

INTEGRATION PROJECT EXPERT PANEL

FIELD INVESTIGATIONS SUBPANEL

CLOSEOUT and FOLLOW-UP REPORT - MARCH 22-23, 1999 MEETING

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For the U.S. Department of Energy, Richland Operations Office
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FOREWORD

The Integration Project Expert Panel (IPEP) was formed in 1998 under the auspices of the Groundwater/Vadose Zone Integration Project at the Hanford Site of the U.S. Department of Energy (DOE). This Project is funded by DOE Richland Operations and managed by Bechtel Hanford, Inc.

The purpose of the IPEP is to provide the Integration Project with independent advice and recommendations on key programmatic, technical, and administrative issues affecting the success of the Project.

The IPEP is composed of eight individuals, independent of DOE, having a diverse set of technical backgrounds and experience relevant to the clean up of the Hanford Site.

This document is a product of IPEP member efforts working through an officially constituted Subpanel. The views expressed in the document represent a consensus of all eight Panel members, except where specifically noted.

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Field Investigations Subpanel

Closeout and Follow-up Report – March 22-23, 1999 Meeting

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Field Investigations Subpanel Membership: John M. Matuszek, Chair, John G. Conaway, Ralph O. Patt, and Peter J. Wierenga

SUMMARY

A meeting of the Field Investigations Subpanel with staff of the Tank Waste Remediation Systems (TWRS)/Office of River Protection (ORP) Vadose Zone (VZ) Characterization Program was held March 22-23, 1999. Objectives proposed for the meeting by the Subpanel were intended to focus on evaluation of the TWRS FY99 field investigation for vadose zone characterization; these are stated below as SUBPANEL OBJECTIVES. A subsequent statement of work forwarded by Bechtel Hanford, Inc. focused primarily on review of documents associated with workplans for the FY99 VZ characterization program; these are stated below as "BHI SCOPE".

1. SUBPANEL OBJECTIVES: Evaluate the plans for field investigations prepared for the FY99 TWRS Vadose Zone Characterization Program. Evaluate the extent to which these plans merge with the Integration Program planning effort, meet site assessment needs, fill identified data gaps, are coordinated with S&T technical elements, and serve as "drivers" for Integration Project elements (e.g., the SAC program, the S&T program, and remedial actions). Evaluate the impact of TWRS FY99 and FY00 budget adaptations on the needs of both the TWRS and Integration Project.
2. BHI SCOPE: "The Groundwater/Vadose Zone Integration Project requests the Field Investigation Subpanel to review the Tank Farms Vadose Zone Project Waste Management Area (WMA) S-SX Preliminary Workplan Addenda. Specifically, the Subpanel is requested to:
 - Provide technical input on whether the Preliminary Workplan Addenda is technically defensible; and
 - Provide technical input for either strengthening the Preliminary Workplan Addenda (sic) or future WMA Workplan Addendas (sic).

The March Subpanel meeting ended prior to final selection by DOE of a preferred alternative for the proposed new borehole. Documents in support of the decision on where and how to perform the FY99 TWRS vadose zone characterization program were not available for review before or during the meeting. The WMA Workplan Addendum

and supporting documents were only made available six weeks after the March meeting. Therefore, the scope of this report extends beyond that of an ordinary closeout report to include the material forwarded to the Subpanel at beginning of May, as well as material and supporting presentations made during the Integration Project Expert Panel (IPEP) meeting of May 13 - 15, 1999.

Conclusions and Recommendations

Some of the conclusions and recommendations presented here have been overtaken by events due to delays in publication of this report. However, most of these same conclusions and recommendations were expressed previously either in the March Subpanel meeting or in informal communications subsequent to the meeting.

Conclusion. The meeting appears to have been productive for both parties, providing for mostly frank and open discussions on technical matters, such as if, how, and where to drill the next test hole. DOE personnel, contractors, regulators, stakeholders, representatives from the Tribal Nations and panel members participated in the discussions.

Conclusion. It seems from the discussions, at least at the level of the meeting participants, that the integration process is gaining some acceptance and that there is a lot of internal discussion on the means of achieving an integrated approach to solving some of the problems at Hanford. This bodes well for the future.

Recommendation. The Subpanel recommends more complete acceptance of the integration philosophy by all stakeholders, especially regulatory authorities, and by the top management at Hanford.

Conclusion. A key issue for field investigations of the type necessary to the success of the TWRS vadose zone (VZ) characterization program is that of adequate funding. The Subpanel judges the proposed TWRS vadose zone characterization budget for FY99, as well as those presented for the next several FY, as unrealistically low.

Recommendation. The Subpanel recommends funding at a level consistent with the goals described by a TWRS contractor at the June 23 - 25, 1998 Vadose Zone Expert Panel [see **MEETING CLOSEOUT REPORT - VADOSE ZONE EXPERT PANEL - JUNE 23 - 25, 1998**, DOE/RL-98-67, Rev. 0, September 1998, pp. 14 - 16.] In the **TANK WASTE REMEDIATION SYSTEM VADOSE ZONE PROGRAM PLAN**, DOE-RL-98-49, prepared by Lockheed Martin Hanford Corp. with the assistance of the Hanford Integration Team, the following annual budgets were recommended for this program: FY 1999, \$7.5-million; FY2000, \$10-million; and FY2001, 2002 and FY2003, \$6-million each year.

Conclusion. The Data Quality Objective (DQO) process attempted for the FY99 TWRS VZ characterization program appears to have produced only mixed results. Clearly defined DQOs were not provided prior to or during the March meeting.

Conclusion. The Subpanel is in general agreement with TWRS plans for research programs to be attempted during drilling of three new wells necessary to meet Resource Conservation and Recovery Act (RCRA) requirements.

Recommendation. The Subpanel recommends a similar level of effort for four RCRA wells planned for this calendar year at other Waste Management Areas (WMA).

Conclusion. The location and drilling method selected for a new borehole, as presented at the March meeting, were not well supported by the facts presented at the meeting and were found to be an alternative actually promoted by the regulatory agency, an alternative with which the Subpanel disagreed. A Subpanel request for documentation and definition of the agency's goals for the FY99 field effort has not yet been honored. It should be emphasized that the new borehole is part of a long-term research effort by TWRS to determine the inventory of contaminants in the vadose zone beneath the tank farms and to develop a better understanding of the transport of contaminants through the vadose zone. Enforcing RCRA-driven requirements is neither appropriate nor productive for such research efforts.

Recommendation. The Subpanel recommends greater flexibility on the part of regulatory agencies by treating the TWRS VZ characterization as the research program it is, rather than requiring the program to meet the strict prescriptive RCRA/CERCLA requirements inherent to the Tri-Party Agreement, as long as safety is not compromised.

Conclusion. The final location for the new research borehole, southwest of SX-115, presents questionable value for achieving definition of contaminant migration, the intended purpose for vadose zone characterization.

Conclusion. The Subpanel is in general agreement with TWRS plans for research programs to be attempted during closure of borehole 41-09-39. The plan for decommissioning borehole 41-09-39 is comprehensive and innovative. In particular, sidewall coring is new to the Hanford site and if successful could become a major vadose zone characterization tool at Hanford and other DOE sites. The data collected during decommissioning of borehole 41-09-39 should improve our knowledge of what is present in the vadose zone at this site.

Recommendation. The FY99 program should go forward considering the availability of funds and the time frame for starting the drilling. The Subpanel strongly supports TWRS in its goal to proceed with at least one new borehole during FY99. Where and how remains at issue. The recommendation to move ahead is prompted by recognition of a variety of needs: scientific (nature of contaminants); technical (drilling method; slant-hole); modeling (sources; mobility); and, of course, political (show progress). The Subpanel does not support the RCRA-driven RFI-CMS alternative currently proposed, because of the clear possibility of failing to intercept measurable concentrations of contaminants, the near impossibility of identifying a pathway downward, and the question of obtaining meaningful data cost effectively.

Recommendation. The proposed analytical methods for analysis of samples from the new research borehole require reconsideration, because the detection limits for mass spectrometric analysis of ^{99}Tc , ^{239}Pu , ^{240}Pu , and ^{241}Am , possibly also for ^{237}Np and ^{129}I , appear inadequate for the purpose proposed for the new borehole.

Recommendation. The Subpanel recommended that if a leak from tank SX-115 were the target for FY99, a slant-hole should have been selected to obtain information about inventory and formation structure beneath the tank. A slant hole near SX-115 might help evaluate whether destruction of the formation structure by the escaping hot, caustic dense liquor did transport contaminants downward rather than down-dip. This would also provide information on the "umbrella effect" postulated as a source of increased infiltration of precipitation.

Conclusion. A 3-D model presented at the March meeting by MACTEC-MEIERS for visualization of subsurface contaminant and physical facility distributions appears potentially valuable for the GW/VZ Integration Project, as well as for TWRS.

Conclusion. In order for the Subpanel to maintain its identity as an independent review panel within the overall mission of the IPEP, it should receive its financial support directly from GW/VZ Integration Project funds rather than from the organizations whose program(s) it is to review

INTRODUCTION

A meeting of the Field Investigations Subpanel was held March 22-23, 1999. The objective of this Subpanel meeting was to review the FY99 Tank Waste Remediation System (TWRS)/Office of River Protection (ORP) field characterization plans for the waste management area (WMA) S-SX. The Subpanel's goal was to evaluate how the FY99 TWRS program will benefit the GW/VZ Integration Program. The purpose of the meeting as suggested by DOE/TWRS and Lockheed Martin Hanford Corp. (LHMC) was to review the preliminary workplan for Waste Management Area (WMA) S-SX, and to provide input into the development of future WMA workplans (see Appendices A, B, and C).

Bechtel Hanford Inc (BHI) obtained funds for the Subpanel meeting from TWRS. This created a difference in expectations for the March meeting and subsequent interactions of the Subpanel with TWRS staffs. No workplan document describing the proposed work was furnished prior to or during the meeting. The Subpanel's evaluation to that point depended entirely on presentations and handouts made by TWRS staff and contractors. The minutes of ten February and March DQO meetings that involved representatives of DOE-RL, contractors, regulators, tribal nations and stakeholders were provided to the Subpanel at the March meeting, but were too voluminous to be reviewed effectively on such short notice. During the course of the meeting, it became apparent that a major reason for the absence of a workplan document was that TWRS had been unable for some time to obtain concurrence from the regulators for even the most general goals for the FY99 work effort, let alone agreement on the details of a workplan.

The principal items discussed during the March meeting (see Appendix D) were an update on the groundwater investigations around WMA S-SX, the plans for installing new RCRA monitoring wells, sampling and analytical plans associated with the decommissioning of borehole 41-09-39, and the plans for drilling a new test well within WMA S-SX. In addition to presentations during the meeting, the Subpanel members also attended a demonstration of the MACTEC-MEIERS 3-D visualization model for evaluating the subsurface contaminant and physical-facilities distributions at the tank farm.

For the meeting closeout session the Subpanel developed a set of consensus comments, in the form of "bullets", that were supplemented by individual comments (no consensus) from the Subpanel members. This report provides the consensus comments as a general framework for supplemental discussion.

Supporting documents finally were made available six weeks later; only about three weeks before the May 13 - 15, 1999, IPEP meeting, but funding was not provided for a comprehensive review of the TWRS documents. Additional presentations and handouts were provided by TWRS contractors at the May IPEP meeting. The documents and May presentations provided entirely new information regarding field work, some of which had been introduced only fleetingly at the March meeting, thus making it difficult for the Subpanel to review them for consensus. Therefore, the scope of this report extends

beyond that of an ordinary meeting closeout report to include the material forwarded to the Subpanel at the beginning of May, as well as material and supporting presentations made during the May IPEP meeting.

This report is divided into three sections:

- **I. MARCH SUBPANEL MEETING.** A technical discussion of the Subpanel's consensus findings regarding the March Subpanel meeting;
- **II. REVIEW OF FY99 WORKPLAN.** A technical review requested by TWRS through Bechtel Hanford, Inc. (BHI) of selected documents provided after the March meeting and of supporting presentations by TWRS and Lockheed Martin Hanford Corp. (LCHM) representatives at the May IPEP meeting; and
- **APPENDICES.**

As with most reviews of this type, this report contains several critical comments and related recommendations. The overbalance toward critical comments does not indicate failure or poor performance by the TWRS organization (DOE, LHMC, or other subcontractors). In fact, the TWRS organization has made a highly commendable effort under difficult conditions and severe time constraints. As with any task as complex as this, there are always issues that require added attention. In the interest of brevity, we focus on those issues.

I. MARCH SUBPANEL MEETING

CLOSEOUT COMMENTS

The following are the consensus comments prepared by the Subpanel for the closeout session of the March 22-23, 1999 meeting. The comments have been edited slightly for clarity.

General

- Statements made in the closeout do not represent IPEP or Subpanel recommendations
- Closeout comments grouped as:
 - General
 - Process
 - Drilling
 - Sampling and Analysis
 - Integration
- Subpanel mission hindered by lack of written documentation
- DOE and contractors provided frank and helpful discussion during meeting
- Budgets for characterization are unrealistically low
- Budgets do not represent a "minimum, credible" characterization program

Process

- DQO process has not yet resulted in a set of DQOs
- DQO process provided a generally accepted recommendation for FY99 borehole
- Consensus approach broke down when Ecology rejected a slant hole at SX-108 for FY99
- FY99 decisions rushed due to long delays
- Vadose Zone Panel recommendations to reinstate limited integral gamma logging not followed
- Integral gamma logging could be useful in planning FY99 hole

Drilling

- Drill hole this summer
- The first hole drilled should be a research effort
- The research hole has two main objectives:
 - Gather data
 - Gain experience
- Table of options for the first borehole was only a variation on a single theme
- Alternative suggested by the Subpanel during meeting
- Contingency Plan not mentioned for decommissioning borehole 41-09-39 should casing withdrawal be compromised
- Subpanel observed strong divergence of opinions on drilling plan

Sampling and Analysis

- Rationale for Ecology analyte list was not provided
 - Analysis protocol presented by TWRS fairly well thought out
 - Plan for prioritizing analyses for FY99 hole was not made available to Subpanel
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Integration

- Subpanel was encouraged by continued progress toward integration
 - Encouraged by robust participation by Tribal Nations and stakeholders
 - Active support of the Integration process by Ecology is essential to success
 - Presentation describing RCRA wells illustrates a promising effort toward integration
 - MACTEC-MEIERS data visualization computer program potentially valuable for IP, as well as TWRS
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DISCUSSION

The following is a discussion of several issues related primarily to the March Subpanel meeting; some are premeeting issues not included in preparing the foregoing consensus comments, others are directed at some, but not all, of the consensus comments, and others are directed at the April-May supplements. Most issues that developed after the meeting, when supporting documents and additional presentations and handouts were received, are addressed in Section II of this report.

Groundwater Monitoring at WMA S-SX

Groundwater monitoring is conducted to meet the requirements of RCRA, CERCLA, DOE orders, and the Washington Administrative Code.

An interesting overview of results obtained so far was presented at the March subpanel meeting. Results are complex, because of groundwater contamination from surrounding areas outside WMA S-SX, and also because the water table is dropping at a rate of about 2 ft per year. This latter fact makes sampling more difficult (some wells are drying up; also samples taken from a given well come from different depths sampled as the water table drops over time). On the other hand the falling water level flattens the water table, decreases the gradient in hydraulic head, and decreases the rate of horizontal spreading of the contaminants (now estimated at 15 m/year). However, multilevel sampling, which has been initiated on a limited scale, should over time help the interpretation of groundwater contamination data.

So far, evidence for the presence of ^{137}Cs in groundwater is limited to one well, and the concentration is only 5% of the drinking water standard. Therefore, a major effort to "find" ^{137}Cs in groundwater below WMA S-SX appears not to be justified. However, there is enough variation in the concentration of various other contaminants in samples collected at different depths that multilevel sampling should be continued.

Evidence of ^{99}Tc contamination of groundwater is much more extensive. A new borehole is to be drilled during the summer of 1999 at a location thought to be a source of ^{99}Tc observed in groundwater monitoring wells south of WMA S-SX.

Overall, the FY99 activities anticipated to be conducted at WMA S-SX by the groundwater monitoring group seem well planned and are justified. If executed as planned, the various activities should improve our understanding of groundwater contamination at WMA S-SX.

During CY99, three more RCRA wells will be installed around WMA S-SX, with five others to be installed at other WMA, to replace wells going dry and to expand the areal coverage. The Subpanel strongly supports the proposed sampling of the vadose zone during drilling for these wells. This is an excellent example of integration across projects. The new wells should provide much needed background data on the depth-distribution of water and contaminants outside the fenced area, where recharge rates

should be lower as a result of the absence of a gravel cover and the presence of some vegetation. Minimum sample analyses are: for water content; integral or preferably spectral gamma; and perhaps some limited hydraulic parameter testing; samples are archived following completion of analyses.

As long as they do not present a pathway to groundwater, the old dried-up groundwater monitoring wells should be preserved for future sampling of the vadose zone using, for example, sidewall coring.

Decommissioning Borehole 41-09-39

The purpose of decommissioning borehole 41-09-39 is to prevent flow of contaminants through the borehole to the groundwater. A secondary goal is to obtain samples of opportunity as the borehole is decommissioned for a better understanding of several vadose zone conditions at that location, with the potential of extending much of the information obtained across the WMA and perhaps the 200 Areas.

Several options were considered and the decision was made to decommission the entire borehole and to collect soil samples from 16 horizons in the upper 130 feet as the casing is withdrawn. A newly designed sidewall sampling tool is to be used to take core samples from below the casing as the casing is removed. The sidewall cores will be analyzed for moisture and contaminants. These data will be supplemented with additional spectral gamma logs, temperature logs, moisture logs, and camera visuals of soil conditions prior to sampling. This plan has the promise of yielding considerable new information on what is present in the vadose zone at this site.

The plan also may provide some information on the distribution of gamma-emitting contaminants to supplement that provided by spectral gamma logs. The difficulty in comparing spectral-gamma data with core samples analyzed in a laboratory is that, although a laboratory measurement may be more accurate for the tiny sample analyzed, the lab sample represents only perhaps 0.01% as much material as is interrogated by the spectral-gamma log. Therefore, statistical sampling error (i.e., variation among physical samples taken from the same general region) is very high and the collected sample may not be as representative as the spectral gamma log of general conditions in the formation soils. This has become a matter of concern with the sidewall sampling device, because of its tendency to disrupt the cored sample and lose the depth (i.e. radial distance from casing) profile necessary to identify contamination spread into the formation from that alongside the casing (J. Serne, private communication, July 2, 1999). The alternative of scraping samples from the sidewall as the casing is withdrawn is not any better choice.

Conversely, a fully satisfactory method for differentiating between gamma-active contamination spread through the formation versus that along the casing has not been exhibited for the spectral gamma logs, either. Spectral-shape analysis has shown some promise of resolving one from the other, but development of the technique has been slow. The *in situ* (logging) and *ex situ* (sample analyses) techniques are neither exclusionary

nor necessarily confirming; rather, they should be considered as two complementary sets of data that must each be interpreted independently as well as jointly.

The plan for decommissioning borehole 41-09-39, described in detail at the meeting, is comprehensive and innovative. In particular, sidewall coring, commonly used in some other borehole applications, is new to the Hanford site and if successful could become a major vadose zone characterization tool at Hanford and other DOE sites. The data collected during decommissioning of borehole 41-09-39 should improve our knowledge of what is present in the vadose zone at this site. However, as noted in the meeting closeout comments given earlier, a contingency plan for decommissioning borehole 41-09-39 should casing withdrawal be compromised was never presented to the subpanel.

Drilling a New Borehole

The Subpanel was pleased to see that progress was being made toward drilling another borehole in WMA S-SX this summer. Drilling a properly designed research-type test-hole in WMA S-SX could provide more complete information on the vertical distribution of technetium and other contaminants in the upper 100 feet of the soil profile inside the tank farm.

The plan TWRS presented for drilling and sample collection appeared well developed and thought through. There was considerable divergence of opinion on the purpose of the new borehole, which in turn created differences in proposed location (under or down-dip of tank SX-108) and the drilling plan (vertical versus slant). The final decision whether to use slant or vertical drilling should be based on the goals established for installing the new borehole and on safety, cost, and technical feasibility within the time frame available.

The selection of a location has been controversial. TWRS staff and contractors are seeking to develop a better understanding of contaminant inventory that may influence decisions about how tanks are to be emptied. Regulators appear to be more interested in defining the extent of contaminant migration to better define more immediate RCRA-related concerns about groundwater contamination and possible remediation. This dichotomy in goals jeopardizes the likelihood of a successful effort for FY99 - and beyond, - unless resolved. A brief review of the relevant sections of the FY99 workplan is provided in Section II of this report.

The final site selected for the new borehole, to the southwest of tank SX-115, is intended to identify a source of ⁹⁹Tc observed in groundwater wells to the south of WMA S-SX. If part of a broadly spread plume is intercepted and analytical detection limits are sufficient to quantify contaminant concentrations some distance from the center of a plume, the planned borehole may provide information toward defining transport at that part of WMA S-SX. However, several more boreholes will be required to understand vertical and horizontal transport of ⁹⁹Tc at this location. On the other hand, if ⁹⁹Tc is transported along a narrow vertical path, the probability seems remote that a 4-in

diameter borehole placed along the periphery of a potentially contaminated planar area some 35 feet or more in diameter will encounter a pathway for downward migration.

Sample Analysis

The sample analysis plan presented at the meeting is excellent. It involves a phased approach consisting of a primary analysis of all samples, a secondary analysis of selected soil samples after review of the primary analysis results, and a tertiary analysis, if deemed necessary. The sample analysis plan appears to have been developed primarily for the original purpose proposed by TWRS - characterization of contaminant inventory near and under a tank. Modification of the sample analysis plan may be necessary, if the workplan for the new borehole proceeds as presented at the May IPEP meeting. Better analytical sensitivity for at least some radionuclides may be necessary. This issue is discussed in Section II of this report.

Additional analyses were proposed by Ecology, but Ecology did not provide supporting documentation as to necessity or sufficiency. Without appropriate justification by Ecology for the additional analyses proposed, the panel recommends that the program should go forward with the sample analysis plan proposed by TWRS. Analysis of highly radioactive samples for chemical or radioactive constituents is very costly, and adding even a few parameters to the list can make the project prohibitively expensive. Furthermore, dealing with the extraordinarily high radiation flux expected from many of the samples of greatest value for inventory definition will lead to unnecessary radiation exposure to analysts. Also, one should have a clear understanding of what to do with the results of any requested analyses once the analytical program is complete, which has not been done.

The determination of ⁹⁹Tc transport pathways is stated to be one of the prime justifications for drilling the new borehole near tank SX-115. It appears that the analytical plan of Table A-1 and detection limit listing in Table C-1 of the **ADDENDUM** should be modified accordingly.

The Subpanel was provided during the meeting with an unpublished February 19, 1990 (sic?) "White Paper" by J. Louis Kovach entitled, **TECHNETIUM INVENTORY AND ANALYTICAL ISSUES**. In the paper, Dr. Kovach presents a discussion about the partitioning of technetium among valence states and soluble/insoluble compounds. The discussion of how partitioning might affect ⁹⁹Tc transport out of the tanks and through environmental media has merit for data interpretation. A plan to perform analysis of 1:1 water extracts of soil samples will quantify the mobile portion of the ⁹⁹Tc plume, although it will not completely satisfy Dr. Kovach's concern for identifying technetium valence states in the samples. It should suffice for risk assessment purposes, however.

Balanced Use of Regulatory Authority Needed

TWRS vadose zone characterization at Hanford (indeed, vadose zone characterization anywhere) is a monumental research problem at this time. It is monumental partly

because vadose zone characterization has been largely underfunded from the start of operations at Hanford. It still receives inordinately low recognition in budgeting (note consensus closeout comment above that "budgets for characterization are unrealistically low"), perhaps because its importance is poorly understood by Hanford management. Not surprisingly, the regulatory agencies have invoked legal remedies available through RCRA, CERCLA, and the TriParty Agreement (TPA) to force Hanford management to early resolution of the technical issues that the regulators view as critical to the protection of health and the environment. The Subpanel agrees with the regulators that something must be done to achieve a more realistic funding level for vadose zone characterization; whether the legal approach is the best or only one, we cannot judge.

One result has been a negotiated **Federal Facility Agreement and Consent Order, Change Number M-45-98-03, January 8, 1999** and related documents, such as **200 Areas Remedial Investigation/Feasibility Study Implementation Plan-Environmental Restoration Program**, DOE/RL-98-28, April 1999, and the **PRELIMINARY SITE-SPECIFIC SST PHASE 1 RFI/CMS WORKPLAN ADDENDUM FOR WMA S-SX**, HNF-4380, April 1999, (**ADDENDUM**). The outcome of this Consent Order is to place greater emphasis on an accelerated, structured, combined RCRA/CERCLA-based RFI-CMS approach, rather than a more deliberate, scientifically-based one. The Subpanel agrees with the goal of and reasons for increasing funding for vadose zone activities, if not the means. Negotiations leading to the consent order and other regulatory documents robbed the planning effort for the FY99 TWRS vadose zone characterization program of valuable time from midsummer 1998 to February 1999. This led to a hasty planning effort for a very complex and challenging task and the outcome is not optimal. The Subpanel places no blame, but urges all participants to work towards improving the planning processes.

After the March Subpanel meeting, and even after reading the draft **ADDENDUM** and listening to TWRS contractor presentations at the May IPEP meeting, Subpanel members still do not have a reasonable understanding of the interaction between DOE and its contractors with Ecology that led to the current FY99 borehole plan. For example, TWRS personnel seemed to imply, but did not state categorically, that Ecology had unilaterally vetoed the borehole location and drilling plan first proposed. Ecology personnel implied, but did not state categorically, that this did not happen. The Subpanel meeting was generally positive, constructive, and cordial, but the discussion of the drilling plan and location for the FY99 borehole became notably acrimonious.

There is some ambiguity in the information the Subpanel has received concerning selection of borehole location and drilling plan. The Subpanel members are unanimous in their concern that the consensus process that had been attempted through ten meetings to develop DQOs and a defensible selection of a preferred drilling location and drilling method broke down. The result of the breakdown appears to be an imposition by Ecology of first one, then another, borehole location - each time without clearly defined goals. The Subpanel requested that Ecology provide it with information to support its selection of location, method, and analytical scheme, but the information has not been received. The borehole location and drilling plan selected during the DOE/Ecology

negotiations following the March meeting are based on goals that are apparently among the weakest of the alternatives presented at the March meeting. This process gives the appearance that Ecology is using its leverage as the permitting agency to force TWRS into selecting Ecology's preferences for the FY99 program. As a general principal, we urge Ecology to strike a judicious balance in its use of regulatory authority and resist the temptation to dictate the details of the characterization program. If Ecology makes the decisions at this level of detail, realistically (as opposed to legally), DOE/RL cannot be held accountable if the program fails to achieve its goals.

Rather than imposing RCRA-driven requirements that reduce the value for risk assessment, the regulators should treat this very complex effort as the investigative program it is. Meeting discussion and review of the **ADDENDUM** indicated that the requirements are not within the scope of these investigations and presented a potential increase in hazard to workers and in costs.

Which First?

The above discussion highlights one of the impediments to moving ahead with vadose zone characterization - a sort of chicken vs egg question. The RFI-CMS process, the RCRA framework for Ecology's approach, appears to focus on near-term resolution of potential groundwater contamination. Aside from restrictions imposed under the TPA, the primary focus for TWRS is to move ahead with preparations for emptying the tanks and providing feed material for vitrification. The RFI-CMS is a rigidly structured process that seeks answers to the question of mobility of contaminants, while TWRS needs to define total inventory, outside as well as inside the tanks. This philosophical difference leads to the variants in proposals for vadose zone characterization - to seek migrating-contaminant fronts, as preferred by Ecology, or to evaluate the inventory of contaminants outside the tanks, as proposed by TWRS.

At face, it appears that Ecology is attempting to use the regulatory process to achieve a laudable goal - to determine which contaminants present the most significant threat to ground water in the near term. Perhaps in its frustration with the laxity of the past Hanford management actions concerning vadose zone characterization, Ecology has selected a viable agent to achieve its goal - enforce TWRS to perform the task, even if the task is peripheral to the TWRS mission. This appears to be the crux of the long negotiations that led finally to the consent order, the implementation plan, and finally the **ADDENDUM**. The result, however, is to have slowed the program such that neither party may achieve its short-term goals, while long-term goals are jeopardized, as well. The final outcome may be an increase in the long-term risk to the public.

Which first? We urge that TWRS be allowed to get on with its principal obligation. If that means seeking better estimates of inventory over those for mobility, then so it should be. The commitment from TWRS to Ecology should be to provide as much information as possible concerning mobility and transport. Thus, mobility should not be the overriding objective, particularly as the current groundwater conditions and potential uses so limit the near-term hazard to the public.

II. REVIEW OF FY99 WORKPLAN

The **PRELIMINARY SITE-SPECIFIC SST PHASE 1 RFI/CMS WORKPLAN ADDENDUM FOR WMA S-SX**, HNF-4380, April 1999, (**ADDENDUM**) provides the details of the FY99 TWRS vadose zone characterization program at WMA S-SX. It is a well-written technical document that provides necessary and sufficient justification for much of the FY99 TWRS vadose zone characterization program. The workplan presented in the **ADDENDUM** was supplemented at the May meeting of the IPEP by an excellent presentation by TWRS contractors. From the time of the March Subpanel meeting, through issue of the **ADDENDUM**, and to the time of the May IPEP meeting, little changed in the goals and workplans for decommissioning borehole 41-09-39 and for installing new RCRA wells at the WMA S-SX. The issues that arise from the May IPEP meeting and the **ADDENDUM** are related primarily to the selected location and drilling plan for the new borehole. The following discussion focuses primarily on that part of the workplan.

Are the goals of the workplan suited to the TWRS mission?

We understand the mission of the TWRS/LHMC program at Hanford to be the delivery of high level waste to the vitrification facility to be constructed by a consortium headed by British Nuclear Fuels Ltd. (BNFL). Initially, waste will be retrieved from the double shell tanks as part of a feasibility demonstration. As space is freed in the double shell tanks, waste from the single shell tanks will be transferred to double shell tanks, with transfer and treatment options yet to be determined, for eventual vitrification. LMHC is under contractual constraints to meet certain time-limited goals of retrieval from both types of tanks.

LMHC has contracted with various organizations to determine the nature and extent of vadose zone characterization necessary to meet its contractual obligations. Two contracts, one with Jacobs Engineering Group Inc. (JE) and the other with Daniel B. Stephens & Associates Inc. (DBS), were considered for this discussion, because they deal with evaluations of the uncertainties associated with the hazard developed from retrieval of tank waste and with the hazard from existing tank leaks. The JE study (published as **(DRAFT) RETRIEVAL PERFORMANCE EVALUATION METHODOLOGY FOR THE AX TANK FARM**, DOE/RL-98-72, September 1998 (**RPE**)) was brought to our attention in 1998 by the Washington Department of Ecology; the DBS study (**SENSITIVITY ANALYSIS OF SLUICING-LEAK PARAMETERS FOR THE 241-AX TANK FARM**, WHC-SD-WM-ANAL-052, Rev. 0, November 1996) was offered by the principal author during the March meeting. Both studies addressed the AX tank farm, so there may be some question about the extent to which details can be extrapolated to WMA S-SX. However, for the purpose of answering the broad question posited for this subsection, differences between AX and SX tank farms should not have a great influence on the hazard and uncertainty outcomes.

The JE study uses a comprehensive systems analysis for its consideration of various radionuclides and pathways to interaction of any leaked waste with various populations. However, fluid and solute transport algorithms are much less robust than used by DBS in its study. LM staff at the March and May meetings alluded to an RPE-type study as part of its definition of a FY99 characterization program for SX tank farm, but details such as the use of more robust algorithms for transport calculations were not provided. The DBS study, while having value for defining a specific issue - control of recharge, does not lend itself to evaluating the relative merit of options for defining the purpose (goals) of the FY99 TWRS vadose zone characterization program. The **RPE** provides nuclide-specific estimates of risk and the associated uncertainty.

The **RPE** estimated the uncertainty for total risk from all constituents to range four magnitudes at initial release and to range seven magnitudes at 10,000 years; similarly large ranges of uncertainty were estimated for human health risk, as well. Such large ranges in uncertainty are important, because the upper limits cover risk levels that are of concern, even when deterministic calculations may not indicate significant levels of risk. From the **RPE**, "Sensitivity results indicate that additional data on source terms followed by contaminant transport parameters would provide the greatest reduction in uncertainty". The quote understates how much more influence the source term (inventory) carries for reduction of uncertainty than does contaminant transport. Sensitivity analysis results with fixed exposure parameters show inventory parameters to result in values for model multiple correlation coefficients that are one (^{238}U) to two or more (^{14}C , ^{99}Tc , ^{129}I) magnitudes greater than the comparable coefficients for transport parameters.

Thus, the TWRS/LM statement reported in the minutes of the March 9 DQO meeting that "prioritization of the nature o(f) source was made over migration pathway" appears justified, if TWRS is to fulfill its primary mission and LMHC is to meet its contractual commitments.

Is location and drilling of new borehole adequately justified?

As described in Section I of this report, three locations out of the eight initially considered (see **ADDENDUM**, Table 4.3) have been described at various times by TWRS as the "preferred location" for the new FY99 borehole:

- a slant hole drilled beneath tank SX-108, with the primary purpose of determining inventory (targeted at the highest gamma-active portion of plume) and secondarily the characterization of the transport pathways and distribution (determine vertical and horizontal extent of plume);
- a vertical hole southwest of tank SX-108 near borehole 41-11-10, with the primary purpose of characterizing transport pathways and distribution; and
- a vertical borehole southwest of tank SX-115, also with the transport pathways and distribution as the primary purpose.

The last of the above, the current choice, was featured in the **ADDENDUM** and during the May IPEP meeting. The second of the above was offered at the March meeting as the preferred location, although during the discussion that ensued it seemed to the subpanel

that this choice may have been imposed on TWRS by the Washington Department of Ecology through the recently negotiated, RCRA-driven TPA milestone amendments. From comments elicited during the March meeting and from the DQO meeting minutes eventually provided at the Subpanel's request, it became apparent that the first of the choices above was initially the preferred choice of TWRS. The Subpanel concurred in its support for the slant hole under tank SX-108, rather than a vertical hole to the southwest, of tank SX-108. Neither option was chosen for the workplan **ADDENDUM**.

It is not at all clear that a borehole at the location southwest of tank SX-115, as specified in a presentation at the May meeting of the IPEP, will successfully intercept a significant segment of the plume that was inferred by Raymond and Shdo (**CHARACTERIZATION OF SUBSURFACE CONTAMINATION IN THE SX TANK FARM**, BNWL-CC-701, 1966). The meeting presentation materials place an "X" on an isopleth signifying $<1 \mu\text{Ci } ^{137}\text{Cs/g-soil}$. The purpose stated in the **ADDENDUM** for drilling at this location (Table 4.3, Location Number 6) is, "The southwest corner of the tank corresponds to observations of horizontal spreading of gamma contamination from the southwest quadrant of the tank footprint." However, there is absolutely no supporting evidence that the isopleth, a purely imaginary outline posited by Raymond and Shdo, is even remotely representative of conditions in or near the selected drilling location. The selected location is midway between the laterals that captured the signature of the leak (at least 25 ft from either lateral). It is midway between two vertical boreholes that captured only the fringe of the plume (at least 15 ft from either of those). It is approximately 15 ft from borehole 41-15-09, which failed to exhibit any radioactivity when spectral gamma logging was performed approximately 3 years ago. Thus, with no factual evidence for contaminants at the selected location, there is a high likelihood that nothing, or at least very little, will be found, either horizontally or vertically.

The previous Vadose Zone Expert Panel (four of whose members form this Subpanel of the IPEP) in its Closeout Report for the June 23 - 25, 1998 meeting recommended the use of slant-hole drilling as a means of avoiding heavily contaminated zones prominent at and a few feet below the tank bottoms when determining the depth of penetration of contaminants. Regardless of location (SX-108, SX-115, or some other tank), the recommendation remains extant. It appears to be as important in the case of a borehole southwest of tank SX-115 as it is for drilling under tank SX-108. If drilling near tank SX-115 does result in a fortunate intersection with the plume inferred by Raymond and Shdo, a key finding will be that of determining how deeply the plume has penetrated in to the formation soils below the laterals. Data from the laterals under tank SX-115 (Figure 4.3 of the **ADDENDUM**) indicate that greatest ^{137}Cs concentration is near the edge of the tank. If tank SX-115 remains the location selected for FY99, it seems to be as or even more important to determine the extent of vertical contaminant transport at the specific location where a large waste volume was leaked over a short period of time. That location would then have been subjected to the "umbrella effect", where infiltrating precipitation is carried by the tank dome to the side wall where it percolates downward at a much greater volume than if the tanks did not focus the infiltrating water

Is the analytical program sufficient?

If a prime purpose of installing a new borehole southwest of tank SX-115 is to define contaminant transport, a key to success will be the laboratory's capability to quantify the contaminants of principal concern, even at fairly low concentrations. The principal contaminants of interest are listed in the **ADDENDUM**, Table A.1, with detection limits listed in Table C.1.

The analytical detection limits using inductively coupled plasma-mass spectrometry (ICP-MS) for "Metals" are listed in Table C.1 of the **ADDENDUM** as ranging from 10 to 25 ppt, but since have been revised to 10 ppb (D. Olson, private communication, July 1, 1999). The latter value is consistent with the results obtained during the extension of borehole 41-09-39, where detection limits for metals ranged from 0.5 to 11 ppb.

The ICP-MS detection limit listed in Table C.1 for "Radioisotopes", including ^{99}Tc , is 10 ppb. This value is in the range of those experienced for metals analysis in borehole 41-09-39 extension, but is so great that ICP-MS is not adequate for the analysis of radioisotopes at the concentrations important for defining their transport parameters. If the 10 ppb detection limit is indeed the anticipated ICP-MS detection limit, then the equivalent concentrations of the radionuclides in soil will be:

• ^{99}Tc	170 pCi/g-soil
• ^{239}Pu	620 pCi/g-soil
• ^{240}Pu	2,300 pCi/g-soil
• ^{241}Am	34,000 pCi/g-soil
• ^{237}Np	7 pCi/g-soil
• ^{129}I	2 pCi/g-soil
• ^{238}U	0.003 pCi/g-soil.

Unless the measurements using the ICP-MS method achieve detection limits approximately three magnitudes lower than those in Table C.1 of the **ADDENDUM**, the results will severely compromise the data for ^{99}Tc , ^{239}Pu , ^{240}Pu and ^{241}Am . Results for ^{129}I and ^{237}Np are also likely to be compromised despite seemingly low detection limits, because historic tank inventories place the concentrations of these radionuclides at even lower levels.

It may be that the detection limits listed in Table C.1 of the **ADDENDUM** were developed for the slanthole originally intended under tank SX-108 and the laboratory personnel have not yet had an opportunity to modify their analytical scheme to suit the revised workplan

The planned ^{14}C measurements are of concern, because the anticipated analytical method (Table A.1) appears to be only now under development (detection limit listed as "Unknown" in Table C.1). This detection limit was recently reported to be 14 pCi ^{14}C /g-soil (D. Olson, private communication, July 1, 1999). Whether this detection limit will be sufficient is difficult to judge, because tank waste concentrations depend not only on

process inventory, but also potential losses during storage. Also, the planned analytical method (combustion) does not differentiate between ^{14}C -carbonate and species that may be bound into various solid phases from polymerization of the organic chemicals in the tanks and immobilized in sludge leaked to the environment.

APPENDICES

Appendix A: Subpanel Plan for March Meeting

The following is an edited version of the Subpanel's plans and goals for the March meeting submitted to BHI on March 8, 1999. This plan is the operational statement for the Subpanel March meeting and sequela.

Attached is the Field Investigation Subpanel Plan for the subject meeting. The Subpanel's chief concern is to determine the extent of coordination between the TWRS (or is it ORP, now?) Characterization Program and the Integration Project, particularly in the context of this summer's efforts in the SX Farm. Specifically, we wish to ascertain the interaction between various assessment efforts (SAC, RPE, CRE, others?) and the field work and data gathering for which TWRS is now developing plans.

Based on the presentations at the February Meeting, there is an overarching concern on the part of the Panel about the apparent delay in developing the SAC. We have been provided little in the way of how CRE is tied to field work and data gathering in general and nothing (to my knowledge) of any connection to this year's efforts in SX Farm. The Subpanel has had a very short briefing about the RPE (at last spring's VZ Panel meeting). It appears, at face, that the RPE is the most advanced (in timeliness, at least) of the assessment capabilities. and that TWRS is basing much of its field work and data gathering on the RPE. The Subpanel, therefore, wishes to invest a reasonable portion of the meeting time to a comparison of the various assessment capabilities (status, merits, deficiencies, timeliness for TWRS deliverables, ties to other field and data programs of which we may not be aware, etc). SUMMARY documents (not the 2-inch RPE report, for example) should be forwarded to the Subpanel members sometime this week to allow prep before we arrive there. Probably allow half, or slightly more of a meeting day to this issue.

We understand that TWRS has developed DQOs for the upcoming field campaign. These and any draft plans should be forwarded to the Subpanel members this week to allow prep time. Depending on the thoughts of the TWRS reps, this effort should likely occupy most, if not all, of a meeting day.

The Subpanel wishes to revisit the SX site, with a view of having TWRS exhibit specifically the locations (and reasons for) this summer's campaign. John Conaway, Peter Wierenga and I would like you , MACTEC or TWRS to FedEx a disk of the visualization model developed by MACTEC. We are NOT looking for the MACTEC-ERS visualizations of the tank farm gamma-logs. What we seek is the model being used for the field effort now being planned. If you have a question about which 3-D model we want, please contact Ralph Patt - he's the only one who has received one, so far. Again, time is urgent, if we are to have an opportunity to view the visualizations before the meeting and the field visit by the Subpanel. Obviously, any supporting documentation will be most valuable, as will any documentation of how the model has been applied to the DQO and planning processes. I would expect that this subject will be part of the presentation of TWRS planning. The site visit can be "after hours" on Monday, so as not to encumber the time allotted for public participation.

That leaves about a half day for a closed Subpanel work session at the end of the 2-day period. We are not allotting a specific time for public input during the public sessions. Because this is more a technical discussion rather than a formal meeting, we anticipate that technical representatives of the stakeholders and Indian Nations will contribute directly as active participants during the public sessions. *(Note added: this recommendation was revised at the opening of the meeting to set aside time during the morning of March 23 for specific public, Tribal Nation, stakeholder and regulatory comments.)* There will not be a closeout report at the end of this meeting - the Subpanel report at the May meeting of the Panel will constitute a closeout report.

VISION. To assist in the coordination and integration of core programs, particularly the TWRS Characterization Program, at Hanford so that data obtained during field investigations will prove meaningful for the needs of broad-based site assessments, in addition to fulfilling the regulatory and contractual requirements imposed on the respective core programs.

OBJECTIVES. Evaluate the plans for field investigations prepared for the FY99 TWRS Vadose Zone Characterization Program. Evaluate the extent to which these plans merge with the Integration Program planning effort, meet site assessment needs, fill identified data gaps, are coordinated with S&T technical elements, and serve as "drivers" for Integration Project elements (e.g., the SAC program, the S&T program, and remedial actions). Evaluate the impact of TWRS FY99 and FY00 budget adaptations on the needs of both the TWRS and Integration Project.

PRODUCTS. Interim reports as appendices to the closeout reports for the Integration Panel's May and September meetings, with short presentations of the subpanel's findings at each of those meetings.

SUBPANEL MARCH MEETING. The Subpanel will meet with ORP (TWRS) and various contractor staff members to discuss the planned summer field campaign in SX Farm. Expect meeting discussions to include Integration Project, SAC and S&T representatives, as well, perhaps, from Ecology (EPA?). Will work with Tony Knepp and Dave Olson about opening meeting to Indian Nation (Wade Rigsbee, Stan Sobczek, and ????) and stakeholder reps. Discussion is to be limited to SX and other vadose zone technical/scientific issues and FY99 and FY00 budgetary impacts on Characterization Program and related Integration Project elements. Minimize formal presentations to only that necessary to define the discussion topics. Specific items to be developed for agenda, so far:

- Coordination of Characterization with Assessment needs (PNNL-SAC and Jacobs Eng.);
- Specifics of FY99 Characterization (why, where, what, how, when, products);
 - selection criteria
 - SX-farm visit and MACTEC geostatistical model

- 41-09-39 withdrawal, new borehole(s)
 - side-core, cone penetrometer, slant-hole, logging (gamma, moisture, physical, thermal, ???), sample collection, analyses, etc.
 - dates for field efforts during FY99, FY00
 - DQOs
- Coordination with S&T data gaps;
 - Budgetary impacts (Char.Pr., Jacobs modeling);

COSTS. The budget estimates for John Conaway, Ralph Patt, Peter Wierenga, and myself are attached. These cover not only the March meeting, but also a September meeting (remainder FY99).

Appendix B: BHI Statement of Work for March Meeting

The following is a statement of work prepared by BHI for the March meeting.

FIELD INVESTIGATION SUBPANEL MEETING

MARCH 22 AND 23, 1999

WASTE MANAGEMENT AREA S-SX PRELIMINARY WORKPLAN ADDENDA

Scope: The Groundwater/Vadose Zone Integration Project requests the Field Investigation Subpanel to review the Tank Farms Vadose Zone Project Waste Management Area (WMA) S-SX Preliminary Workplan Addenda. Specifically, the Subpanel is requested to:

- Provide technical input on whether the Preliminary Workplan Addenda is technically defensible; and
- Provide technical input for either strengthening the Preliminary Workplan Addenda or future WMA Workplan Addendas.

Background: The Tank Farms Vadose Zone Project is responsible for the four WMAs (S-SX, B-BX-BY, T, and TX-TY) which have been placed under RCRA assessment by the Washington State Department of Ecology. The first WMA area to be investigated is the S-SX that will be completed in two phases. The first phase, the scope of the this Subpanel meeting, will be the development of the WMA S-SX Preliminary Workplan Addenda that will enable initial WMA site characterization activities to commence in Fiscal Year (FY) 1999. The second phase of WMA S-SX and the other WMA RCRA Assessment activities will be conducted between Fiscal Year 2000 through 2004. The Tank Farm Vadose Zone Project and its activities are being managed in a fully integrated fashion with the Groundwater/Vadose Zone Integration Project.

Objective: Obtain the Subpanel's oral (March 23, 1999) and written (April 3, 1999) review and technical input on the WMA S-SX Preliminary Workplan Addenda. The Subpanel will review the WMA S-SX Preliminary Draft Workplan Addenda (to be transmitted on April 26, 1999) and provide written substantive comments by May 7, 1999 to support the May 13-15, 1999 Expert panel meeting. The comments and input will be discussed at the May 13 – 15, 1999 Expert Panel meeting. By May 15, 1999, all parties will need to agree that the approach to the WMA S-SX Preliminary Workplan Addenda. This input is needed to support our submittal of the Preliminary Workplan Addenda to meet a Tri-Party Agreement Milestone (M-45-52-T01) by April 31, 1999 to the Washington Department of Ecology.

Integration Project Deliverables: The Field Investigation Subpanel will meet in Richland, Washington on March 22 and 23, 1999. The Tank Farms Vadose Zone Project will provide a technical briefing and presentation of the development of the WMA S-SX Preliminary Workplan Addenda. The Tank Farms Vadose Zone Project has been

conducting detailed Data Quality Objective meetings to support the development of the Preliminary Workplan Addenda. The technical input of the Subpanel from this meeting will be considered in preparation of the Preliminary Workplan Addenda or into future WMA Workplan Addendas.

Subpanel Deliverables: The Subpanel will provide a oral assessment with technical input regarding the WMA S-SX Preliminary Workplan Addenda development activities at the close of the meeting (March 23, 1999). The Subpanel will also provide a written summary of their assessment April 3, 1999 and brief the entire Expert Panel at the quarterly May 1999 meeting.

Schedule:

March 22-23, 1999	Subpanel Meeting - Richland Washington Topic: WMA S-SX Preliminary Workplan Addenda
March 23, 1999	Subpanel provides oral assessment of Workplan Addenda
April 3, 1999	Subpanel provide written assessment of Workplan Addenda
May 1999	Subpanel briefs Expert Panel on March meeting on assessment of Workplan Addenda

Appendix C: January 19, 1999 Proposal for Subpanel

The following proposal, edited from an email message, was submitted on January 19, 1999 to Dr. Edgar Berkey, IPEP Chairman, to initiate a project-review meeting by the Field Investigation and Data Gathering Subpanel.

As discussed at the last meeting, the concern of my subpanel is assurance that data gathering, particularly field efforts, is tied to assessment needs. This is directly related to an agenda item for Monday during which the Panel will receive an update concerning the TWRS Vadose Zone Characterization Program. What will be presented there is primarily what has transpired over the past 4 months in negotiations with Ecology (see the 1/11/99 meeting minutes). Lockheed Martin plans to be in the field this summer characterizing the SX Farm, despite the delays caused by Ecology. A work plan is just now started with a target date for presentation in April and field work progressing soon after (perhaps even before our May Panel meeting). My effort following the February Panel meeting will be to determine just what Lockheed Martin has conceptualized for their workplan (e.g., at the November meeting, our effort to extract selection criteria for the 24 planned drill holes). Although this is in the framework of the Integration Project, Lockheed Martin is running out ahead of the IP. Dave Olson (DOE-RL) is setting up a meeting with responsible LM staff and he expressed great interest in using this mechanism as a means of keeping the Panel informed as LM moves rapidly ahead. I expect to spend a half-day or slightly more for this. Thermal analysis is not new; it was part of recommendations by earlier VZ Panel and is part of the plan at LM --- just another potential evaluative tool. I want to see what their thinking is for that, but even more for cores and lab analyses, gamma logs, location of drill holes, etc. Document review will be, in the short term, the earlier LM report which set out the Farms and Tanks of greatest data gathering potential and, later, the SX-Farm Workplan. Deliverables will be email postings to the Panel as to progress on developing a credible workplan and its value in the grand scheme of the Integration Project. From this meeting and followon review of the LM workplan as it develops, I expect to define an important agenda item for the next several Panel meetings.

Bob Lober tried to reach me today (at Dave Olson's suggestion) re a meeting I am trying to set up with Jacobs Engineering. I'll catch Lober tomorrow to set up a meeting to discuss the JE report, RETRIEVAL PERFORMANCE EVALUATION METHODOLOGY FOR THE AX TANK FARM. If you recall that's the report which shows more than ten-thousand fold uncertainty in risk estimates. It was done at least in part for Lockheed Martin. My concerns are that now that LM has switched focus to the SX Farm, there may be gaps in meshing the field work this summer with the needs defined by the Jacobs Engineering study. I will review the referenced report (all 2 inches of it) for both meetings --- the aforementioned LM meeting and the one with Jacobs staff. I may request some cross pollination between the two staffs, depending on what Olson and Lober believe to be appropriate. The two meetings are basically a short term effort to assure coordination between model development and a field-measurement program. Again, I plan to spend a half-day onsite, plus the document review. Deliverables will be email reports to the Panel with copies to whomever you determine appropriate.

An intended meeting with Center for Risk Excellence is to determine how they fit into the grand scheme of things (we've got Jacobs Engineering modelers, PNNL modelers, CRE modelers, and God knows who else). As far as I can tell so far, no one knows exactly what CRE is going to contribute. Whatever it is, I wish to see that the LM field work considers the CRE modeling needs as much as possible. I also am concerned about the degree to which the CRE will coordinate with Hanford needs. I plan to review the CRE workplan, DQOs, etc to evaluate that question. A half-day meeting with CRE staff is planned. Document review is not yet defined, because I know not what they may have produced.

Your PNNL session fits all the above, because they are the other field and modeling group. Depending on what develops during the Wednesday visit to PNNL, I may pursue some issues with staff there during the following days.

I realize that all the above falls under the Integration Project scope of work, but the technical programs are running so far ahead of the IP, the Panel risks losing its advisory role. These issues are at the ground level, rather than at 10,000 feet, but must be tracked now so that we can intelligently plan for our May meeting and beyond.

I hope the above satisfies BHI's request. If you or Michael Hughes needs more info, please call me during the day tomorrow.

Appendix D

GROUNDWATER/VADOSE ZONE INTEGRATION PROJECT EXPERT PANEL FIELD INVESTIGATIONS AND DATA GATHERING SUBPANEL MEETING

MARCH 22-23, 1999

Bechtel Building Assembly Room
Richland Washington

AGENDA

March 22

7:30 – 8:00	On-Your-Own Coffee From Columbia River Deli	
8:00 – 8:10 LMHC	Introductions	David Olson – DOE-RL/Carolyn Haass -
8:10 – 8:30	RCRA Corrective Action/TPA Negotiation Overview	David Olson
8:30 – 9:30	Tank Farm Vadose Zone Project Overview and Framework	Carolyn Haass
9:30 – 10:15	RCRA Groundwater Status and Update	Vern Johnson
10:15-10:30	Break	
10:30-12:00	WMA S-SX Preliminary Workplan Addenda	Colin Henderson
12:00- 1:00	Lunch	
1:00 – 2:15	WMA S-SX Workplan Addenda (cont.)	Colin Henderson
2:15 – 2:30	Break	
2:30 – 4:00	3-D Visualization	Stan Blacker
4:00 – 4:30	Summary/Open Discussion	
4:30 – 6:00	Field Trip to WMA S-SX (Subpanel only)	David Olson

March 23

7:30 – 8:00	On-Your-Own Coffee From Columbia River Deli	
8:00 – 9:30	Approach to Sample Analysis	Tom Jones/ Mark Wood
9:30 – 9:45	Break	
9:45 – 10:30	Subsurface Physical Model	Marc Wood

10:30-11:00	Summary/Open Discussion	
11:00-11:30	SAC/CRE	Charley Kincaid/David Olson
11:30-12:00	Public, Stakeholder, Tribal Nation, Regulatory Comment	John Matuszek
12:00-12:30	Lunch	
12:30- 4:00	Closed Session – Subpanel Caucus	
4:00 – 5:00	Closeout	

Appendix E.

Meeting Attendees

Stan Leja	Michael Graham	Tom Jones	Fred Mann
John Williams	Ralph Patt	Dru Butler	Phil Staats
Carolyn Haass	Tom Wintczak	Peter Wierenga	Carolyn Williams
Vem Johnson	Karen Strickland	Jim Berziak	Dave Myers
David Olson	Dave Nichols	Virginia Rohay	Peg McCarthy
Mark Wood	Bruce Ford	Mike Thompson	Rob Yasek
John Matuszek	John Conaway	Tony Knepp	Jim Poppiti
Harry Boston	Prem Attanyake	Rich Holten	Colin Henderson