screening returned a preliminary reading of more than 4 million pCi/L of tritium. That caused concern since it was more than double the return from the previous year. Due to that concern a quick turnaround was requested from the lab.

COMMENT: Normally the lab takes up to 7 days for a quick turn around analysis. They got this one back to us in 3 days.

QUESTION: Why wasn't the 1.8 million pCi/L found by the field screening in 1999?

ANSWER: That sample wasn't screened in the field. The 1.8 million reading was from a lab analysis.

QUESTION: Is field screening a new procedure?

ANSWER: We do a field activity screen if we think rad levels could be high.

COMMENT: But you weren't aware the levels might be high until January 27.

RESPONSE: No, we knew it. They suspected it could be high due to the 1.8 million reading from the previous year.

COMMENT: I thought you said nobody knew until last week.

RESPONSE: The scientists knew. It's common to check the previous year's readings in the database before sampling.

COMMENT: PNNL knew, but they didn't bring it to DOE's attention.

COMMENT: The high reading was entered into the HEIS database in May of 1999, but it wasn't flagged as an unusual number so it just sat there.

COMMENT: It would help if you back up and give a timeline of when the 1999 sample was taken, when it went into the database, and when you knew there was a problem.

RESPONSE: I (Mike Thompson) have a chronology here (updated timeline attached – Attachment 1). I'll boil this down to lowest common denominator. The first samples from Well 699-13-3A to be analyzed for tritium were taken on 1-25-99. This was an Environmental Restoration Contractor (ERC) routine yearly sample, and it was analyzed for tritium per a request by PNNL. Previous sampling of that well had not included tritium analysis. PNNL wanted the tritium data for their sitewide contaminant mapping. On 1-27-99 the sample was delivered to Quanterra Analytical Services. I'm not sure when the results came back (4-99), but the data was entered into the HEIS database on 5-1-99. The database information was accessed by ERC in August 1999 to support the annual update of the 300-FF-2 Limited Field Investigation (LFI), but that result was limited to the COCs for the 618-11 Burial Ground. Since tritium wasn't listed as a COC for 618-11, the high tritium reading wasn't noted. Ecology discovered the high tritium reading about 2 months ago, and had some conversations with EPA about it.

COMMENT: Ecology talked to DOE-RL about the tritium in mid-January.

COMMENT: In January, PNNL delivered their Draft Sitewide Groundwater Monitoring Report for FY99 to DOE-RL for comment. In that report, the 1.8 million pCi/L is shown on a plume map for that area, but it is not mentioned in the report text. That report will be delivered to Ecology, and then the rest of the world, in March. A reanalysis of the January 1999 sample was requested on January 24 of this year to confirm the 1.8 million reading. On January 27, a new routine sample was taken from Well 699-13-3A. A preliminary screening of the sample indicated a tritium level in excess of 4 million pCi/L. As a result of the screening, a quick turnaround was requested from the lab for analysis of the sample. On January 31, the 1.8 million pCi/L result from the 1999 sample was confirmed, and on February 2 the 8 million pCi/L result from the January 2000 sample came from the lab.

QUESTION: If the 1999 result had been 2 million pCi/L instead of 1.8 million, then this all would have turned out differently?

ANSWER: Yes, a result over 2 million would have triggered an off-normal occurrence notification.

COMMENT: The reading was high, just not quite high enough for the system to automatically flag it.

COMMENT: The issue is that the people looking at the data need to be aware of what they are looking at.

COMMENT: It sounds like they were aware.

COMMENT: Here's the thing. If you get a reading like this in the 200 West Area, you're not concerned at all. Nobody even blinks. In the 300 Area, where you have a background of 20,000 pCi/L it's a different story. The point is that 200 West is different than the 300 Area. You have to tailor what you're looking for to each particular location. There's a different "why" for every "where".

QUESTION: Why is the flag level set so high in the system?

ANSWER: It's an elimination process. From 1962 to present there have been 75 different wells to return a value over 2 million pCi/L of tritium.

COMMENT: I (Michael Graham) would like to bring my perspective to the table. This whole situation is unfortunate, but this is why the Integration Project exists in the first place. It's a sitewide program looking at things from a sitewide angle, and not just from one perspective. This monitoring was done for other reasons, so they didn't pick up on the significance of the tritium levels being so high. PNNL is now going back and making sure something like this isn't repeated. That's why we're here. Yes, this did get through the net this time. It just means we need a finer net. However, if you look at the ensuing activities, the ability to bring all of the various contractors, DOE, and the regulators together and get in the field quickly was greatly enhanced. Unfortunately the reading for 1999 was 1.8 million pCi/L instead of the 2.01 million needed to cause a flag to pop up in the first place, but I think everyone concedes that no one has been trying to hide anything. This situation is an example of why the Integration Project exists.

QUESTION: Go back for a minute. I'm still confused. You said that you did a screening of the 2000 sample because you were aware of the level of the 1999 sample, and that you did this so you didn't ship a hot sample to the lab. How do you routinely determine whether to screen a sample or not?

ANSWER: We do that when there is a trend or a reason to believe that the sample might be hot. If the well isn't along the path of a known tritium plume and there is no reason to believe there would be a jump in the level, then there's no reason to do a screening for tritium in the field.

QUESTION: You didn't analyze the samples from this well for tritium prior to 1999?

ANSWER: No.

QUESTION: Is there a certain level it has to be below to go to the lab?

ANSWER: The lab would do a preliminary screen of the sample before doing an in-depth analysis. They'd send it back if it was too hot for them to handle. It just depends on what the lab folks say.

QUESTION: What is the acceptable level for the lab you use?

ANSWER: I believe Quanterra is licensed for radioactive samples. I can't remember them ever refusing anything because it was too hot.

COMMENT: Their license has something to do with measuring gross gamma and/or gross beta and not processing anything over a certain level, but it's not something I know off the top of my head.

COMMENT: People shouldn't be too awfully critical of PNNL during this whole thing. If they hadn't asked for the tritium analysis to begin with, we still wouldn't know there was a problem. There are literally hundreds of wells with dozens of analytes for each well. It's not their

fault if the tritium level didn't trip a flag. It's just that new guidance is needed. Things need to be tailored so that flags are more specific to individual sites.

COMMENT: The system was just set up to ignore anything less than 2 million. Even 1.99 million wouldn't have triggered it.

RESPONSE: I think ignore is the wrong word.

COMMENT: The point is that there should be site-specific criteria.

COMMENT: In terms of the path forward for this, we're needing to tie flags to the location the sample was drawn from. From a sitewide perspective, an entry into the HEIS system of over 2 million pCi/L of tritium is not unusual. For this particular well it is. We need a DQO process to figure out how to determine the flag values.

COMMENT: We will share the lessons learned from our critique with everyone.

QUESTION: I'd like to ask a point of clarification. Was the field screening done as a lab issue or a shipping issue?

ANSWER: Those are indeed two different issues. The screening of the January 2000 sample was done for DOE shipping requirements.

QUESTION: Did it exceed those requirements?

ANSWER: Yes, we had to ship per special DOE requirements.

QUESTION: Was the first sample in non-compliance?

ANSWER: Fortunately no. It was just below the level. The level is 2 million pCi/L.

There's one last item on the agenda for groundwater monitoring that I wanted to make everyone aware of. We've transmitted the sampling and analysis plan for the North Richland area to the City of Richland. This concerns the area that was discussed earlier located north of town that had the odd tritium readings.

<u>RIVER PROTECTION PROJECT (RPP) ASSESSMENTS (Tony Knepp):</u>
We've installed four cone penetrometers in the S-Tank Farm. Here's a quick summary of what's been going on there. We've been working over the last couple of weeks with a rig out in the S-Tank Farm. We discussed the locations for placing the cone penetrometers with Ecology and agreed on sites. We've installed the units in four separate spots around the farm. We identified gamma contamination in two spots and pulled soil from one of those. We're using cesium as an indicator to identify contaminant source. We're planning more installations. We're running two pushes per day on a good day. This is the first time that cone penetrometers have been used inside the tank farms in some time.

We met with the folks from Ecology to discuss our S-SX Workplan for this year. We received tentative approval to go forward with drilling and installation of the slant borehole under SX-108. We also committed to developing better planning documents to show what we're doing.

Sampling tools are being designed and drill rigs are being checked for entry into the SX Tank Farm. As most of you are aware, the SX-108 slant drilling is relatively unique. All of the equipment is being configured to this particular site. The sampling type and handling of the samples we're proposing are all unique. The technique for the drilling and the rig are being fabricated this week. There will be a cold test next month, and the month after that we'll be doing the hot work in the farm. There's a lot of effort going into all this to get it to work like it's supposed to.

COMMENT: There's a question of why you're doing the slant hole at all for this tank. In this handout you provided, you've got your conceptual model on the front page and your diagram of what to expect to find on the second page (diagram attached – Attachment 2). However, when you map out the defined contamination zone it shows higher than where you're aiming for. When you're actually under the tank, you won't be in the contaminated zone. The contamination is actually on the side of the tank.

RESPONSE: That's right. We're headed down at a 30 degree angle. We'll be at about 120 feet down before we're dead center under the tank.

COMMENT: The hottest zone is from the bottom of the tank to about 70 feet, but there's still cesium from about 70-130 feet and very high levels of technetium, chromium, and nitrates to about 140 feet. We'll be well within that area. Coming in from the side also allows us to get moisture figures. The angle allows us to explore a little bit and to supplement data we've collected previously. Part of the idea for this borehole is to duplicate some of the data collected from Borehole 41-09-39. This new borehole is in somewhat the same area, but we'll get more under the tank. We hope to demonstrate how deep the contamination is directly below the tank and show moisture as we go through the different layers of soil. This is a lot more sophisticated method to get data than we've used before.

QUESTION: I'm just playing the devil's advocate, but if you drilled a vertical borehole right next to the tank, wouldn't you get the same data?

ANSWER: You'd come close, and that is something that we've discussed with Ecology. Our backup plan is to do that if we encounter problems with the slant drilling since we'll already have the equipment out there.

COMMENT: Plus that area has pipes going underground every which way.

RESPONSE: Yes, it's very difficult to move around out there. If we can't get the 30 degree hole to work, then we'll go vertical.

COMMENT: I just don't understand why you need to get under the tanks so early in the game. What do you gain by doing a slant well when a vertical well gives just about the same data? It's not clear if you're interested in the hottest zone or not.

RESPONSE: What we hope to find beneath the tank is soil altered by contaminants or heat or salt, or possibly all three. If we find that, we'd like to determine if it has any effect on flow. We know that the only other ways to get to this possibly altered soil are to pick up the tank or to

go down a caisson and push out. Neither of those are feasible. This 30 degree angle is the only way to get to the potentially altered soil.

COMMENT: When an SX Tank fails, the bottom buckles up and the sides rupture, hence the contamination is all concentrated on the sides.

RESPONSE: Actually there are three or four different ways that the tanks out there develop leaks. We're not really sure why SX-108 developed a leak, but we do know that it wasn't due to buckling. It's not a burping tank or the like. This particular tank didn't fail that way, but we don't know specifically why it did.

COMMENT: As far as this drilling is concerned, it's enough for us to know that the tank does have leaks somewhere. How we sample isn't related to the cause of the leak.

QUESTION: Why does the angle of drilling make such a difference?

ANSWER: We want to get under the tank, but we want to be as close to the surface as possible when we get there. The steeper we drill, the nearer we'll be to the bottom of the tank.

COMMENT: A slant borehole is not that unique in the business. What makes this borehole unique is that the technique we're using should allow us to get ahead of the drag down. It should allow cleaner sampling than past techniques.

COMMENT: Besides that, Ralph Patt of the Integration Project Expert Panel (IPEP) said that drilling a slant borehole would let us sleep better at night.

COMMENT: We're (Oregon) glad to hear that there aren't significant problems to drilling a slant well. We've been asking for it for 15 years.

COMMENT: I just want to reiterate that before we spend a million dollars or so to do this, we already have a pretty good idea of what we expect to find. We put into the workplan what our expectations are. We're not going into this blind.

COMMENT: The workplan itself is driven by the Tri-Party Agreement. The what and when are defined by the Tri-Party Agreement, but not the technique.

QUESTION: You'll be drilling 35 feet from the tank itself?

ANSWER: Actually we'll be about 10 feet off when we get near the bottom of the tank due to the angle.

QUESTION: It's a given that there is more cost involved to drill a slant borehole than a vertical borehole. That's fair to say, isn't it?

ANSWER: Because of sampling technique used in this case, yes.

QUESTION: You can drill a vertical borehole at the edge of the tank, get to same depth, go right through the same portion of heavy contamination, and do it for less money. Is it really worth the money to drill the slant hole?

ANSWER: You're asking the rhetorical question now. What it comes down to is that the Groundwater Peer Review Panel says it's a worthwhile undertaking, so we're moving ahead.

QUESTION: What do you gain by drilling a slant hole that you don't get from a vertical one?

ANSWER: There's an opportunity to get samples of altered soil. We'll be nearer heat and pressure. There's an opportunity to look at the moisture effects of the umbrella effect around the tank. Plus, we get to take more contamination samples and confirm hypotheses developed from the last borehole.

COMMENT: But by drilling right on the edge, you'll see the water driving down and see deeper contamination.

RESPONSE: We've done one on the side already. This one will also be on the side so to speak. We can't make everyone happy at once. We've already drilled a vertical hole, and we couldn't see doing it again to get more data. Drilling one more vertical hole is not as valuable as drilling through the hot zone and then sliding under the tank given where we are now and what we're doing in the tank farm. Just a year ago, we would not have been able to do this. We've gotten more sophisticated. When the program began, vertical drilling was the only way to go.

COMMENT: As Mike Thompson said, resources are finite. You should be spreading those funds out all over the place.

RESPONSE: We're doing some of that with the cone penetrometers. SX is probably the deepest and most contaminated tank farm. B-BX-BY is shallower. We'll use a lot more cone penetrometers there. We won't do much deep drilling there.

RESPONSE: Not if you spend your entire drilling budget on SX-108.

COMMENT: This has been a good discussion. It's good to talk about why you're spending the money. The point is though that this is the first time this has been done. We're not really going to know if the money was worthwhile until after the work is done.

QUESTION: Are you drilling at 15 degrees or 30?

ANSWER: We'll be drilling at 30 degrees. It's about as steep as we can get. It's a unique situation anchoring the drilling rig within the tank farm.

INTEGRATION PROJECT EXPERT PANEL (IPEP) (Michael Graham):

I'd just like to touch on a couple of thing from the recent IPEP Meeting (January 26-28). The panel's closeout slides are attached to the agenda (bulleted version attached – Attachment 3).

As I said in my closing at the meeting, I feel that from the standpoint of the Integration Project, this was the most productive IPEP Meeting to date. We're starting to talk more on the level of real things that are happening instead of plans. Part of that was a result of dialogue with the IPEP up front. Virginia Rohay did an excellent job of coordinating the preparation and the meeting itself.

One thing I wanted to know was the general feeling on public input being on the IPEP agenda. The first day of the meeting there was an extended public comment period. Should we set aside some agenda time every day of the meetings for that? We'll capture your input in our lessons learned for the May IPEP Meeting.

QUESTION: The period given on the first day of this past meeting was pretty substantial. Are you asking if we'd like to do that each day of the meetings?

ANSWER: On the first day there was a formal time on the agenda for public input. We'll likely keep that. The question is should we allow time on the other days, maybe an hour or so.

RESPONSE: It might be nice, but it's not a necessity.

RESPONSE: In general it might be nice to have a short public session on the end of each day, but not an hour.

COMMENT: The period set aside shouldn't be for long diatribes, but rather an opportunity to raise a point if you want. It'd be particularly nice to have that chance.

COMMENT: This could also be used as a chance for fresh perspectives and technical steering from other sources. There should definitely be a chance for public comments every day, maybe at the end of the morning session and then again after the afternoon session.

COMMENT: Ecology definitely wants to comment, but having a comment period on only one day limits our ability to respond. We're not allowed to talk when the presenters are delivering their presentations. More interaction would be good and would give us a chance to respond to issues raised in the presentations as they're given. It would definitely be good to have more interactions.

QUESTION: Do you have any input on this Dirk (Dunning)?

ANSWER: 15 minutes twice a day sounds good to me.

<u>SCIENCE AND TECHNOLOGY UPDATE (Mark Freshley and Amoret Bunn):</u>
At the end of the two National Laboratory Workshops, there were 50 risk activities identified. These activities ranged across the four risk areas of ecological risk, human health risk, economic impacts and socio-cultural impacts. The on-site and off-site risk co-leads reviewed these activities at the January 18, 2000 Risk S&T Roadmapping Meeting. During the meeting the co-leads prepared a brief scope and outcome for each activity, identified the duration and cost of the activity, relevant linkages of the activities to other risk areas or core projects, and assigned ranks to the activities associated with its potential to reduce uncertainty. As a consequence of the roadmapping process, the co-leads also identified some tasks that were better suited for Characterization of Systems or SAC. At the conclusion of the roadmapping

exercise, the 50 activities were reduced to 27 high priority activities. Thirteen activities were considered better suited for Characterization of Systems or SAC, and 10 activities were considered lower priority. Of the 27 high priority activities, there are 12 ecological risk activities, 9 human health risk activities, 5 economic impact activities, and 1 socio-cultural impact activity. The socio-cultural impact analysis has the fewest science and technology activities because it is such a new field that most of the activities identified during the National Laboratory Workshops were more suited to Characterization of the System or SAC.

The cost for these 27 activities is estimated to be $22 million over 5 years. We are currently looking for ways to fund the S&T activities through Hanford and national programs. Also, we are working to include the other activities in the future plans for Characterization of Systems and SAC. The next steps are to take the risk input, incorporate it into the S&T Roadmap, and then sit down with the site programs that interact with us and get their priorities. This feeds into our Detailed Work Plan (DWP) process.

QUESTION: Risk is one of the various components of the project within S&T issues or needs. You mentioned prioritization, not just in risk issues but across a broader spectrum. What is this prioritization based upon? Is there a developed criteria? Will you set the criteria?

ANSWER: This is something we did last year with site programs. They helped rank different actions within the S&T elements and then across elements. Identifying scope is what we're tackling this year.

QUESTION: Will you reprioritize as you get more information in from assessment work? It might cause you to rethink an approach on dominance, sensitivity, or uncertainty.

ANSWER: Yes, the roadmap process will go through a reevaluation each year. With the SAC tool and the like coming online, it will help identify priorities that may need to be shifted up or down in level. Down the road the problems are likely to be different than they are now.

QUESTION: On the subject of available funds, I assume the Environmental Management Science Program (EMSP) funds are already accounted for. Do you anticipate that when you are looking for funding opportunities that you might be limited by the nature of the research the funding is intended for? If the funding has limits to only a particular type of science, then might the driver be more the funding source than meeting the priority?

RESPONSE: That's an interesting point.

COMMENT: In the risk area, you're likely to only get funding for human health or low-level rad effects. Your plan should include sending proposals everywhere you can.

COMMENT: We understand though that you'll get what you can where you can.

RESPONSE: At this point we're thinking that activities that are specifically Hanford oriented, such as the hyperion zone, will likely only be funded through Hanford funds. Something dealing with common contaminants or species across the DOE complex would be more likely to draw funding from someplace else off-site.

We gave an update on the Inventory Technical Element at the IPEP meeting. We will be delivering a set of numbers for use in the SAC Rev. 0 sometime in February. We're in the final stages of model runs and write-ups. We signed up for inventory estimates for 4 waste streams, but we're actually doing 9 waste streams. I don't believe that the project schedule reflected DOE reviews, but that needs to be done first, and then we can get it out to everybody.

COMMENT: I (Dib Goswami) think it's a good thing you're trying to do. Ecology would like to be involved. There are 2600+ sites, and we'd like to be involved in identifying who can work with the project on each. You need to concentrate a lot of effort on the inventory. We'd like to get more into this. When can we start working on it, and who is the contact for waste sites and gaps and doing those kinds of things?

RESPONSE: Dib, I think you're asking about the bigger picture being done by the SAC. The effort I'm referring to is just for the S&T. The SAC would be the right place to get involved for the bigger picture.

COMMENT: Mike Cooney is consolidating the effort for the Integration Project. He's working on inventory for the SAC Rev. 0 and also for the Characterization of Systems.

COMMENT: The correct point-of-contact for Ecology would be Doug Hildebrand of DOE-RL.

I'd also like to just give a quick update on outcomes from the Vadose Zone Advanced Characterization Workshop. We've populated the PNNL web site with the presentations, abstracts, and summaries of what's been done so far. I looked this morning and there's quite a bit of information out there. It can be accessed through the Integration Project website (http://www.bhi-erc.com/vadose) in the S&T section. It's at the bottom of the page under the related S&T links.

UPCOMING EVENTS AND OPPORTUNITIES FOR PARTICIPATION:
See attached calendar (Attachment 4).

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) Chronology of Tritium Evaluation at Well 699-13-3A
2) Diagram of Single-Shelled Tank SX-115 Slant Borehole
3) Integration Project Expert Panel Outbrief Presentation – January 28, 2000
4) GW/VZ Integration Project Two Month Look Ahead Calendar

ATTENDEES:

Martin Bensky, Tri-Cities Caucus
Mary Lou Blazek, OOOE
Bob Bryce, PNNL
Dru Butler, BHI
Amoret Bunn, PNNL
Dirk Dunning, OOOE
Bruce Ford, BHI
Mark Freshley, PNNL
Dib Goswami, Ecology
Michael Graham, BHI
Mary Harmon, DOE-HQ
Doug Hildebrand, DOE-RL
Dave Holland, Ecology
Kathy Huss, SAIC
Moses Jarayssi, BHI
Gary Jewell, BHI
Tony Knepp, CHG
Steve Kowall, PNNL
Stuart Luttrell, PNNL
Fred Mann, CHG
Gordon Rogers, HAB
Stan Sobczyk, NPT
Mike Thompson, DOE-RL

Attachment 1

CHRONOLOGY OF TRITIUM EVALUATION AT WELL 699-13-3A

1979 Wells 699-13-1A and –1B downgradient of 618-11 Burial Ground show tritium at 600,000 to 1.4 million pCi/L

8/95 Well 699-13-3A installed adjacent to and downgradient of 618-11
- *No analysis for tritium in 1997 Limited Field Investigation (LFI) report*

1/25/99 Well 699-13-3A sampled
- *ERC requested analysis of 618-11 Contaminants of Concern (COCs) (which do not include tritium)*
- *PNNL requested tritium analysis to support sitewide monitoring program (includes tritium mapping)*

1/27/99 Sample delivered to Richland Quanterra Analytical Services for analysis
- *Contract required 45 day turnaround*

4/99 PNNL received tritium analysis from Quanterra

5/1/99 Tritium result of 1,860,000 pCi/L was entered into Hanford Environmental Information System (HEIS) database

6/11/99 The PNNL January-March quarterly summary report (of water samples from 54 wells analyzed for tritium and collected between 1/1/99 and 3/31/99) was prepared and reviewed.
- *The report automatically flagged each tritium analysis that that equaled or exceeded 20, 000 pCi/L.*
- *PNNL examined the data and concluded that no trend could be analyzed (only one data point).*

8/99 Environmental Restoration Contractor (ERC) accessed HEIS data for Well 699-13-3A
- *Evaluation of data required to support annual update of 300-FF-2 LFI*
- *Evaluation limited to 618-11 COCs*

12/8/99 Letter report (Annual 300-FF-2 Groundwater Sampling Results for FY99) prepared including evaluation of Well 699-13-3A groundwater sample results
- *High tritium value noted; attributed to migrating 200 Area tritium (tritium is not a COC for 618-11 Burial Ground)*

1/00 Ecology accesses HEIS database and notes high tritium value

1/00 PNNL produces DRAFT Hanford Site Groundwater Monitoring Report for FY99 for DOE-Richland (RL) review
- *The high tritium value is not mentioned in the report text (but was shown as a value on Plate 3); no evaluation of source*
- *Final report due March 2000*

1/18/00 Ecology provides notice of 1999 tritium data to EPA and DOE-RL (R. McLeod) at the Remedy Review Board meeting in Seattle

1/24/00 Department of Health inquired with PNNL about high tritium value in Well 699-13-3A.

1/24/00 ERC requests reanalysis of archived 1999 Well 699-13-3A groundwater sample

1/27/00 New sample collected from Well 699-13-3A

1/28/00 Preliminary screening (total activity screening required prior to shipping to Quanterra) of new sample shows total beta of 4 million pCi/L (picocuries per liter)

1/28/00 Groundwater/Vadose Zone Integration Project (Integration Project) notified of 1999 tritium data

1/31/00 Reanalysis of archived 1999 sample reported to Integration Project: 1.78 million pCi/L

2/1/00 Occurrence reporting began by PNNL

2/2/00 Sample results received from 1/27/00 sample: 8 million pCi/L

2/2/00 Notified Oregon Office of Energy, and regulators of the 8 million pCi/L sample result

2/3/00 Off Normal Occurrence event classified

2/3/00 Press briefing by DOE-RL and EPA. HAB briefed

BACKGROUND

- 300-FF-2 OU consists of 9 burial grounds, 47 source sites and groundwater not addressed in the 300-FF-5 OU (i.e. groundwater under the outlying waste sites such as 618-10, 316-4, 618-11)

- Groundwater sampling to support the 300-FF-2 OU was described in the *Limited Field Investigation Report (LFI) for the 300-FF-2 Operable Unit* (DOE/RL-96-42). The groundwater sampling and analysis consisted of sampling well 699-13-3A, identified for the 618-11 burial ground, and 699-S6-E4A, identified for the 618-10 burial ground and 316-4 crib.

- Well 699-13-3A and the 618-11 Burial Ground is sampled annually for metals, gross alpha and beta, and total uranium, which are the COCs identified by the DOE and regulators.

- The Annual 300-FF-2 Groundwater Sampling Results for FY99 (Letter Report) is typically provided at the end of the fiscal year; however the FY99 Letter Report was delayed until December 1999 due to other work priorities.

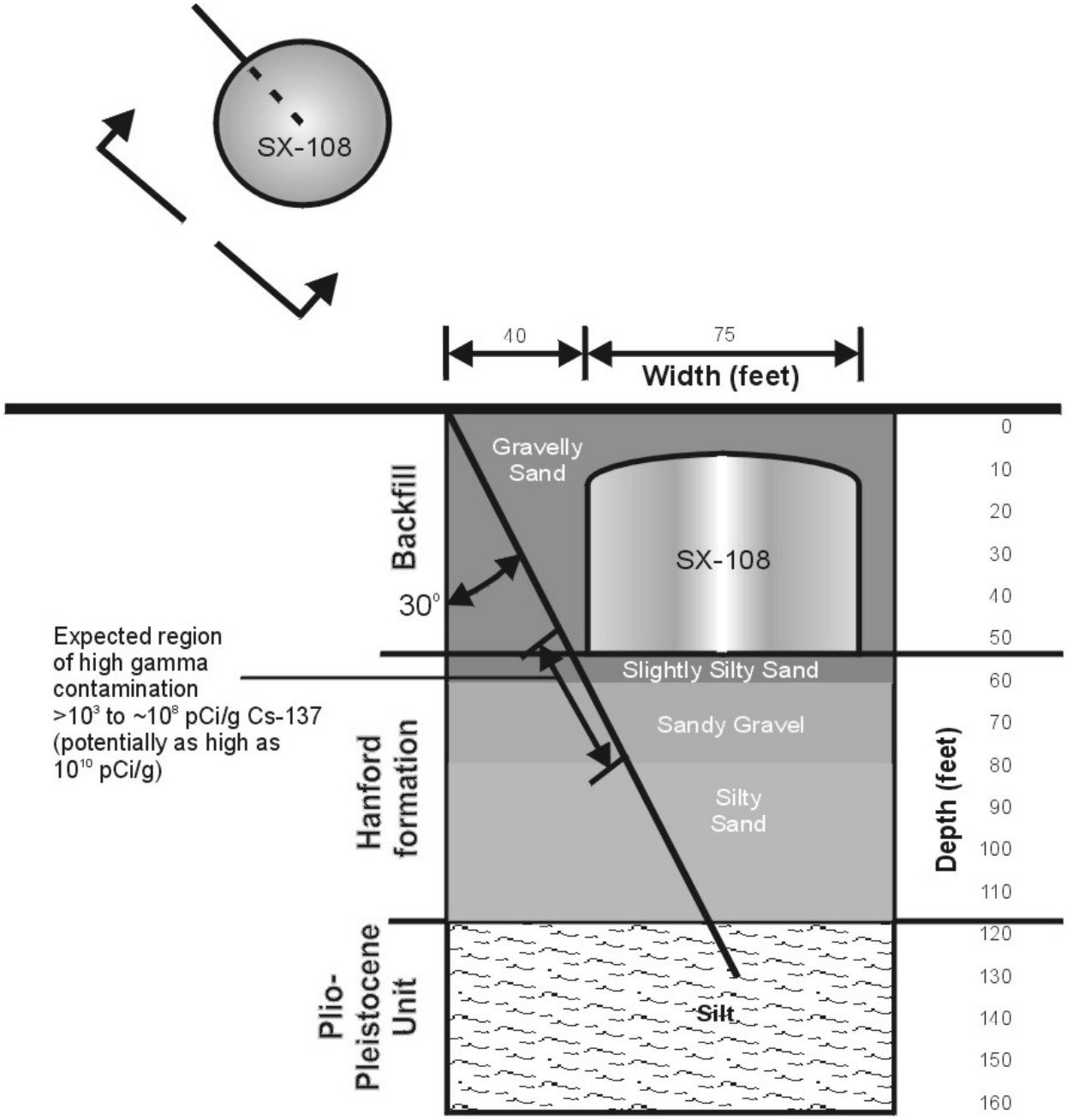
ACTIONS

- First phase of the Integration Project action plan calls for re-sampling of approximately 27 wells. The well sampling began on 2/7/00 under the direction of the Integration Project. An expedited Data Quality Objective (DQO) process occurred 2/3/00 to enable the sampling to proceed. DOE has adopted a 7-day quick analysis plan for the first round of sampling.

- The second phase of the action plan includes data analysis and will begin after data has been received.

Attachment 2

Diagram of Single-Shelled Tank SX-115 Slant Borehole



Attachment 3

Integration Project Expert Panel Outbrief Presentation – January 28, 2000

Introduction – E. Berkey, IPEP Chairman

Topics Covered

- Stakeholder, Tribal Nation, and Regulator Input
- Science & Technology Program
- System Assessment Capability
- Modeling and Transport
- Subsurface Investigations
- Overall Status of Integration Project

To Begin With

- 2000 is "Leap Year" -- an appropriate theme for the Integration Project
- IPEP members interacted with Integration Project presenters before the meeting
  - Now SOP

Stakeholder, Tribal Nation, and Regulator Input

- Input from Ecology
  - IPEP agrees with many of your comments on:
    - SAC, Rev. 0
    - SAC in general
    - Knowledge of inventory
    - Importance of Carbon Tetrachloride plume
    - Groundwater modeling
  - Regarding IPEP, we are:
    - Increasing technical review
    - Trying to work smarter within constrained budget
    - Encouraging peer review
  - We also want to increase dialogue -- within constrains of open meetings

Science and Technology – M. Kavanaugh & J. Conaway

Integration Project

- Update presented by M. Freshley and J. Zachara
- FY00 Budget $4.7M
- EMSP Budget for FY00 ~$10M
- Projects at an initial stage
- Too early to determine effectiveness
- S&T Roadmap being revised

Positive Directions

- EMSP projects are an impressive list
- Planning efforts clearly show linkages to site activities (soil inventory, site characterization, SAC)
- Connecting users with S&T and EMSP projects -- coordination teams

Areas of Concern
- Inherent limitations to directing EMSP project goals towards site needs
- Clear definition of priority research needs and their relation to EMSP and S&T projects
- Need to clarify end states for cleanup to establish S&T priorities
- Management and tracking of interactions between users/scientists
- Insufficient attention to technology needs (site characterization methods, remediation)
- The first round of EMSP awards was Hanford's "shot"
  - A substantial commitment is needed

Preliminary Recommendations
- Program is on the right track
- IPEP will continue to review S&T activities; NRC scope under development
- Document benefits of S&T/EMSP projects as related to specific project activities -- IPEP, September '99
- Formalize priority setting process for S&T needs and publish those needs from various time scales
- Assess adequacy of funding for S&T based on potential savings for Hanford cleanup costs
- Increase funding of internal projects to support technology needs

System Assessment Capability – E. Berkey & J. Karr

Observations
- Effort is ambitious, but essential
- Sufficient detail has now been articulated to give IPEP greater comfort that a useful tool will result
- Challenge is now to become more efficient and effective -- at doing relevant analyses and communicating the results
- Large uncertainty in SAC outputs no reason not to proceed
- Expectations from SAC need to be moderated and placed in perspective
- SAC, Rev. 0 likely to be more useful in decision-support than currently envisioned

Recommendations
- Address more fully IPEP request to provide a hypothetical but realistic example of inputs and outputs, step-by-step, including how uncertainty is handled
- As soon as possible, carry out some bounding scenario analyses that will be internally valuable
- Remain aware of but not constrained by TPA milestones -- Hanford needs SAC

Modeling and Transport – P. Wierenga & R. Bassett

Groundwater Modeling
- Observations:
  - The groundwater modeling group has responded well to suggestions from the outside review panel through:
    - Development of improved conceptual models of groundwater flow
    - Inverse modeling of existing data
    - Use of stochastic approach for predictions of groundwater flow
    - Hiring of staff with expertise in stochastic modeling

- Recommendations:
  - We recommend to keep strengthening the groundwater modeling group with internal expertise or outside consultants versed in stochastic hydrology
  - The function of the groundwater review panel should remain as peer review
  - We are concerned that the modeling tasks become overly computationally intensive, which could delay product delivery

Vadose Zone Modeling

- Observations:
  - There has been interaction with modeling groups at other national laboratories; a positive result of the integration project
  - Selection of a vadose zone flow and transport model is imminent
  - The model selection process was not well documented, and selection criteria were not well defined
- Recommendations:
  - Final model selection should be based, among other criteria, on how well the model can be adapted to future project needs
  - Modeling chemical processes should receive equal efforts as compared to flow processes
  - Model testing should be done with well defined field and lab data, including field tracer tests, and data from the recently completed boreholes in the tank farms
  - A vadose zone monitoring program (gamma and neutron moisture logging) should be started immediately

Subsurface Investigations – J. Matuszek & R. Patt

200 Area ER Remedial Action

- Purpose -- to support remedial decisions regarding land use
- Test of streamlined subsurface investigation
  - Representative sites
  - Test pits (25 ft. depth, backhoe)
  - Confirmation with limited number of boreholes
- Data quality appears sufficient for purpose
- Approach seems to be effective, relatively inexpensive
- Follow-up on conceptual models

RPP Results

- Cooperation with RCRA, S&T and Integration Project
- Borehole 41-09-39 decommissioning (SX-108/109)
  - Innovations (sidewall sampling, camera, temperature)
  - Information obtained
    - Hottest soil samples (1.3 R/hr @ 30 cm for 400g)
    - Defined contaminant distribution (1997 gamma logs)
    - Correlation of Nitrate, Sodium, Chromium, Tc-99 and conductivity
    - High desorption values for Cs-137

- Borehole 299-W23-19 (SX-115)
  - Innovations (continuous sampling to 160 ft, air-rotary, gadolinium tracer with neutron, gamma logging)
  - Information Obtained
    - Correlation of nitrate, Tc-99 and conductivity, but not chromium
    - Hottest Tc-99 in groundwater (at interface with vadose zone)
  - RCRA Wells
    - Integrated effort
    - Geologic, chemical and radiological data
    - Groundwater sampling at multiple depths

RPP Plans
- Cone Penetrometers in Tank Farm (shallow)
- SX-108 Slant Borehole
  - Geophysics (moisture, neutron, gamma, and neutron-enhanced)
  - Sediment samples (contaminants and alteration of formation soils)
  - Recommend adding temperature logging
- Temperature Sensitivity Study
- Estimates of Tank Leak Volumes

Overall Status of Integration Project – E. Berkey

Overall Observations/Comments
- Encouraged by overall progress and direction of Integration Project
- Project is now yielding results, not just plans
- Concerned about ability to retain momentum and meet expectations
- Evident that there is pressure to increase relevance and understanding of project work
- Decisions facing the site, other than milestones, are not clear to us

Overall Recommendations
- Role of DOE Project Manager needs to be filled on a permanent basis
- Increase the emphasis on making Integration Project output relevant to site decisions
- Revisit benefits to customers of Integration Project outputs
  - Must be understandable and meaningful
- Work on defining the hierarchy of decisions that the Integration Project can support

Attachment 4

GW/VZ INTEGRATION PROJECT

FEBRUARY 28 – MAY 1, 2000

TWO MONTH LOOK AHEAD CALENDAR

February 28 - March 2	Waste Management 2000 Workshop Tucson, AZ
March 6	GW/VZ Open Project Team Meeting BHI Assembly Room – 1-3 p.m. (Contact: Dru Butler)
March 8	DOE FY 2002 Hanford Budget Workshop Richland, WA – Red Lion – 802 George Washington Way – 12:30-6 p.m.
March 13-14	HAB Environmental Restoration Committee Meeting March 13 – Richland Federal Building Rm. 124 – 9 a.m.-4 p.m. March 14 – BHI Assembly Room – 9 a.m.-12 p.m.
March 20	GW/VZ Open Project Team Meeting BHI Assembly Room – 1-3 p.m. (Contact: Dru Butler)
March 28	Oregon Hanford Waste Board Hermiston, OR
March 28	DOE FY 2002 Hanford Budget Meeting Seattle – Seattle Center – 7-10 p.m.
March 30	DOE FY 2002 Hanford Budget Meeting Portland – State Office Building – 7-10 p.m.
April 3	GW/VZ Open Project Team Meeting BHI Assembly Room – 1-3 p.m. (Contact: Dru Butler)
April 6-7	Hanford Advisory Board Meeting Richland, WA
April 11	HAB Environmental Restoration Committee Meeting BHI Assembly Room – 9 a.m.-4 p.m.
April 17	GW/VZ Open Project Team Meeting BHI Assembly Room – 1-3 p.m. (Contact: Dru Butler)
May 1	GW/VZ Open Project Team Meeting BHI Assembly Room – 1-3 p.m. (Contact: Dru Butler)