

Rocky Flats Citizens Advisory Board Recommendation 2000-1

to the U.S. Department of Energy

TRG Comments on the Conceptual Model for Actinide Migration Studies at the Rocky Flats Environmental Technology Site

Approved January 6, 2000

Background:

The Actinide Migration Studies Technical Review Group (TRG) was formed in 1998 as a semi-autonomous sub-committee of the Rocky Flats Citizens Advisory Board to provide independent public oversight to the Actinide Migration Evaluation (AME) being performed at the Rocky Flats Environmental Technology Site. The TRG has initiated a contract with Advanced Technologies and Laboratories International, Inc. (ATL) to provide technical review and advisory services. The TRG had asked ATL to review the site's conceptual model for actinide migration; their comments are attached.

The TRG, after reviewing the conceptual model and ATL's comments, would like to draw special attention to the following comments, and provide some comments of their own.

Contractor Comments:

Justification/Reference Needed

1. Statements such as "not a viable pathway" and "dominant processes" should be defined and extensively referenced to provide justification for the designation.
2. It is unclear whether the conceptual model has been prepared to reflect current knowledge or to guide the research. The model should contain the scientific rationale for determining which processes need focus in order to develop a robust model. The model should clearly document what data has been collected and what data needs to be collected.
3. A far larger body of data is available to support/refute the importance of various pathways than has been reviewed to prepare this document. These data exist in studies and monitoring data, including some site-specific information. The site should initiate a more extensive review of such data and refer to it in the document.
4. A great deal of the AME work has been performed at other sites, thereby indicating that much of the AME work is a re-hash of these studies. More effort should be put into the report to show the

advantage of gaining site-specific understanding of actinide movement and to explaining the use of some of this data in modeling efforts.

Clarification Needed

5. The report does not state what the primary drivers for the quantification of actinide transport are. These should be stated early in the document. As well, the model should reflect those drivers. For example, if the driver for the model is protection of surface water quality, then erosion would be a significant pathway and air transport would not be significant. If, however, the driver were protection of the surrounding public, the air pathway would be very significant. This should be clarified in the report.
6. On page five, the site contends that dissolved species move more quickly than colloidal or particulate species. It is the opinion of the TRG's contractors that this is not necessarily the case. Horton (1998) and Puls et al (1992) found that particles with diameters greater than 1 μ m can move more quickly than the average groundwater flow in porous media. This is attributed to the size exclusion from smaller pore spaces, and the likelihood that dissolved species will more readily interact with soil particles. The report should reflect these findings.

Further model coverage needed

7. Extreme, episodic events such as fire, flood, and human disturbance of soil surfaces or water channels are likely to be much more significant, in the long run, for the transport of actinides than the normal daily conditions. The site should attempt to quantify the actual impact and duration of impact of these events on soil movements and in what ways these events alter the stability of the soils, plant cover, etc. The model should reflect these processes.
8. Biologically mediated physical transport mechanisms are being neglected in the model. It fails to address the creation of preferential flow paths via worm and root channels and animal trails. It also does not link ecological health to erosion. A loss of vegetative cover would likely greatly increase the loading to the atmosphere or surface water. The model lumps these processes together as opposed to analyzing each individually. The model should seriously consider plant and animal roles in vertical distribution in soils, protecting the soil surface, and in enhancing infiltration.

TRG Member Comments:

1. The AME's contribution to determining the source(s) and cause(s) of exceedences of the water quality standards at surface water points of evaluation and points of compliance will play an important role in short-term and long-term surface water quality protection. This should be clearly stated as a goal of the AME.
2. Section 2.0 states that there are five sources for actinide transport in the Walnut Creek and Woman Creek watersheds. The narrative describes these and states that the conceptual model will evaluate them. However, Figures 3 and 4 only shows three sources: IHSSs, D&D, and stack

emissions. Diffuse low-level surface soil contamination and potentially unknown IA sources of contamination are not shown in the conceptual model diagrams. These last two actinide sources are potential contributors and should be included as the fourth and fifth source boxes on Figures 3 and 4 of the conceptual model.

3. The model as illustrated in Figures 3 and 4 seems to be overly simplistic.
 - Example #1: The general category of "surface water" should be depicted on Figures 3 and 4 as two separate boxes, ponds and streams, because at times they operate somewhat independently. Furthermore, the general category of "sediments" should be divided into stream sediments and pond sediments.
 - Example #2: The model needs to specify all of the activities and processes that are addressed by each pathway category to ensure that a critical activity or process to contaminant transport is not overlooked. The channel flow (Rsp) pathway is composed of different types of channel flow (i.e. scour of streambeds vs. pond sediment turnover due to temperature inversions), some of which are not immediately apparent from Figures 3 and 4. The narrative provides additional information regarding this pathway, which in reality are multiple sub-pathways grouped under a major pathway. The model must adequately factor in the contributions of sub-pathways. The way in which sub-pathways will function in the model should be depicted graphically in the conceptual model report.
4. The report should reference the supporting information and explain the rationale for considering air to be a minor actinide migration component as illustrated in Figures 3 and 4.

The TRG requests in-depth and detailed responses to the above comments. Also, please find the TRG's contractors' comments attached. Please note that not all their comments are listed above. We request responses to all their comments.

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The Rocky Flats Citizens Advisory Board is a community advisory group that reviews and provides recommendations on cleanup plans for Rocky Flats, a former nuclear weapons plant outside of Denver, Colorado.

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