

Rocky Flats Environmental Technology Site: Actinide Migration Evaluation

Meetings: January 7-9, 2002

Advisory Group: Greg Choppin, David Clark, David Janecky, Leonard Lane, Annie Kersting

Summary and Recommendations for Path Forward

The progress made on the Actinide Migration Pathway Report is impressive, and we look forward to release of the final document following additional editing and polishing. Completion and detailed review of the water balance analysis is a necessary prerequisite for integration of the pathway analysis report, land configuration design, and comprehensive risk assessments. The risk assessment activities need to define interactions, detailed drivers and strategy for measurements and assessments. Implicit coupling between risk assessment expectations and developing assumptions used in the latest RSAL definitions raise substantial questions about consistency and balance (e.g. assumption of on-site vegetable gardening and site use). Stewardship continues to need attention in areas of infrastructure requirements for measurements and assessment criteria, both for near term actions and communication between DOE and Kaiser-Hill. For Environmental Remediation, the Advisors team is very interested in hearing more about plans and options for actions and tradeoffs with respect to Old Process Waste Lines, the Original Landfill, and the 903 pad and its contamination plume.

Progress and Integration

D&D is making good progress in analysis and planning for component closure. Integration and participation in characterization of actinide migration is comforting.

The streamlining of ER planning and documentation is admirable. Progress in planning for OPWL is now including more technical basis, but substantial questions remain.

RADMS is a very nice tool, excellent for data management in a spatial perspective.

Results and Discussions

Erosion Modeling Results on Land Configuration Design Basis Project and Discussion, G. Wetherbee

A summary of simulation modeling and analyses in support of the LCDB was presented by Greg Wetherbee (WWE). The analyses included the current conditions and three bounding scenarios. The three scenarios all included re-vegetating the Industrial Area. One scenario included flow-through with wetlands to enhance settling of sediments and contaminants. Other scenarios included detention basins and source isolation through re-grading and mixing of the surface soil layers. Major questions remaining for the LCDB include: 1) incorporation of results from the Site-Wide Water Balance (SWWB) analysis to determine if there will be sufficient surface water flow available to maintain wetlands, 2) conducting additional analyses to determine which scenarios might meet the surface water quality standards (i.e. 0.15 pCi/L) at Indiana Street, 3) re-grading of the Industrial Area and the 903 pad area and the impacts on erosion and actinide transport, and 4) developing geomorphic design criteria to ensure long-term landscape stability from hillslope erosion, gully migration, and slope stability failure. The LCDB modeling effort will resume once the SWWB modeling results are available for incorporation. The AME Advisors were pleased to see the LCDB analyses as a positive step in integration at the Site.

Peter Santschi's Work Plan and Groundwater Sampling Protocols

Sampling and analysis for mobile Pu and Am is focused on pond water and groundwater samples. Taking the next step in investigating settling times in ponds is important to management of site closure and follows logically from previous work. The work plan needs to further specify strategies for filtration, for example, how clogging of filters will be evaluated and avoided and detailed development of particulate separation from colloidal and dissolved materials. Analysis of the resulting fractions is the most valuable enhancement of this work plan. In particular, application of mass spectrometric techniques should be exploited to decrease detection limits. However, care must be taken to avoid the possibility that decreased sample size requirements through mass spectrometry sensitivity does not also become confounded by inhomogeneity of particulate and colloidal materials in pond and aseptic well water samples (e.g. hot particle effects). Where particulate and colloidal samples can be separated into size dependent fractions, evaluation of organic and inorganic constituents should include analyses using multiple approaches – for example, Transmission Electron Microscopy (TEM) investigations should be coupled with X-ray diffraction and other techniques to identify the locus of actinides and bulk structure/composition.

Pathway Analysis Report, I. Paton

Ian Paton presented a status report of the Pathway Analysis Report and meeting participants assisted with suggestions for editing the Summary Report. Good progress is being made in this comprehensive report. The Pathway Analysis and the associated technical reports will play a major role in closure activities and the AME Advisors are pleased to see it being developed and documented to meet this site-wide need. The degree of dominance of the air transport pathway in actinide transport was a little surprising to some of the Advisors. Therefore, we suggest that tables/maps be prepared illustrating wind erosion and transport at the Site in traditional units of tons/ha. These tables and maps will be useful in assessing the reasonableness and uncertainty of the wind erosion estimates as well as in providing baseline data for such activities and land configuration design activities.

D&D Sample Update

An overview and summary of ongoing D&D planning was discussed. The results of the building 771 UBC sampling study were presented. The data and findings are very encouraging and will help the D&D team design their plan for D&D of building 771. It was agreed that we should wait to see the result of this study before releasing the data. D&D requested that the AME group write a short summary white paper on the role of scoping concrete leaching studies and what they tell us.

ER Update (IA SAP)

The approach to Environmental Remediation, and particularly the use of Sampling and Analysis Plans (SAPs) for the Industrial Area and Buffer Zone was discussed by Lane Butler. It is important to note that the entire scope is not part of the contract between DOE and Kaiser-Hill. The two key program goals for closure are disposition of all contaminant release sites under the RFCA and development of a draft comprehensive risk assessment. The development of the RADMS with strong geospatial controls is important, especially when coupled with goals for rapid approvals and analyses. Clear and consistent definition of "routine" operations for both characterization and remediation is not clear to the Advisors, and evidently, not to regulators either. This is particularly true for site components such as the Process Waste Lines, for which key questions remain about determination of how removal, sampling and potential for remaining contamination quantities will be balanced and evaluated for risk in the closure actions. Data quality is both an issue in making near term decisions and in development of the basis for stewardship maintenance. How accelerated actions, at least some of which are not final Record of Decision standards based, can be robustly evaluated for impacts on post closure stewardship is also not clearly defined as yet. In the future, the Advisors will be particularly interested in

evolution of plans for the site as a Wildlife Refuge, especially as those plans define DOE participation, controls on the Industrial Area, 903 Pad and plume, pond residual contamination, and integrated stewardship for actinide residual contamination.

RSAL Update

An overview and summary of the status and models being developed by the RSAL working group was presented. In general, it was felt that the scenarios being developed were certainly conservative, but not credible, and hard to take seriously by the AME group.

A major concern is the rather ridiculous assumptions made in the scenarios. Although this is to be a wildlife refuge they are assuming that there will be a resident 350 days per year – this doesn't allow any vacation time etc. This resident would also be outdoors 5 hours every day for those 350 days, which is rather absurd itself. Moreover it is expected that the resident grows all his own produce and buys nothing off-site and also drinks the groundwater and uses it for irrigation. We should stress that while it is appropriate to have a degree of conservatism in such risk estimates, absurd conservatism is not true conservatism but is based on false assumptions that are irrelevant to reality. The RSAL will be far more acceptable and useful if the risk analyses are based on reasonable assumptions of on-site use for limited hours per days for a limited number of days per year with food and drink from off site. Anything else can be so criticized that it would put in jeopardy the whole RSAL report. In the comments they mention that RESRAD is limited in its applicability. This is more true for americium and plutonium since RESRAD is a model based on solubility determining the transport whereas these f-elements are transported in colloids. In the case of uranium it is probably a mixture as there is a certain limited solubility that is much higher than that of Pu or Am. However at the pHs on site there would probably also be significant colloid uptake by U which would contribute to its transport.

Uranium Transport Modeling

The AME group discussed the white paper on uranium geochemistry prepared by Pat Longmire. In general the group was disappointed that the report failed to provide a critical review and assessment of the findings from previous studies on uranium geochemistry related to the Site. Rather than provide a critical assessment of key data and findings, the report offers recommendations, akin to a research proposal, on what additional long-term studies could be performed to properly characterize minerals, water chemistry, and Kds for uranium at the Site. The report does not state, but strongly implies that Honeyman (1997) provided only a cursory examination of site-specific Kds, and that if Kds are to be used for modeling uranium transport, a more thorough assessment of uranium Kds is

needed. What is missing from this report is 2-3 pages of succinct summary of what we really know from the earlier work, compiled in one place, followed by a list of conclusions on what we can or cannot say with certainty about uranium geochemical transport at the RFETS site. It was agreed that the AME group should prepare such a summary. Uranium geochemistry data is needed to complete the RSAL study.

Documents Provided to Advisory Group

AME Project Update, January 7, 2002 – Chris Dayton
Site-wide water balance model status, November 27, 2001 (CD-ROM)
Hydrologic evaluation of the land configuration design basis project scenarios
for the Rocky Flats Environmental Technology Site – December 2001
Actinide migration evaluation pathway analysis summary report – draft
AME White Papers (CD-ROM) – January 3, 2002
X-ray absorption spectroscopy for oxidation state determination of RFETS
Samples – David L. Clark
Final Report: Characterization of Pu valence in RFETS samples by XAFS,
FY01 – Steven D. Conradson et.al (August 2001)
Leaching of plutonium from concrete and soil samples collected at the Rocky
Flats Environmental Technology Site, Final Report – Wolfgang Runde
Site grading plan drawings and documentation
Pathway analysis report – discussion topics --- handout
Implications for site closure – pathway analysis report --- handout
Paint/concrete samples from building 771
RFETS Environmental Restoration Process

Documents and Information Requested for Advisory Group

Grading plan drawings and document – electronic version (CD-ROM)

Requests for Future Presentations and Information

Risk assessment planning, conceptual models and work to date – Jerry Milard
Water balance results
John Rampe – concepts for long term erosion management... and
stewardship/sustainability and options for integration with AME
DOE integration expert - Reg Tyler

Participants in AMS technical meetings

<u>Name</u>	<u>Organization</u>
David Clark	LANL
David Janecky	LANL
Leonard Lane	Tucson
Greg Choppin	FSU
Annie Kersting	LLNL
Chris Dayton	K-H
Greg Wetherbee	WWE
Russell McCallister	DOE/RFFO
Ian Paton	WWE
Mike Peters	RMC
Bob Nininger	K-H
Rachael Peterson	WWE
Jerry Milard	consultant to KH, risk assessment lead
Bob Prucha	RMC
Jeff Stevens	K-H
Tom Scott	K-H
Mike Bemski	SSOC
Lane Butler	K-H
Lee Norland	K-H
Susan Serrezze	Arcadia
Steve Luker	RMC
David Shelton	K-H
Doug Bryant	K-H
Curtis Carter	Waterstone

Future Meetings

April 29-May1 – 2002 third quarter site meeting

July 22-24 – 2002 fourth quarter site meeting

October 21-23 – 2002 conclusion & 2003 kickoff meeting