

**RFCA Stakeholder Focus Group
REVISED Meeting Agenda**

When: March 28, 2001 3:30 - 6:30 p.m.

Where: Broomfield Municipal Hall, Bal Swan and Zang's
Spur Rooms

3:30-3:40 Introductions, Agenda Review, 3/14 Meeting Minutes Review

3:40-4:25 RSAL Working Group Update

4:25-5:15 Path Forward Proposal for Agenda Group

5:15-5:25 Break

5:25-6:00 Comprehensive End State Discussion - Overview / Approach

6:00-6:15 Workshop Update

6:15-6:30 Set Future Agendas and Review Meeting

6:30 Adjourn

Reviewed for Classification/UCNI/OUO
By: Janet Nesheim, Derivative Classifier
DOE, EMCBC *Classn Office*
Date: 08-12-09
Confirmed Unclassified, Not UCNI/Not OUO

RFCA Stakeholder Focus Group Attachment A

Title: Agenda for March 28, 2001 Focus Group Meeting

Date: March 23, 2001

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AlphaTRAC, Inc.

Phone Number: (303) 428-5670

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ADMIN RECORD

RFCA Stakeholder Focus Group
March 28, 2001
Meeting Minutes

INTRODUCTION AND ADMINISTRATIVE

A participants list for the March 28, 2001 Rocky Flats Cleanup Agreement (RFCA) Stakeholder Focus Group meeting is included in this report as Appendix A.

Reed Hodgin of AlphaTRAC, Inc., meeting facilitator, reviewed the purpose of the RFCA Focus Group. Then he went over the meeting rules. Introductions were made, with an explanation of what the community member hopes to accomplish in these meetings.

Reed reviewed the meeting revised agenda, which included:

- RSAL Working Group Update
- Path Forward Proposal for Agenda Group
- Comprehensive End State Discussion - Overview / Approach
- Workshop Update
- Set Future Agendas and Review Meeting

Joe Goldfield asked if he could add a discussion on the article he had found in the Denver Post today, regarding the "Workers exposed to plutonium." Joe Legare, U.S. Department of Energy (DOE), was not prepared to comment on the article at this time.

MH: Can DOE contact you Joe?

JL: Yes.

CL: You just went over the purpose of the Focus Group. This subject has been covered very extensively in other meetings. I don't see it within the scope of this particular forum.

Reed asked the Focus Group if there were any changes or additions / corrections to the March 14, 2001 meeting minutes. There were no corrections noted.

ADMIN RECORD

1/14



RFCA Stakeholder Focus Group
March 28, 2001
Meeting Minutes

RSAL WORKING GROUP UPDATE

Jean Lillich, U.S. Environmental Protection Agency (EPA), updated the Focus Group on the RSAL Working Group. We met last Thursday. Under a new agenda, we're having a two-day workshop next week, Wednesday and Thursday at the EPA Conference Center. Everyone is welcome to come. Big items on the agenda for next week are:

Finalize input parameters, RESRAD
Input parameters

I've put out an email which was the action items for next week as well as a detailed description of the RSAL process, what we've done so far and what there is left to do. Until we get a Task 3 report out in draft next week. I also have a little table we sent out as well that kind of goes through what the parameters have shown up to be, and which of our toxicologist will determine what type of value it's going to be, and that should be out next as well.

Sandy MacLeod, DOE, noted that the Task 2 report was sent out today by AlphaTRAC, Inc. to the Focus Group. That is ready now for your review. Task 4, which is the new scientific information, should be out to the Focus Group by the end of next week.

VH: Two weeks ago, there were nine people from here who met in Chicago and met with the RESRAD ... group. It was very useful to that discussion. We learned how ... into the probabilistic model and how to run the probabilistic model. We also learned how to decode the intermediate files between RESRAD and the ..., so that now we're able to come up with any kind of graph we want as opposed to this selection of RESRAD alternates. They were not able to discuss policy matters with us, so we didn't go into that. Nor did we go into their recommendations on parameters. I think all of us have a much better understanding of how the program operates and what its limitations are and what the capabilities are.

TM: Next Thursday when you discuss parameters, does that mean there are draft parameters?

RFCA Stakeholder Focus Group
March 28, 2001
Meeting Minutes

SM: We're going to work on those. They aren't available today. We've gone through and done the sensitivity analysis to show which parameters are sensitive. The goal next week is to ... and get values for those.

TM: So the goal of next week is to select those parameters?

SM: ... the people that are responsible for each one. If you look on this ... it shows who will be working on ...

TM: Just to be clear on next Wednesday, are you planning on walking out on Wednesday with the values you're going to say this is what we're going to use?

? My understanding is each of these people are going to ... conclusion as to what we find ... and will be discussed by the entire group. Finalize is too strong a word.

JL: If anyone has comments on ... we're going to run ... on Thursday for each scenario, but it doesn't mean that we ... progress to clear that up.

TM: You're going to come out with draft numbers on Thursday for all different scenarios?

? I'm including the draft...

JL: If anyone has any comments ...

MH (or NS): Is it possible for this working group to come back to the Focus Group with decisions that you're making and what are the assumptions that you're proceeding on so that we have something that we can say how are you justifying this or did you think of this. I don't want to wait for the last minute when we've got this list of ... and everything done and people start questioning why did you chose this.

RH: The idea as it came up last meeting is there's a lot of the detail work and what's actually going to happen with these plans and how the work's going to be done is

RFCA Stakeholder Focus Group
March 28, 2001
Meeting Minutes

occurring in the RSAL Working Group. This group observe the Working Group, but they decided it would be nice if they had a direct link into this group. Every one of our meetings, the RSAL working group will come and report on where they are and what they're doing and what they decided is going to occur. This group can stay pretty updated on what's happening at the working group without having to be in the real fine details.

RH: Are there any summary materials that we can include in our Focus Group mailing packet?

In the next two weeks, what do you think are going to be the areas of focus for the working group that may produce information that you can bring back here.

JL: I think they did that.

TM: I want to pass this on to the Working Group. Next time we're going to be dealing with the Task 1 issue. I'd appreciate getting the comments on the peer review. There are some places in here that simply refers you back to the original document or perhaps other documents. Can you put the referenced section in the comments document rather than the reference?

[? I didn't get the answer on this question Reed.]

PATH FORWARD PROPOSAL FOR AGENDA GROUP

RH: Monday afternoon the Agenda Group that you formed last meeting met for it's first time. One of the charges you gave to that group was to develop a proposed path forward for the focus group.

John Marler, Rocky Flats Coalition of Local Governments, presented the proposed path forward for the Focus Group (Appendix B).

RFCA Stakeholder Focus Group

March 28, 2001

Meeting Minutes

Focus Group Community Process Discussion from 2/28/01

- Collaborate with agencies on cleanup analyses and decisions
- Understand the objectives for each discussion
- Get closure on each issue addressed
- Collaborate with agencies on setting Focus Group agendas

Regarding the above-noted bullet, understanding the objectives for each discussion, I think there's a consensus among the group that a lot of times our discussions can be framed better. Sometimes we get off track, we don't really understand what we're trying to get out of discussing a particular issue. Hopefully, the Agenda Group will help address that.

The other point was a key interest in coming to closure on certain issues. The consensus opinion on that is that closure doesn't mean that we finish the conversation on an issue that's brought to the Focus Group and we never talk about it again. Instead, before we get into it, we try to outline why we're talking about it, how it fits in with our path forward with our strategic plan, what we're trying to get out of the Focus Group, and that we really try to flush out all of the questions, concerns, etc with that particular issue.

Focus Group Process

- Agencies and community should set the path forward
- Establish a steering committee to set meeting agendas
- Agendas should have time for full dialogue on each issue
- Prior to a meeting, the agencies should provide background information on each issue to be discussed
- Focus Group should have a round robin at the end of each meeting to get a key thought from each participant.

RFCA Stakeholder Focus Group

March 28, 2001

Meeting Minutes

- A holistic “check-in” should be a part of every meeting -- where we are in the big picture and where we are going next

RH: What is the objective for this discussion?

JM: To get feedback from the Focus Group as to whether or not what the Agenda Group did on Monday is a good idea, whether or not you like our proposal, and whether or not you want us to continue with it.

What We Propose

- Agenda group (agency staff and community members) will work together to determine path forward and set agendas
- Each meeting will contain a review of the path forward and the goals and objectives for each agenda
- Each issue will be explored fully but within the framework and schedule determined by the agenda group
- Agencies will provide background material before the meetings and Focus Group will be expected to review this material and be prepared for the meeting

Draft Focus Group Path Forward (through June 2001)

MEETING	AGENDA
March 28	<ul style="list-style-type: none"> • RFCA RSAL Working Group Update • Agenda Group Debrief <ul style="list-style-type: none"> Focus Group Strategy (re: RSALs and ER briefings) Approach for Task 1 Peer Review Response Discussion • Integrated ER Decision-Making Overview
April 11	<ul style="list-style-type: none"> • RSALs: Regulatory Analysis (Task 1) <ul style="list-style-type: none"> RFCA Parties' Responses to Peer Review Comments Focus Group Summary of Task 1 Issues • ER: Stewardship

RFCA Stakeholder Focus Group

March 28, 2001

Meeting Minutes

April 25	<ul style="list-style-type: none"> • RSALs: New Science (Task 4) Focus Group Summary of Task 4 Issues • ER: Surface Soils
May 9	<ul style="list-style-type: none"> • RSALs: Model Evaluation (Task 2) RFCA Parties' Responses to Peer Review Comments? Focus Group Summary of Task 2 Issues • ER: Water
May 23	<ul style="list-style-type: none"> • RSALs: Parameter Evaluation (Task 3) • ER: Subsurface Soils
June 7	<ul style="list-style-type: none"> • RSALs: Parameter Evaluation (Task 3) RFCA Parties' Responses to Peer Review Comments?

Q: Did you talk about the timeframe for each meeting? It looks like there's a lot scheduled in each meeting.

A: It's going to be tough. It comes back to framing the discussions and figuring out at what level of detail we want to get on each issue.

Q: Are you going to fill up the packet with background information.

A: I think that was the plan.

C: We're not bound by the June 7 date or the June 14 date. I was a member of the agenda group and I think the schedule is very tight. Look at task 4 and we only have one meeting. That means no discussion before. We need to bear that in mind.

C: The end date for the RSAL discussion could be driven by the community's need to discuss the issue in this Focus Group. If necessary, the end date would move out because of that as determined by you. While there are target dates in the schedule, the Focus Group should recognize that they are very ambitious and that they the date will be changed if necessary to meet the needs of this group.

LA: I think the round-robin ideas is a waste of time and not necessary. Regarding the statement all topics will be explored fully, some of us always need more information than others. How do we determine the cutoff of "explored fully?" Is it the majority of folks have information? If there are one or two that don't, they can get it outside of the meeting?

RFCA Stakeholder Focus Group
March 28, 2001
Meeting Minutes

RH: That's what we decided. I think we need to check in. If there are one or two people who need more discussion, then you set a specific way for them to get the information they need.

As facilitator, are you as a group willing to have me tell you that was in the packet materials, let's move on?

Group: Yes.

?: This assumes somebody's not asking for an explanation?

RH: It's asking about factual information. If it was in the packet, it doesn't need clarification again.

Q: So the end dates of 9/30 for the RSAL reports can move?

A: Yes. Absolutely. The goal is not to move the schedule. The goal is to get the right information out so we get out the best draft report we can. In fact, we have not had the right discussions that should be had before that draft report goes out, we are going to set aside time to have those discussions. The second part is, once the draft report goes out, I don't think that represents the cessation of future discussions about what's in the draft report, even though we get into that formal space of 30-, 60-, 90-day public comment period, I would suggest that discussions about RSALs continue. What we talked about in the Agenda Group was that there was some concern that by having these integrated end state discussions in parallel with continuing our commitment on the RSALs discussions, we ... little squeaks. If we get squeezed, if find there's too many things in the parking lot, a whole subject hasn't been covered, we're going to cover it. The goal is not come hell or high water we're going to ... Obviously we'd like to adhere to a schedule. If we find that important discussions haven't happened and need to happen before the draft report goes out, then we need to set aside time to do that. If that means pushing back the draft report, we ought to do that. That does not mean compressing the formal public comment period.

MH: One of the things we talked about was using email to have conversations offline.

RFCA Stakeholder Focus Group
March 28, 2001
Meeting Minutes

RH: That would be useful and allow you to prepare yourself better for your discussion and be more productive in your discussions when you come here.

RH: So the objective for this discussion was to get agreement or modify the path forward from the Focus Group. Do you think we've reached that agreement?

Group: Yes.

RH: The objective for the Agenda Group is to look forward a few meetings down the road and how the path is ... us where we're going and bring that back to this Group. Their focus isn't nearly so much on the next meeting as it is on the next 3 or 4 or 5 meetings.

Comprehensive End State Discussion - Overview / Approach

Joe Legare presented an overview of the comprehensive end state discussion (Appendix C).

The goal of this is you're going to see a bunch of slides on why we think this approach is important ... some of the issues ... better out there that could be framed up in greater detail as we go through these meetings. Also, it's a first opportunity to ... express yourselves as I go, please comment and be clear about what the question is and we'll do our best to get them all written down. But as we go through this, we're getting smart the same time you are.

Also, don't ask us to engage in a conversation about cost if you're not going to share cost data. Don't just make it this nebulous thing out there. If you're saying cost is a factor, show why cost is a factor. As an example, and there's other area of controversy as well.

You're going to see some brainstorming, ... how we think this will go, and how we frame up issues. But add your own 2 cents if you will. This will help us prepare for the first one, which will be the Stewardship discussion in the context of integrating factors.

RFCA Stakeholder Focus Group

March 28, 2001

Meeting Minutes

He then discussed the following points:

- Why Take This Approach
- What Does Success Look Like
- End State Issues
- Integrating Factors
- Surface Soil Contamination
- Subsurface Soil Contamination
- Surface Water Management and Standards
- Stewardship and Post Closure Obligations
- What Does Each Discussion Look Like?
- What is the End Game?
- What Needs to Happen?
- Challenges

End State Issues

- Surface Contamination
- Subsurface contamination
- Surface water standards and management
- Stewardship and post closure obligations

First we'll get up to speed in each of these areas over every other week here, and then we start to see the integrated discussions.

What Does Success Look Like

This is a reiteration of the areas we identified that we thought capture the appropriate level of focus.

RFCA Stakeholder Focus Group
March 28, 2001
Meeting Minutes

Integrating Factors

We'll talk about the integrating factors within each of the issues, starting with stewardship.

?: If you make sure that you consider the stewardship implications of any of these decisions that might come up related to that, I think that's going to be important. What are we going to have to live with when you're gone.

JL: It's going to be hard to have these discussions in isolation. Just having a surface water discussion and say we'll get to stewardship later. We'll have to be cognizant of that.

?: I think that's a good point. I think if we look at those issues of long-term stewardship after we may find out, it may point out that there is some ... in the way we're going about it. I think that ought to be a part of it. When you go through all of the issues and then look at the stewardship.

JL: Stewardship issues may be raised in future meetings. We may find they need to be followed up on.

CL: I'd like to see it as a bullet under Integrating Factors so that it doesn't get lost. In addition, you have all these ... the last one says "cost consequences ..." I don't see where you elucidated the various end state alternatives so that we can consider the cost and consequences thereof.

JL: I don't think it's explicit. Let me try this. We have a surface water discussion. We throw out different options for dealing with surface water that includes engineered controls, may include institutional controls, the ponds, the South Interceptor Ditch, and so on. So we talk about all these various factors that effect surface water. We talk about soil excavation. All the things that could effect surface water. Then we have a similar discussion on surface soil later. We talk about the RSAL, we talk about ALARA, the 903 pad specifically, ... directly analogous.

RFCA Stakeholder Focus Group

March 28, 2001

Meeting Minutes

When we work through those four discussions (issues), then we start looking at it this way. What if we did this with surface water and this with subsurface soil, and this is how it looks with the post-closure stewardship. You can tell it's not fully developed, but that's how I'm thinking it might go. Okay. That's the 903 pad and options within that spectrum of what's regulatorily and technically defensible, but how does that make the SID look, and how does that effect a dam, or a wetland. The idea would be teaming (?) up with the spectrum of issues that are relevant to each one of these discussions. Then go back and go, what's a logical combination of outcomes in these different areas, and what kind of picture does that paint of end state? This is the model I have in my head.

CL: That's fine. I'd just like to see explicitly another bullet somewhere before you start analyzing the cost and consequences. At least you take a stab at defining the end state alternatives so that we can then discuss the consequences.

JG: Our main objective should be to try and deal with health safety. In dealing with that, the first thing we've got to decide, what are the allowable limits from a health standpoint that are acceptable. I don't recall a real good discussion on whether we should have 15 mrem, 25 mrem, and now I see 3.3 mrem. One of the consequences of the risk associated with those numbers are which ones will we accept. I think that is the primary discussion. Some of the other discussions are worthless, like stewardship.

JL: You're right. Every discussion has to talk about what the existing law is, what the standards are, presumably they're health-based standards, that has to be the fundamental aspect of these discussions.

JG: More than the law, I think we need to understand what these standards mean. Not only what's on paper and what's legal, but what they mean and do those numbers accomplish what they say their objective is. We've known for a couple of years now that the standards do not coincide...

JL: My goal was not to solve any of these factors, but to understand what you would be expected to see integrated into these discussions.

RFCA Stakeholder Focus Group
March 28, 2001
Meeting Minutes

TM: The 25th is when we would take up the first media topic surface soils. Do you actually have costs available for different alternatives?

JL: No. We're not going to have the costs. In the subsurface soil, the Industrial Area SAP talks about inprocess characterization. What we can commit to do is to clearly articulate what's currently in the baseline and where we do know costs, we're going to provide that. When we don't have costs, we'll have to show that and we'll have to discuss it.

TM: What else might be helpful is that if there are cost savings from say D&D or ... packaging or something like that, they ... moved into ER... We heard that there may be savings from ... in different areas ... A couple of meetings ago, we were told that a small portion of the money actually goes toward ER. Part of the reason we're having this conversation is the assumption of capitol funding, limited funding. The question is, if there are actual savings in different areas work, then they should go to ER.

HS: In addressing some of these problems, is there a document somewhere for instance that identifies each of the variables associated with ... topics?

JL: I don't think it exists in one place. That would be part of what we would try and bring to the table. Here are the range of possible outcomes because we have the variables versus consequence?

HS: I want to be sure we have ... all the variables so ... didn't proceed. So the document either exists or we have to get it. Everything that impacts the decision on surface water.

MH: When you talk about community priorities, what are you assuming?

JL: That bullet does not lend itself to specific priorities, but rather to ... these discussions so we can understand, as an example. You may be able to accomplish the same thing through a dam, a wetland, or a berm. They each have different implications in terms of near term cost and long term stewardship. Having that discussion about the

RFCA Stakeholder Focus Group
March 28, 2001
Meeting Minutes

various alternatives. We then get feedback and it's not going to be the same. It might be very different.

Could it be better termed community acceptance rather than priorities.

I think that's different.

Another bullet?

Okay.

TM: What I think you want out of this whole conversation is something that you would want to come back to after all of these different topic areas have been dealt with.

JL: Yes. I don't want to rule out case-by-case, but you're right. Similar to the stewardship equation, that changes when you've gone through each one of these and you have to go back and ... There's no doubt the first year it's going to fall down here. We're going to have to go through a series of discussions to get a balance.

LM: I think I'm correct in saying that the contract between DOE and Kaiser-Hill does not require them to meet the present surface water standard. If that's true, I don't know how to reflect that on the integrating factors, but it seems like there's a conflict between and the assumptions of the contract.

JL: This is a topic of discussion between DOE and Kaiser-Hill that has real implications. Whether they are perceived or real inconsistencies in the contract versus RFCA, we ought to know that. We the DOE is going to fulfill that. K-H is going to fulfill the contract ... mutual goals we can fill both by going through the contract. But I think it's honest and earnest to highlight that right up front. Here's what the contract says about surface water, here's what RFCA says. And there may be or there is absolutely is, an ... depending on a specific issue we're talking about, an inconsistency. That doesn't mean we're going to the contract and modify RFCA, it's just information.

14/14

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our meetings, the RSAL working group will come and report on where they are and what they're doing and what they decided is going to occur. This group can stay pretty updated on what's happening at the working group without having to be in the real fine details.

? Is there a specific topic then that you want us to report on next week? There's a lot of stuff and to update everything we talked about we would take the whole meeting up. We could now ... and fully prepare for that.development plans has a certain section in it ... selection, then we have the issue of parameters, then we have ... selection of the values. We could see about getting a representative ... technical on ... parts.

? Is that maybe the type of technical information that could be included in our packet that we could read beforehand and be prepared for any questions from the Working Group?

RH: Are there any summary materials that we can include in our Focus Group mailing packet?

In the next two weeks, what do you think are going to be the areas of focus for the working group that may produce information that you can bring back here?

JL: I think they did that. There's going to be a workshop next Wednesday and Thursday for individual workshop members are going to come back and share the information they've developed individually regarding distribution, or absolute values of parameters, the extent that that discussion develops perhaps that table's a new way to express the information. I think they can come next week with what conclusions that may have been drawn.

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- Each meeting will contain a review of the path forward and the goals and objectives for each agenda
- Each issue will be explored fully but within the framework and schedule determined by the agenda group
- Agencies will provide background material before the meetings and Focus Group will be expected to review this material and be prepared for the meeting

Draft Focus Group Path Forward (through June 2001)

MEETING	AGENDA
March 28	<ul style="list-style-type: none">• RFCA RSAL Working Group Update• Agenda Group Debrief Focus Group Strategy (re: RSALs and ER briefings)

	<p>Approach for Task 1 Peer Review Response Discussion</p> <ul style="list-style-type: none"> • Integrated ER Decision-Making Overview
April 11	<ul style="list-style-type: none"> • RSALs: Regulatory Analysis (Task 1) RFCA Parties' Responses to Peer Review Comments Focus Group Summary of Task 1 Issues • ER: Stewardship
April 25	<ul style="list-style-type: none"> • RSALs: New Science (Task 4) Focus Group Summary of Task 4 Issues • ER: Surface Soils
May 9	<ul style="list-style-type: none"> • RSALs: Model Evaluation (Task 2) RFCA Parties' Responses to Peer Review Comments? Focus Group Summary of Task 2 Issues • ER: Water
May 23	<ul style="list-style-type: none"> • RSALs: Parameter Evaluation (Task 3) • ER: Subsurface Soils
June 7	<ul style="list-style-type: none"> • RSALs: Parameter Evaluation (Task 3) <p>RFCA Parties' Responses to Peer Review Comments?</p>

Q: Did you talk about the timeframe for each meeting? It looks like there's a lot scheduled in each meeting.

A: It's going to be tough. It comes back to framing the discussions and figuring out at what level of detail we want to get on each issue.

Q: Are you going to fill up the packet with background information.

A: I think that was the plan.

C: We're not bound by the June 7 date or the June 14 date. I was a member of the agenda group and I think the schedule is very tight. Look at task 4 and we only have one meeting. That means no discussion before. We need to bear that in mind.

C: The end date for the RSAL discussion could be driven by the community's need to discuss the issue in this Focus Group. If necessary, the end date would move out because of that as determined by you. While there are target dates in the schedule, the Focus Group should recognize that they are very ambitious and that they the date will be changed if necessary to meet the needs of this group.

LA: I think the round-robin ideas is a waste of time and not necessary. Regarding the statement all topics will be explored fully, some of us always need more information than others. How do we determine the cutoff of "explored fully?" Is it the majority of folks have information? If there are one or two that don't, they can get it outside of the meeting?

RH: That's what we decided. I think we need to check in. If there are one or two people who need more discussion, then you set a specific way for them to get the information they need.

As facilitator, are you as a group willing to have me tell you that was in the packet materials, let's move on?

Group: Yes.

?: This assumes somebody's not asking for an explanation?

RH: It's asking about factual information. If it was in the packet, it doesn't need clarification again.

Q: So the end dates of 9/30 for the RSAL reports can move?

A: Yes. Absolutely. The goal is not to move the schedule. The goal is to get the right information out so we get out the best draft report we can. In fact, we have not had the right discussions that should be had before that draft report goes out, we are going to set aside time to have those discussions. The second part is, once the draft report goes out, I don't think that represents the cessation of future discussions about what's in the draft report, even though we get into that formal space of 30-, 60-, 90-day public comment period, I would suggest that discussions about RSALs continue. What we talked about in the Agenda Group was that there was some concern that by having these integrated end state discussions in parallel with continuing our commitment on the RSALs discussions, we ... little squeaks. If we get squeezed, if find there's too many things in the parking lot, a whole subject hasn't been covered, we're going to cover it. The goal is not come hell or high water we're going to ... Obviously we'd like to adhere to a schedule. If we find that important discussions haven't happened and need to happen before the draft report goes out, then we need to set aside time to do that. If

that means pushing back the draft report, we ought to do that. That does not mean compressing the formal public comment period.

MH: One of the things we talked about was using email to have conversations offline.

RH: That would be useful and allow you to prepare yourself better for your discussion and be more productive in your discussions when you come here.

RH: So the objective for this discussion was to get agreement or modify the path forward from the Focus Group. Do you think we've reached that agreement?

Group: Yes.

RH: The objective for the Agenda Group is to look forward a few meetings down the road and how the path is ... us where we're going and bring that back to this Group. Their focus isn't nearly so much on the next meeting as it is on the next 3 or 4 or 5 meetings.

Comprehensive End State Discussion - Overview / Approach

Joe Legare presented an overview of the comprehensive end state discussion (Appendix C).

The goal of this is you're going to see a bunch of slides on why we think this approach is important ... some of the issues ... better out there that could be framed up in greater detail as we go through these meetings. Also, it's a first opportunity to ... express yourselves as I go, please comment and be clear about what the question is and we'll do our best to get them all written down. But as we go through this, we're getting smart the same time you are.

Also, don't ask us to engage in a conversation about cost if you're not going to share cost data. Don't just make it this nebulous thing out there. If you're saying cost is a factor, show why cost is a factor. As an example, and there's other area of controversy as well.

You're going to see some brainstorming, ... how we think this will go, and how we frame up issues. But add your own 2 cents if you will. This will help us prepare for the first one, which will be the Stewardship discussion in the context of integrating factors.

He then discussed the following points:

- Why Take This Approach
- What Does Success Look Like
- End State Issues
- Integrating Factors
- Surface Soil Contamination
- Subsurface Soil Contamination
- Surface Water Management and Standards
- Stewardship and Post Closure Obligations
- What Does Each Discussion Look Like?
- What is the End Game?
- What Needs to Happen?
- Challenges

End State Issues

- Surface Contamination
- Subsurface contamination
- Surface water standards and management
- Stewardship and post closure obligations

First we'll get up to speed in each of these areas over every other week here, and then we start to see the integrated discussions.

What Does Success Look Like

This is a reiteration of the areas we identified that we thought capture the appropriate level of focus.

Integrating Factors

We'll talk about the integrating factors within each of the issues, starting with stewardship.

?: If you make sure that you consider the stewardship implications of any of these decisions that might come up related to that, I think that's going to be important. What are we going to have to live with when you're gone.

JL: It's going to be hard to have these discussions in isolation. Just having a surface water discussion and say we'll get to stewardship later. We'll have to be cognizant of that.

?: I think that's a good point. I think if we look at those issues of long-term stewardship after we may find out, it may point out that there is some ... in the way we're going about it. I think that ought to be a part of it. When you go through all of the issues and then look at the stewardship.

JL: Stewardship issues may be raised in future meetings. We may find they need to be followed up on.

CL: I'd like to see it as a bullet under Integrating Factors so that it doesn't get lost. In addition, you have all these ... the last one says "cost consequences ..." I don't see where you elucidated the various end state alternatives so that we can consider the cost and consequences thereof.

JL: I don't think it's explicit. Let me try this. We have a surface water discussion. We throw out different options for dealing with surface water that includes engineered controls, may include institutional controls, the ponds, the South Interceptor Ditch, and so on. So we talk about all these various factors that effect surface water. We talk about

soil excavation. All the things that could effect surface water. Then we have a similar discussion on surface soil later. We talk about the RSAL, we talk about ALARA, the 903 pad specifically, ... directly analogous.

When we work through those four discussions (issues), then we start looking at it this way. What if we did this with surface water and this with subsurface soil, and this is how it looks with the post-closure stewardship. You can tell it's not fully developed, but that's how I'm thinking it might go. Okay. That's the 903 pad and options within that spectrum of what's regulatorily and technically defensible, but how does that make the SID look, and how does that effect a dam, or a wetland. The idea would be teaming (?) up with the spectrum of issues that are relevant to each one of these discussions. Then go back and go, what's a logical combination of outcomes in these different areas, and what kind of picture does that paint of end state? This is the model I have in my head.

CL: That's fine. I'd just like to see explicitly another bullet somewhere before you start analyzing the cost and consequences. At least you take a stab at defining the end state alternatives so that we can then discuss the consequences.

JG: Our main objective should be to try and deal with health safety. In dealing with that, the first thing we've got to decide, what are the allowable limits from a health standpoint that are acceptable. I don't recall a real good discussion on whether we should have 15 mrem, 25 mrem, and now I see 3.3 mrem. One of the consequences of the risk associated with those numbers are which ones will we accept. I think that is the primary discussion. Some of the other discussions are worthless, like stewardship.

JL: You're right. Every discussion has to talk about what the existing law is, what the standards are, presumably they're health-based standards, that has to be the fundamental aspect of these discussions.

JG: More than the law, I think we need to understand what these standards mean. Not only what's on paper and what's legal, but what they mean and do those numbers accomplish what they say their objective is. We've known for a couple of years now that the standards do not coincide...

JL: My goal was not to solve any of these factors, but to understand what you would be expected to see integrated into these discussions.

TM: The 25th is when we would take up the first media topic surface soils. Do you actually have costs available for different alternatives?

JL: No. We're not going to have the costs. In the subsurface soil, the Industrial Area SAP talks about inprocess characterization. What we can commit to do is to clearly articulate what's currently in the baseline and where we do know costs, we're going to provide that. When we don't have costs, we'll have to show that and we'll have to discuss it.

TM: What else might be helpful is that if there are cost savings from say D&D or ... packaging or something like that, they ... moved into ER... We heard that there may be savings from ... in different areas ... A couple of meetings ago, we were told that a small portion of the money actually goes toward ER. Part of the reason we're having this conversation is the assumption of capitol funding, limited funding. The question is, if there are actual savings in different areas work, then they should go to ER.

HS: In addressing some of these problems, is there a document somewhere for instance that identifies each of the variables associated with ... topics?

JL: I don't think it exists in one place. That would be part of what we would try and bring to the table. Here are the range of possible outcomes because we have the variables versus consequence?

HS: I want to be sure we have ... all the variables so ... didn't proceed. So the document either exists or we have to get it. Everything that impacts the decision on surface water.

MH: When you talk about community priorities, what are you assuming?

JL: That bullet does not lend itself to specific priorities, but rather to ... these discussions so we can understand, as an example. You may be able to accomplish the same thing through a dam, a wetland, or a berm. They each have different implications

in terms of near term cost and long term stewardship. Having that discussion about the various alternatives. We then get feedback and it's not going to be the same. It might be very different.

Could it be better termed community acceptance rather than priorities.

I think that's different.

Another bullet?

Okay.

TM: What I think you want out of this whole conversation is something that you would want to come back to after all of these different topic areas have been dealt with.

JL: Yes. I don't want to rule out case-by-case, but you're right. Similar to the stewardship equation, that changes when you've gone through each one of these and you have to go back and ... There's no doubt the first year it's going to fall down here. We're going to have to go through a series of discussions to get a balance.

LM: I think I'm correct in saying that the contract between DOE and Kaiser-Hill does not require them to meet the present surface water standard. If that's true, I don't know how to reflect that on the integrating factors, but it seems like there's a conflict between and the assumptions of the contract.

JL: This is a topic of discussion between DOE and Kaiser-Hill that has real implications. Whether they are perceived or real inconsistencies in the contract versus RFCA, we ought to know that. We the DOE is going to fulfill that. K-H is going to fulfill the contract ... mutual goals we can fill both by going through the contract. But I think it's honest and earnest to highlight that right up front. Here's what the contract says about surface water, here's what RFCA says. And there may be or there is absolutely is, an ... depending on a specific issue we're talking about, an inconsistency. That doesn't mean we're going to the contract and modify RFCA, it's just information.

JG: ... only it's obscured. What is the number for cleanup of water in the contract? And what is RFCA's number for cleanup? I understand that RFCA or the local authorities have 4.5 pCi/l. What is the number in the contract for cleanup?

JL: I don't want to solve that problem here.

JG: But isn't it a different number?

JL: Language is expressed a little differently. But that's exactly the kind of discussion we should have when we have the surface water discussion.

RH: That's the integration when you compare the two.

JG: Let's talk understandably. What is the allowable concentration of plutonium in water in the contract and what is the allowable concentration of plutonium in the authorities' standpoint or the state or whoever else is regulating?

JL: We'll talk about that when we have the surface water conversation.

JG: It would take five minutes to give us those numbers.

RH: The thing to take away from this conversation is, clarity is one of things we need. Clear discussion, clear information.

JL: Some of the things we would talk about coming into the subsurface information, things that are important. Because one, there are some unknowns, how are we going to deal with those. How are we going to deal with them now, how are we going to deal with them when they become knowns as we find contamination? Does it matter where it is? How deep it is? Other values and issues here? Each of those outcomes have other implications to stewardship, to cost, to health and safety of the worker.

MH: Since there is a bill before Congress to make this site a wildlife refuge, at what point do we ask the Fish and Wildlife Service what their desires are for the cleanup levels and what do we need to do to make sure that animals are protected?

JL: We wait to see if the bill passes. If the bill passes, we'll hear a lot more from the Fish and Wildlife Service.

DS: Even in the absence of that bill, we cannot ignore ecological risk. It's not as if the animals have been forgotten. There is no doubt, however, that if the bill passes there will be a new focus on that issue.

MH: Why shouldn't we be looking at, since we're looking at all these maybes here. If the bill passes, we have one scenario; if the bill doesn't pass, we have another scenario. We're going to be playing catch up, because this is going to take two years for this to go through. How do we tie Fish and Wildlife into all these decisions related to cleanup.

Msattelberg: We're in negotiations with DOE for technical assistance. We're hoping to have Fish and Wildlife presence looking at these issues, speaking for the animals, the Wildlife refuge worker.

LA: I would presume that if the cleanup were protected to human life and health, the animals would be protected too. One of the things I'm concerned about are the needs and the ability of U.S. Fish and Wildlife to be able to fulfill long-term stewardship needs. We need to know if Fish and Wildlife Service has the capability of taking care of this site as it exists at the end state.

MS: As far as the ecological receptors, many times it's a lower level than human. The RMA cleanup levels there are set to the bio...? levels rather than human health. It actually increases the radiation 3-fold. Secondly, stewardship as far as Fish and Wildlife, we're doing it at other sites. We have a handful of Superfund sites as refuges, and so are responsible for the stewardship on those sites.

LA: I still have a concern about your capabilities and how it will fit in your budget.

RH: Recognize that this is something we need to talk about.

JL: We can't just keep treating stewardship as a black box. As we identify stewardship issues, we need to start flushing out what's your commitment, what are the costs associated with that, who's going to do that?

Stewardship and Post Closure Obligations

JL: This should be the first, middle, and last thing we talk about. This is the one you'll see in two weeks. It may not be primarily agency folks because there are folks very well engaged in the stewardship discussions...

? I think people should have some understanding of what, and I use the term "bodies" as pockets of ... when they find new bodies are discovered, what happens when you do find something?

JL: Added "followup commitment" to "Post closure reviews."

We have a lot of guidance. Not that stewardship, as it's first up, is going to be developed enough to address all of this, but we know the foundation for what we ought to be looking at when we bring up these discussions. We'll proceed with the schedule we came up with, which means stewardship would be teed up, get something in the packet that presented in two weeks. Then surface soil.

LM: Under Surface Water, I'm wondering about groundwater.

JL: Added to "Subsurface Soil Contamination."

DS: As we discuss surface water and subsurface contamination, we're going to deal with mobility of those contaminants and how they might affect surface water and if we don't cover it sufficiently, then we can spend more time on it.

KK: I'm looking at a standard outline for these presentations. One of the important areas is to, getting back to your integrating factors, if we could know what is regulatorily required, and what's in the contract.

JL: We'll make sure we know what those are.

KK: Then a statement of the problem in terms of what you know from the human health risk assessments, ... identify pathways that you need to address. A restatement

of the existing contamination or what contamination is out there. So you state the problem. That should be the first part, then move into the human health statement about why it's a problem.

LM: The SALs are not being calculated to protect surface water. That's being thought of independently. Is that correct?

JL: It is not being calculated to address the surface water standard.

LM: Dealt with separately, by institutional controls or generic controls?

JL: It could be excavation as well. But the RSAL doesn't set that number that would help you meet the standard.

LM: I remember the Actinide Migration Group produced a document that said if the RSAL was driven by the water standard, the RSAL would have to be 10 pCi/g or lower. That's being handled differently.

JL: We need to take that head on.

VH: DOE is ... I anticipate that there is going to be a limited amount of money left over after that where the community can decide what risks they want to clean up, and maybe we want a better soil cleanup, maybe the surface water standard to be met. I think those are the discussions ... We don't need to discuss a lot of the regulatory ... because it's not going to happen. I would rather discuss the others, because there are going to be some alternatives. Is it more important to protect the offsite community or the future land user? These may well be ... controls.

JG: What is the purpose of trying to set up two populations with different goals?

VH: Nobody is going to live on the site, so is it more important?

JL: This process would help us prioritize, deal with resources that aren't encumbered by ... or some other. It's not the sole goal here, because we have to see as the cleanup progresses each year and as Congress appropriates each year what it looks like, but we

would be better prepared as a community to express ourselves on how these sources should be applied if that situation should arise.

VH: Because the 903 pad cleanup could happen in the next couple of years, and the subsurface water cleanup could take five years, you have to be careful that the community doesn't spend all its money on the 903 pad cleanup, and then find out you can't cleanup any more of the subsurface area.

JL: That's why I think it's important to look at all of this in an integrated way.

DS: You're assuming that you have to comply with the regulations, so we don't really have to talk about it. The reality is that within the regulation, there is a band of activities that can occur. You can comply in many different ways to achieve the end point. It isn't like there aren't a lot of choices between here and there. It isn't just a black and white comply with regulations. If you don't want to play in those choices, that's fine.

DA to come up with Stewardship presentation for 4/11 RFCA FG meeting. GdeP will if he can. John Marler will let Dave know.

Broomfield stewardship letter in packet. Give to Chris. Shirley.

A copy of the Executive Summary of the National Academy of Sciences study on long-term stewardship. CAB office?

Objectives for this discussion:

- Inform FG about proposed discussion
- Get FG feedback about process, then modify process according to feedback

WORKSHOP UPDATE

KK gave an update on the Workshops. They will be held April 27 and 28, at the Westin Hotel.

April 27, 2001

?

Challenges in Applying Computer Models at Rocky Flats

Application of RESRAD 6.0

April 28, 2001

RSAL Working Group views and plans for key issues of concern

Panel Members / Audience to interact with RSAL Working Group

MH: Is there still interest in this group on having a workshop on health effects?

FG: Yes.

MH: We need to start looking at that in May.

Victor, Tom, LeRoy, Shirley, Mary volunteered to work on the workshop.

SET FUTURE AGENDAS AND REVIEW MEETING

RH: I need to add to this. Peer Review on Task 2 report. You need to agree on questions to the Peer Reviewers.

Collect questions, then to Christine. John Marler and Jerry Henderson will gather and present them 4/11.

John and Jerry will pull comments and send to Christine by next Wednesday for inclusion to packet.

- RSAL Working Group update

- Task 1 Peer Review and Response
- Collect Questions and Presentation on Task 2 (John & Gerry)
- Presentation from agency Re Key Issues and How we answered them
- Final opportunity to raise issues on Task 1 – Round Robin
- End State: Stewardship

ADJOURNMENT

The RFCA Focus Group meeting was adjourned at 6:00 p.m.

**RFCA Stakeholder Focus Group
March 28, 2001
Meeting Minutes**

**Appendix A
Participants List**

**RFCA Stakeholder Focus Group
March 28, 2001
Meeting Minutes**

**Appendix B
John Marler, Rocky Flats Coalition of Local Governments:
Proposed Path Forward for the Focus Group**

**RFCA Stakeholder Focus Group
March 28, 2001
Meeting Minutes**

**Appendix C
Joe Legare, U.S. Department of Energy: Comprehensive End
State Discussion - Overview / Approach**

RFCA Stakeholder Focus Group

March 28, 2001

Participants List

NAME		ORGANIZATION / COMPANY
Lorraine	Anderson	City of Arvada
Christine	Bennett	AlphaTRAC, Inc.
Kent	Brakken	U.S. DOE - RFFO
Laura	Brooks	Kaiser-Hill Company, LLC
Kimberly	Chleboun	RFCLOG
John	Corsi	Kaiser-Hill Company, LLC
Gerald	DePoorter	RFCAB
Sam	Dixon	City of Westminster
Carey	Dowling	AlphaTRAC, Inc.
Shirley	Garcia	City of Broomfield
Joe	Goldfield	RFSALOP
Aaron	Grider	Jefferson County
Mary	Harlow	City of Westminster
Jerry	Henderson	RFCAB
Reed	Hodgin	AlphaTRAC, Inc.
Victor	Holm	RFCAB
Martha	Hyder	Wind River Environmental Group
Ken	Korkia	RFCAB
Joe	Legare	DOE
Jean	Lillich	US EPA
Ann	Lockhart	CDPHE
Carol	Lyons	City of Arvada
Sandi	MacLeod	U.S. DOE
John	Marler	RFCLOG
Tom	Marshall	Rocky Mountain Peace and Justice Center
Dan	Miller	Natural Resources and Environment Section Colorado Department of Law
LeRoy	Moore	RMPJC
Mark	Sattelberg	US Fish and Wildlife Service
Dave	Shelton	Kaiser-Hill Company, LLC
Carl	Spreng	CDPHE

**RFCA Stakeholder Focus Group
Participants List**

**Broomfield City Hall
January 31, 3:30-6:30 p.m.**

Noelle	Stenger	RF CAB
Honorable Hank	Stovall	City of Broomfield

Path Forward Proposal for Focus Group

March 28, 2001

Agenda Group:

Christine Bennett, Shirley Garcia, Mary Harlow, Reed Hodgins,
Ken Korkia, Joe Legare, John Marler, and Tom Marshall

Focus Group Community Process

Discussion from 2/28/01

- Community Interests for Focus Group:
 - Collaborate with agencies on cleanup analyses and decisions
 - Understand the objectives for each discussion
 - Get closure on each issue addressed
 - Collaborate with agencies on setting Focus Group agendas

- Focus Group Process:

- Agencies and community should set the path forward
- Establish a steering committee to set meeting agendas
- Agendas should have time for full dialogue on each issue
- Prior to a meeting, the agencies should provide background information on each issue to be discussed
- Focus Group should have a round robin at the end of each meeting to get a key thought from each participant.
- A holistic “check-in” should be a part of every meeting -- where we are in the big picture and where we are going next

What We Propose

- Agenda group (agency staff and community members) will work together to determine path forward and set agendas
- Each meeting will contain a review of the path forward and the goals and objectives for each agenda
- Each issue will be explored fully but within the framework and schedule determined by the agenda group
- Agencies will provide background material before the meetings and Focus Group will be expected to review this material and be prepared for the meeting

April 11 Focus Group Meeting

- RSALs: Regulatory Analysis (Task 1)
 - RFCA Parties' Responses to Peer Review Comments
 - Focus Group Summary of Task 1 Issues (Task 1 report, peer review reports, supporting documents)
- ER Issues: Stewardship

DRAFT Focus Group Path Forward (through June 2001)

Meeting	Agenda
March 28	<ul style="list-style-type: none"> • RFCA RSAL Working Group Update • Agenda Group Debrief <ul style="list-style-type: none"> Focus Group Strategy (re: RSALs and ER briefings) Approach for Task 1 Peer Review Response Discussion • Integrated ER Decision-Making Overview
April 11	<ul style="list-style-type: none"> • RSALs: Regulatory Analysis (Task 1) <ul style="list-style-type: none"> RFCA Parties' Responses to Peer Review Comments Focus Group Summary of Task 1 Issues • ER: Stewardship
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May 9	<ul style="list-style-type: none"> • RSALs: Model Evaluation (Task 2) <ul style="list-style-type: none"> RFCA Parties' Responses to Peer Review Comments? Focus Group Summary of Task 2 Issues • ER: Water
May 23	<ul style="list-style-type: none"> • RSALs: Parameter Evaluation (Task 3) • ER: Subsurface Soils
June 7	<ul style="list-style-type: none"> • RSALs: Parameter Evaluation (Task 3) <ul style="list-style-type: none"> RFCA Parties' Responses to Peer Review Comments?



COMPREHENSIVE END STATE DISCUSSIONS

**Integrating Decisions to Ensure the Best Cleanup
and Most Thoughtful Application of Resources**

Joe Legare
Rocky Flats Field Office
Wednesday, March 28, 2001



ADMIN RECORD



Why Take This Approach

- Cleanup must be health based and compliant
- Range of outcomes can be protective and compliant
- Plan ahead
- Limited resources
- Decisions today may impact or constrain choices later
- Choices will be made -- it is smarter for us to make them together



What Does Success Look Like

- Reviewing problem and issue
- Comparing and discussing options in each area and across each area
- After 5 or 6 meetings, bounding the question
- We will not have enough information to make decisions
- We may have enough information to make more informed and better decisions on the immediate issues -- RSALs and 903 pad



End State Issues

- Surface contamination
- Sub-surface contamination
- Surface water standards and management
- Stewardship and post closure obligations
- **Groundwater**



Integrating Factors

- Human health and environmental protection are inviolate
 - There are multiple ways to achieve an end state that is protective and that complies with prevailing regulations
- Assumptions in the contract and baseline
- Requirements of RFCA / **Regulations**
- Other legal requirements
- Community priorities
- Costs and consequences of various end state alternatives
- **Stewardship / Agency Commitment**
- **Define End State Alternatives**
- **Identify Variables for Each Subtopic**
- **Community Acceptance**
- **Problem Statement**



Surface Soil Contamination

- RSAL protective of future site user
- Rad and non-Rad
- Cleanup beyond the RSAL
 - To meet surface water standards
 - Everywhere or case-by-case
- As Low as Reasonably Achievable (ALARA)
 - process
 - goals
- Ecological Impacts



Subsurface Soil Contamination

- Rad and non-Rad contamination in and near the industrial area
- Process waste lines
- Under-building contamination



Surface Water Management and Standards

- On site and off site water quality
- Standards and measurements
 - where to measure
 - how to measure
 - what to measure
- Engineered controls
- Land configuration
- Water Balance



Stewardship and Post Closure Obligations

- Safe and compliant
- Post closure reviews + **Follow-up Commitment**
 - intensity of review
 - frequency of review
 - independence of review
- Engineered controls and institutional controls
- Technology
- Community Participation
- Permanent Institutional DOE presence post 2006



What Does Each Discussion Look Like?

- Lots of technical information in packet on issue area
- Overview presentation at Focus Group
 - Scope of problem
 - Regulatory requirements
 - Baseline Assumptions (policy and budget)
- Alternatives Presentation at Focus Group
 - What are alternatives to baseline
 - What do they look like
 - What are the pros and cons of the alternatives



What Is the End Game?

- Several meetings devoted to “bundling” the options
- The community and the agencies would try to identify several scenarios based on assumptions in each issue area
- The community and the agencies will discuss cross-cutting issues or options that involve more than one issue area
- These scenarios will be discussed globally after we have sufficiently discussed each topic area
- Cost will not by itself limit the discussion, but it will be a factor
- Other factors or issues may come in to the discussion once we have concluded the review of each issue
- None of these discussions bind anyone’s right to take specific positions later in the process
- None of these discussions in any way limit the formal public process needed to close these issues through the appropriate RFCA process



What Needs to Happen

- From the agencies
 - provide sufficient technical information in the packet and on request between meetings to enable this discussion
 - If cost is a factor, give the community hard data on cost impacts. Don't hide behind generalizations
 - select a reasonable spread of alternatives to bound the options and the discussion
- From the community
 - help us formulate the alternatives to explore
 - give honest reaction to the issues and present your own alternatives
 - don't shoot the messenger



Challenges

- Is there sufficient technical and other information available to enable this discussion?
- Can we discuss options and alternatives freely without reflecting an institutional position?
- Can we strike the right balance between technical and policy discussions to achieve the kind of integrated discussion we are seeking?



DRAFT Focus Group Path Forward (through June 2001)

Meeting	Agenda
March 28	<ul style="list-style-type: none"> • RFCA RSAL Working Group Update • Agenda Group Debrief <ul style="list-style-type: none"> Focus Group Strategy (re: RSALs and ER briefings) Approach for Task 1 Peer Review Response Discussion • Integrated ER Decision-Making Overview
April 11	<ul style="list-style-type: none"> • RSALs: Regulatory Analysis (Task 1) <ul style="list-style-type: none"> RFCA Parties' Responses to Peer Review Comments Focus Group Summary of Task 1 Issues • ER: Stewardship
April 25	<ul style="list-style-type: none"> • RSALs: New Science (Task 4) <ul style="list-style-type: none"> Focus Group Summary of Task 4 Issues • ER: Surface Soils
May 9	<ul style="list-style-type: none"> • RSALs: Model Evaluation (Task 2) <ul style="list-style-type: none"> RFCA Parties' Responses to Peer Review Comments? Focus Group Summary of Task 2 Issues • ER: Water
May 23	<ul style="list-style-type: none"> • RSALs: Parameter Evaluation (Task 3) • ER: Subsurface Soils
June 7	<ul style="list-style-type: none"> • RSALs: Parameter Evaluation (Task 3) <ul style="list-style-type: none"> RFCA Parties' Responses to Peer Review Comments?



COMPREHENSIVE END STATE DISCUSSIONS

**Integrating Decisions to Ensure the Best Cleanup
and Most Thoughtful Application of Resources**

Joe Legare
Rocky Flats Field Office
Wednesday, March 28, 2001



Why Take This Approach

- Cleanup must be health based and compliant
- Range of outcomes can be protective and compliant
- Plan ahead
- Limited resources
- Decisions today may impact or constrain choices later
- Choices will be made -- it is smarter for us to make them together



What Does Success Look Like

- Reviewing problem and issue
- Comparing and discussing options in each area and across each area
- After 5 or 6 meetings, bounding the question
- We will not have enough information to make decisions
- We may have enough information to make more informed and better decisions on the immediate issues -- RSALs and 903 pad



End State Issues

- Surface contamination
- Sub-surface contamination
- Surface water standards and management
- Stewardship and post closure obligations
- **Groundwater**



Integrating Factors

- Human health and environmental protection are inviolate
 - There are multiple ways to achieve an end state that is protective and that complies with prevailing regulations
- Assumptions in the contract and baseline
- Requirements of RFCA / **Regulations**
- Other legal requirements
- Community priorities
- Costs and consequences of various end state alternatives
- **Stewardship / Agency Commitment**
- **Define End State Alternatives**
- **Identify Variables for Each Subtopic**
- **Community Acceptance**
- **Problem Statement**



Surface Soil Contamination

- RSAL protective of future site user
- Rad and non-Rad
- Cleanup beyond the RSAL
 - To meet surface water standards
 - Everywhere or case-by-case
- As Low as Reasonably Achievable (ALARA)
 - process
 - goals
- Ecological Impacts



Subsurface Soil Contamination

- Rad and non-Rad contamination in and near the industrial area
- Process waste lines
- Under-building contamination



Surface Water Management and Standards

- On site and off site water quality
- Standards and measurements
 - where to measure
 - how to measure
 - what to measure
- Engineered controls
- Land configuration
- Water Balance



Stewardship and Post Closure Obligations

- Safe and compliant
- Post closure reviews + **Follow-up Commitment**
 - intensity of review
 - frequency of review
 - independence of review
- Engineered controls and institutional controls
- Technology
- Community Participation
- Permanent Institutional DOE presence post 2006



What Does Each Discussion Look Like?

- Lots of technical information in packet on issue area
- Overview presentation at Focus Group
 - Scope of problem
 - Regulatory requirements
 - Baseline Assumptions (policy and budget)
- Alternatives Presentation at Focus Group
 - What are alternatives to baseline
 - What do they look like
 - What are the pros and cons of the alternatives



What Is the End Game?

- Several meetings devoted to “bundling” the options
- The community and the agencies would try to identify several scenarios based on assumptions in each issue area
- The community and the agencies will discuss cross-cutting issues or options that involve more than one issue area
- These scenarios will be discussed globally after we have sufficiently discussed each topic area
- Cost will not by itself limit the discussion, but it will be a factor
- Other factors or issues may come in to the discussion once we have concluded the review of each issue
- None of these discussions bind anyone’s right to take specific positions later in the process
- None of these discussions in any way limit the formal public process needed to close these issues through the appropriate RFCA process



What Needs to Happen

- From the agencies
 - provide sufficient technical information in the packet and on request between meetings to enable this discussion
 - If cost is a factor, give the community hard data on cost impacts. Don't hide behind generalizations
 - select a reasonable spread of alternatives to bound the options and the discussion
- From the community
 - help us formulate the alternatives to explore
 - give honest reaction to the issues and present your own alternatives
 - don't shoot the messenger



Challenges

- Is there sufficient technical and other information available to enable this discussion?
- Can we discuss options and alternatives freely without reflecting an institutional position?
- Can we strike the right balance between technical and policy discussions to achieve the kind of integrated discussion we are seeking?



**RFCA Stakeholder Focus Group
Attachment B**

Title: Meeting Minutes for March 28, 2001 Focus
Group Meeting

Date: April 5, 2001

Author: C. Reed Hodgkin
AlphaTRAC, Inc.

Phone Number: (303) 428-5670

Email Address: cbennett@alphatrac.com



**RFCA Stakeholder Focus Group
Attachment C**

Title: RSALs Review Schedule

Date: March 22, 2001

Author: Sandra MacLeod
U.S. Department of Energy

Phone Number: (303) 966-3367

Email Address: sandra.macleod@rf.doe.gov

ADMIN RECORD



DRAFT RSAL PUBLIC PROCESS PROPOSED SCHEDULE (3/21/01)
(Changes from Rev. 8 are in bold)

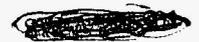
Tasks	1 st Draft Distributed	Focus Group Meeting (Done)	2 nd Draft Distributed	Focus Group Meeting (Proposed)	Peer Review/ Focus Group Comments Due	Final Draft to Principals
Task 1 (Regulatory Analysis)	10/27/00	11/29/00 2/14/01	1/19/01	3/28/01	3/8/01	5/30/01
Task 2 (Model Evaluation)	11/20/00	12/13/00	3/26/01	4/11/01	5/4/01	5/30/01
Task 3 (Parameter Evaluation)	5/3/01	1/31/01	(see Note 1)	5/9/01 5/23/01	5/24/01	5/30/01
Task 4 (New Scientific Information)	4/6/01	1/17/01	(see Note 1)	4/25/01	4/27/01 (see Note 2)	5/30/01
Task 5 (Cleanup Levels at Other Sites)	10/25/00	11/8/00 1/3/01	12/1/00		4/18/01	5/30/01

Formal Public Comment Period for RSAL Report (compilation of Tasks 1-5):

6/14/01:	8/13/01:	9/14/01:
›Public Comment Begins	›Public Comment Ends	›Final Report Released

Note 1: Second draft is not currently planned. Peer Review and Focus Group comments will be incorporated into the first draft (note that Peer Review of Task 4 is not currently planned, so only Focus Group comments will be incorporated).

Note 2: Focus Group comments only because Peer Review is not currently planned for Task 4.



Attachment 1

MEMORANDUM

TO: Whom it may concern

FROM: Tim Rehder, Rocky Flats Team Leader
U.S. Environmental Protection Agency, Region 8

Subject: Answer to a Frequently Asked Questions About Radiation Risk

Question: Isn't an RSAL based on 25 mRem/yr dose less conservative than an RSAL based on the CERCLA risk range of 10^{-4} to 10^{-6} ?

Answer: Not necessarily. The risk associated with a given dose is dependent upon the specific radionuclide of interest and the routes of exposure (i.e. it can vary depending whether the exposure is the result of inhalation, ingestion or external gamma exposure).

EPA takes issue with 25 mRem/yr dose limit in the NRC Decommissioning Rule because for the majority of radionuclides the lifetime risk associated with a 25 mRem/yr dose is outside the risk range of 10^{-4} to 10^{-6} . But, it is important to remember that for some radionuclides, given certain exposure scenarios, the lifetime risk associated with this dose is within the acceptable range. This point is illustrated in the report "Determining Cleanup Goals at Radiologically Contaminated Sites" RSAL Annual Review Task 5, authored by Carl Spreng, dated January 17, 2001. The table on page 36 of that document shows cleanup levels based on a 10^{-4} risk calculated for Melton Valley at Oak Ridge and compares those to levels calculated using a 25 mRem/yr dose. For 3 of the 10 radionuclides considered, the dose-based value was more conservative than the risk-based value. This point is probably best illustrated in the EPA draft document "The Relationship Between Radiation Dose and Risk and Its Implications in Developing the Radiation Site Cleanup Standard, December 12, 1995, which contains a graph (see attachment labeled Exhibit 5) showing for 62 different radionuclides the risk from exposure to a soil concentration corresponding to a 15 mRem/yr dose. Of the 62 radionuclides considered, 17 have a risk less than or equal to 10^{-4} . Of those 17, ten would still be below 10^{-4} at a dose of 25 mRem/yr.

Question: If a 15 mRem/yr dose equates to a lifetime cancer risk of 3×10^{-4} , then doesn't the risk associated with a 25 mRem/yr dose have to be outside the acceptable risk range.

Answer: Again if you look at Exhibit 5, you see that the value of 3×10^{-4} is basically an average risk number for the 62 radionuclides considered. Of the 62 radionuclides, 16 have a risk that equates to 3×10^{-4} , the others have risk values that are either higher or lower.

The risk of 3×10^{-4} is also the level of risk that equates to a dose of 15 mRem/yr of Low Linear Energy Transfer radiation (i.e. gamma radiation). More information on this topic can be found in the memo on "Radiation Risk and Radiation Dose, How Do They Relate?" (Attachment 1 to regulatory analysis).

Draft Response to Peer Review Comments on the Radionuclide Soil Action Level Regulatory Analysis – Task 1 Report

The following are draft responses to comments made by two peer reviewers on the Radionuclide Soil Action Level (RSAL) Regulatory Analysis, Revision 2, dated January 24, 2001.

Comments from Reviewer 1:

1. *The regulatory analysis should explain how the Radionuclide Soil Action Levels (RSALs) are intended to protect public health.*

The outcome of the RSAL review will be incorporated into RFCA Attachment 5. The regulatory analysis will be one chapter in this review. The questions of how the RSALs protect human health and how they fit into the overall cleanup at Rocky Flats will be addressed in the introduction of that document.

2. *The definition and purpose of RSALs are not clear. The regulatory analysis contains conflicting definitions and explanations of the concept of RSALs. It is not clear on (1) when RSALs are to be applied; (2) what specific action, if any, an exceedance of an RSAL triggers; and (3) whether RSALs are intended to be public health protective.*

The agencies do not believe that the brief definition on an RSAL given in the background section conflicts with the Proposal for the RSAL and Cleanup Decisions on page 13 of the document.

3. *It is not clear on (1) when RSALs are to be applied; (2) what specific action, if any, an exceedance of an RSAL triggers; and (3) whether RSALs are intended to be public health protective.*

The question of when RSALs are to be applied is answered on page 13 of the document:

“The RSAL will be used to determine where cleanup actions will be taken at Rocky Flats.”

That determination will be made by comparing sampling data against the RSAL. When sampling data indicate that soil contamination is greater than the RSAL, an action will be triggered.

4. *It is not clear on what specific action, if any, an exceedance of an RSAL triggers*

The Regulatory Analysis does not specify what action will be triggered by exceeding the

RSAL. The specific action will be determined during the design of the specific project. But, for radionuclide contamination in surface soils, the agencies anticipate that the action will involve excavation and off-site disposal.

5. *It is not clear whether RSALs are intended to be public health protective.*

The RSALs are intended to be protective of the health of the anticipated future land user.

6. *I cannot discern whether RSALs are intended to act as soil screening levels or clean up levels, or something in between.*

They are not screening levels. In certain areas of the site they could end up being de facto cleanup levels, because if contamination in an area does not exceed the RSALs, it is probable that no action will be taken to address that contamination. However, for most of the radiologically contaminated surface areas at Rocky Flats (most of which are associated with the 903 Pad) the agencies believe the RSAL will represent a minimum cleanup level. The actual cleanup level, after the ALARA analysis is conducted, will in most cases be a more conservative number.

7. *Issues associated with drinking and ground water contamination, and their relationship to RSALs, are not addressed.*

The RFCA Action Level Framework applies to all media and all contaminants, although drinking water is not specifically addressed because there is no current drinking water use of groundwater. This regulatory analysis is specific to just radionuclides in soils because there have been significant developments in radiation regulation (i.e., the NRC decommissioning rule, withdrawal of the EPA draft rule) and because an independent scientific review of RSALs recommended a number of changes be considered. The issues of contaminated ground water and drinking water will be addressed in other documents as appropriate, and will consider the outcome of future discussions with local officials and members of the public.

8. *The use of the NRC Decommissioning Rule may not be appropriate.*

This comment speaks to the concern that EPA has raised that a dose limit of 25 mRem/yr may not be protective of human health which EPA defines as falling within the cancer risk range of 10^{-4} to 10^{-6} . The regulatory analysis, section titled "Acceptable dose and/or acceptable risk" is very clear on this issue:

"Given the concern that the 25 mRem/yr dose limit may not be protective of human health, at least for some radionuclides, the DOE, EPA and CDPHE will also calculate RSALs based on risk, and choose the more conservative value between dose and risk. So the only way the RSAL could be based on the 25 mRem/yr dose would be if the risk associated with the dose fell within the risk range" (emphasis added).

Some in the community are of the opinion that an RSAL based on the CERCLA risk range will always be more conservative than an RSAL based on a 25 mRem/yr dose, but this is not true in all cases. See attached memo.

9. *Institutional controls (ICs) are discussed, but not identified in detail, in the regulatory analysis.*

Institutional Controls will be addressed in other documents as appropriate, and decisions on institutional controls will consider the outcome of future discussions with local officials and members of the public.

10. *Clean up goals should be calculated in terms of risk, not dose, to comply with the OSWER directives that interpret the NCP and CERCLA. According to the EPA guidance, at Superfund sites dose assessments should generally not be performed to assess risk or to establish clean up levels.*

While it's true that EPA guidance has a strong preference for using risk rather than dose for the purpose of establishing cleanup levels, the guidance does not do a good job of anticipating a situation such as the one at Rocky Flats where the State of Colorado has identified its decommissioning rule as an ARAR. In order to be certain we're meeting that ARAR, the agencies have to calculate a contaminant-in-soil value that corresponds to the 25 mRem/yr dose. But again the regulatory analysis is clear that the agencies will not chose an RSAL based on 25 mRem if it is less conservative than one based on the CERCLA risk range.

11. *Attachment 1 contains the statement that "EPA believes that the Dose Conversion Method is fine for calculating the risks of exposure to low LET radiation ... but does not work well for internal exposure to alpha and beta emitting radionuclides. In the case of internal exposure, the Dose Conversion Method generally overestimates the risk ..." (page 3). While EPA says "[e]stimates of cancer risk from radionuclide exposures may also be computed by multiplying the effective dose equivalent computed using the DFCs by a risk-per-dose factor. EPA recommends that this method **not** be used at CERCLA sites to estimate risks for PRGs or cleanup levels, and estimates computed using this method may tend to inaccurately estimate potential risks, with the magnitude of discrepancy dependent on the dominant radionuclides and exposure pathways for the site specific conditions." These two statements seem to conflict.*

Actually, these two statements are in perfect agreement. This issue is addressed in attachment 1 of the regulatory analysis.

12. *Additional important information would greatly assist in analyzing the public health protectiveness and appropriateness of the RSALs. The regulatory analysis would be more useful if it addressed the following:*

- *a fuller discussion linking the 9 Superfund criteria, especially the modifying and balancing criteria, with ALARA.*

The Superfund remedy selection criteria have been discussed in some detail with the Focus Group, and discussions will continue with local officials and members of the public in the course of developing an ALARA process for determining the final cleanup levels.

if uranium is a contaminant of concern at Rocky Flats, a discussion of whether an RSAL for toxicity (based perhaps on the uranium Red) would be appropriate;

This is a good suggestion. The agencies will add a discussion of this to the regulatory analysis. But the short answer is that uranium poses a cancer risk at levels well below those that would pose a toxicity risk so that by developing an RSAL based on uranium carcinogenicity, one is also being protective from the perspective of uranium toxicity.

- *a complete discussion of exposure pathways, and how RSALs are related to these exposure pathways (see page 2, RESRAD model);*

This discussion will be found in the Task 3 chapter of the RASL report.

- *a discussion and analysis of RME in the context of the eight scenarios set out in the table on page 13; and*

This discussion will also be found in the Task 3 chapter.

- *a discussion of the time factor, especially as it relates to long lived radionuclides, restricted releases and maintenance of ICs.*

These issues will be addressed to some degree in the Introduction section of the RSAL report. They will be addressed in more depth in the coming years as the discussions occur on how IC's will be utilized at Rocky Flats what long-term stewardship will look like.

Comments from reviewer 2:

13. The regulatory analysis is still tentative in a number of important respects –

There is no decision on the risk level (10^{-4} , 10^{-5} , or 10^{-6}) to be used for the RSALs;

The agencies staff will make a recommendation on a dose or risk level when the first draft of the Task 3 chapter is completed.

14. A future use as a wildlife refuge is assumed, though the necessary legislation has not yet been passed;

The agencies may have to reconsider their proposal for an RSAL/cleanup level if the Rocky Flats National Wildlife Refuge Act of 2001 fails to become law. However, it should be noted that the anticipated future land user that the agencies have chosen as the basis for RSALs (the wildlife refuge worker) is a more conservative future use scenario than either the light industrial/office worker or open space user envisioned in the Rocky Flats Cleanup Agreement (RFCA). The refuge worker would spend more time at the site, engage in more strenuous activity, disturb more contaminated soil and therefore have greater potential exposure to contaminants than the anticipated future users currently considered in the RFCA.

15. The RSALs could be entirely negated (in the direction of becoming more stringent) by characterization of subsurface soils and surface water;

While this is a possibility, the agencies don't believe this situation is very likely unless new characterization comes to light that suggests the nature and extent of contamination at Rocky Flats is substantially different from our current understanding.

16. The possibility of a two-tier system of RSALs is left open;

The possibility of retaining a two-tier system was left open in the regulatory analysis because, at that time, there was some sentiment among the various agency staff that a tiered system would have utility. To date, we do not have a specific proposal to continue using a two-tiered system for RSAL's. The parties will consider the utility of retaining the tiered approach after the risk and dose calculations for the various scenarios are completed.

17. The ultimate clean-up levels, which are triggered by the RSAL, have yet to be determined.

This is true, as described in the regulatory analysis, the ultimate cleanup levels for projects that are triggered by the RSALs will be determined on a project-specific basis during the design of the project.

18. The Regulatory Analysis is a bit confusing on the role of alternatives analysis at the RSAL phase.

The alternatives analysis discussed in the Task 1 document is a consideration of remedial options for given contaminated area. DOE would conduct this during the design of a specific cleanup project after an action had been triggered by the RSAL. The alternatives analysis is not part of the RSAL setting process.

RFCA Stakeholder Focus Group Attachment D

Title: Draft Response to Peer Review Comments on
the Radionuclide Soil Action Level Regulatory
Analysis – Task 1 Report

Date: March 22, 2001

Author: DOE, EPA, CDPHE

Phone Number:

Email Address:

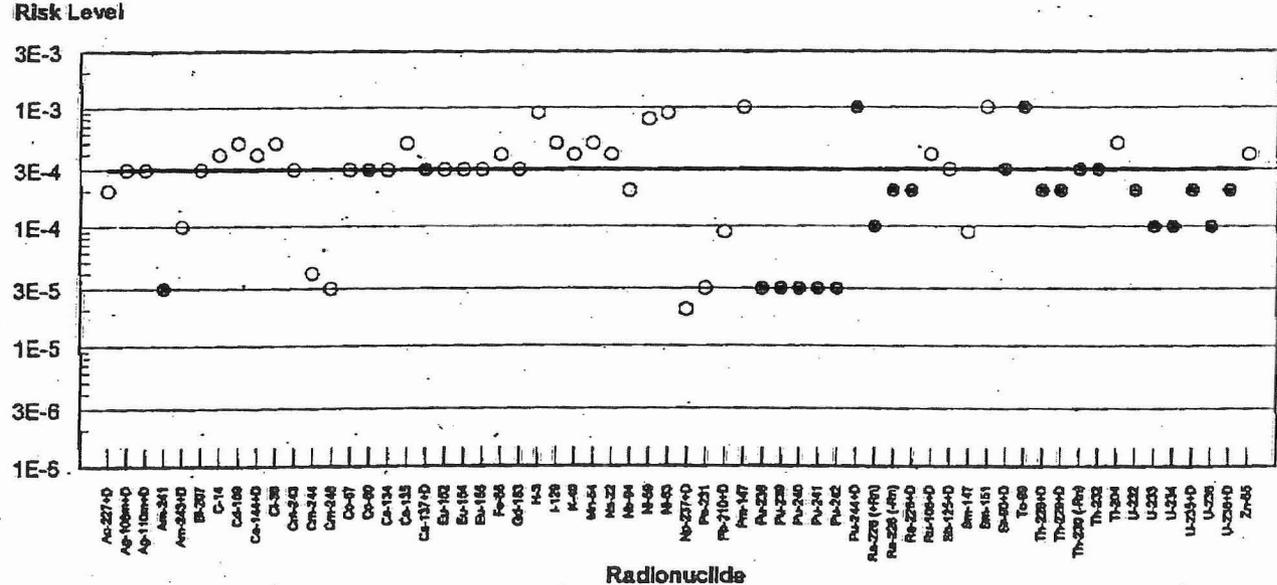
FOUNDED DRAFT - Do Not Cite, Quote, or Attribute

December 12, 1995

001

Exhibit 5

Risk from Exposure to a Soil Concentration Corresponding to a 15 mrem/yr EDE Dose Limit Suburban Residential



Radionuclides of Special Concern at Cleanup Sites

Radionuclides listed alphabetically

ADMIN RECORD

27

87



Hey everyone,

I put together slides for tomorrow's Focus Group meeting presentation on the Agenda Group's proposal (see attachments). I'm sending them today to get feedback from you. Please let me know if you have any changes for the slides and or the information below. Thanks and I'll see you tomorrow afternoon.

Slide 1: Title Slide

Slide 2: Focus Group Community Process Discussion Summary from 2/28/01
This slide is word-for-word from the Focus Group Community Process Discussion Summary, rev 0, Reed put in the Focus Group packet. I will review the four interests and emphasize #2, #3, and #4. For #2, I'll explain that we are trying to focus on the objectives for each discussion, so we can get the most out of the time we spend at the meetings. For #3, I'll define what we mean by "closure" on the issues. What I took away from yesterday's conversation was that for the Focus Group, closure means we make sure we've examined an issue in its entirety and determine if there is any need to continue discussing that particular issue at the Focus Group meetings. Closure does NOT mean that all questions on that issue are resolved or that the entire Focus Group agrees on the issue. Closure simply means we've exhausted that topic and are ready to move on. For #4, I'll emphasize the interest that the community and agencies work together on the Focus Group agendas, hence the formation of the Agenda Group.

Slide #3: Focus Group Process

The information on this slide is a condensed version of the bullet list on page 2 of the Process Discussion Summary (rev 0). These bullets are the revisions that the community requested be made to the Focus Group process. We hit all of these issues at yesterday's meeting, so I think it's important to relate this list with what we talked about doing as a group. For this slide, I'll just summarize the bullets and explain that this is what we intend to do with the Agenda Group and the larger Focus Group.

Slide #4: What We Propose

To reiterate, I see a strong correlation between our conversation yesterday and the community's suggested revisions. I'll discuss the four parts of the proposal. First, I'll explain that the agenda group (agency and community reps) will work on the path forward for the Focus Group and set the agendas.

This is NOT to say that only the agenda group will have a say on the strategic plan and the agendas. It is the Agenda Group's job to take input from the Focus Group as a whole then work with it at the Agenda Group meetings. Second, I'll explain that each meeting will have a review of where we've been, where we are, and where we're going. Third, I'll talk about how we arrive at "closure" for each issue. I think everyone in the Focus Group would agree that we need to get to the bottom of each issue, but not at the expense of other issues. This means that one of the primary objectives of the Agenda Group is to structure the agendas so that we can make sure each issue gets an appropriate amount of coverage. Fourth, I'll talk about the expectations of the Focus Group participants -- that we're getting back to the routine of having the agencies provide information that the participants study before coming to the meetings.

Slide #5: April 11 Focus Group Meeting

This slide will cover the first meeting that the Agenda Group would frame. We'll run our ideas by the Focus Group, take their input, then modify the agenda accordingly. I split the agenda into RSALs and ER issues, as we discussed. We'll have a short presentation from the agencies on their responses to the peer review comments (with emphasis on how the peer reviewer's comments will influence the final report). After this time, we'll address the issues that we highlighted as at the 3/28 meeting (where the Focus Group gave us input on the Task 1 issues they wanted to "wrap-up"). Hopefully, the Focus Group will have reviewed all pertinent Task 1 materials and will have questions and comments to share. We'll wrap up the 4/11 RSAL discussion by coming to "closure" on Task 1, meaning we've exhausted the discussion avenues for Task 1 issues at the Focus Group meetings. Following the RSAL discussion, we'll move into a presentation on ER issues, specifically stewardship.

Slide #6: DRAFT Path Forward (Word attachment)

This chart is from the path forward we sketched out on the board during the meeting. As we discussed, future meetings will be shared between RSALs and ER subjects, with RSALs getting the bulk of the attention for the next 2-3 months. You'll see several references to "Focus Group Summary" in the chart. "Summary" means that the Focus Group has had a full dialogue on that particular task and is ready to move on to discussing the next task. I think the Task 1 meeting will give us a good indication of whether this is possible or not.

I realize this is a fairly general overview, but I'm expecting a lot of input from the Agenda Group and the Focus Group. Obviously, much of this can and will change as we try to implement the Focus Group's suggested revisions. Please email or call me with your suggestions on the presentations before tomorrow's meeting. I'm planning on about a 15 minute discussion from me using the slides, then an open-ended conversation with the Focus Group as a whole.

Thanks,
John

John Marler
Technical Advisor
Rocky Flats Coalition of Local Governments
Tel: 303-412-1200

Path Forward Proposal for Focus Group

March 28, 2001

Agenda Group:

Christine Bennett, Shirley Garcia, Mary Harlow, Reed Hodgins,
Ken Korkia, Joe Legare, John Marler, and Tom Marshall

ADMIN RECORD

SW-A-006507

1/5

Focus Group Community Process

Discussion from 2/28/01

- Community Interests for Focus Group:
 - Collaborate with agencies on cleanup analyses and decisions
 - Understand the objectives for each discussion
 - Get closure on each issue addressed
 - Collaborate with agencies on setting Focus Group agendas

- Focus Group Process:

- Agencies and community should set the path forward
- Establish a steering committee to set meeting agendas
- Agendas should have time for full dialogue on each issue
- Prior to a meeting, the agencies should provide background information on each issue to be discussed
- Focus Group should have a round robin at the end of each meeting to get a key thought from each participant.
- A holistic “check-in” should be a part of every meeting -- where we are in the big picture and where we are going next

What We Propose

- Agenda group (agency staff and community members) will work together to determine path forward and set agendas
- Each meeting will contain a review of the path forward and the goals and objectives for each agenda
- Each issue will be explored fully but within the framework and schedule determined by the agenda group
- Agencies will provide background material before the meetings and Focus Group will be expected to review this material and be prepared for the meeting

April 11 Focus Group Meeting

- RSALs: Regulatory Analysis (Task 1)
 - RFCAs Parties' Responses to Peer Review Comments
 - Focus Group Summary of Task 1 Issues (Task 1 report, peer review reports, supporting documents)
- ER Issues: Stewardship

Draft Response to Peer Review Comments on the Radionuclide Soil Action Level Regulatory Analysis – Task 1 Report

The following are draft responses to comments made by two peer reviewers on the Radionuclide Soil Action Level (RSAL) Regulatory Analysis, Revision 2, dated January 24, 2001.

Comments from Reviewer 1:

1. *The regulatory analysis should explain how the Radionuclide Soil Action Levels (RSALs) are intended to protect public health.*

The outcome of the RSAL review will be incorporated into RFCA Attachment 5. The regulatory analysis will be one chapter in this review. The questions of how the RSALs protect human health and how they fit into the overall cleanup at Rocky Flats will be addressed in the introduction of that document.

2. *The definition and purpose of RSALs are not clear. The regulatory analysis contains conflicting definitions and explanations of the concept of RSALs. It is not clear on (1) when RSALs are to be applied; (2) what specific action, if any, an exceedance of an RSAL triggers; and (3) whether RSALs are intended to be public health protective.*

The agencies do not believe that the brief definition on an RSAL given in the background section conflicts with the Proposal for the RSAL and Cleanup Decisions on page 13 of the document.

3. *It is not clear on (1) when RSALs are to be applied; (2) what specific action, if any, an exceedance of an RSAL triggers; and (3) whether RSALs are intended to be public health protective.*

The question of when RSALs are to be applied is answered on page 13 of the document:

“The RSAL will be used to determine where cleanup actions will be taken at Rocky Flats.”

That determination will be made by comparing sampling data against the RSAL. When sampling data indicate that soil contamination is greater than the RSAL, an action will be triggered.

4. *It is not clear on what specific action, if any, an exceedance of an RSAL triggers*

The Regulatory Analysis does not specify what action will be triggered by exceeding the

RSAL. The specific action will be determined during the design of the specific project. But, for radionuclide contamination in surface soils, the agencies anticipate that the action will involve excavation and off-site disposal.

5. *It is not clear whether RSALs are intended to be public health protective.*

The RSALs are intended to be protective of the health of the anticipated future land user.

6. *I cannot discern whether RSALs are intended to act as soil screening levels or clean up levels, or something in between.*

They are not screening levels. In certain areas of the site they could end up being de facto cleanup levels, because if contamination in an area does not exceed the RSALs, it is probable that no action will be taken to address that contamination. However, for most of the radiologically contaminated surface areas at Rocky Flats (most of which are associated with the 903 Pad) the agencies believe the RSAL will represent a minimum cleanup level. The actual cleanup level, after the ALARA analysis is conducted, will in most cases be a more conservative number.

7. *Issues associated with drinking and ground water contamination, and their relationship to RSALs, are not addressed.*

The RFCA Action Level Framework applies to all media and all contaminants, although drinking water is not specifically addressed because there is no current drinking water use of groundwater. This regulatory analysis is specific to just radionuclides in soils because there have been significant developments in radiation regulation (i.e., the NRC decommissioning rule, withdrawal of the EPA draft rule) and because an independent scientific review of RSALs recommended a number of changes be considered. The issues of contaminated ground water and drinking water will be addressed in other documents as appropriate, and will consider the outcome of future discussions with local officials and members of the public.

8. *The use of the NRC Decommissioning Rule may not be appropriate.*

This comment speaks to the concern that EPA has raised that a dose limit of 25 mRem/yr may not be protective of human health which EPA defines as falling within the cancer risk range of 10^{-4} to 10^{-6} . The regulatory analysis, section titled "Acceptable dose and/or acceptable risk" is very clear on this issue:

"Given the concern that the 25 mRem/yr dose limit may not be protective of human health, at least for some radionuclides, the DOE, EPA and CDPHE will also calculate RSALs based on risk, and choose the more conservative value between dose and risk. So the only way the RSAL could be based on the 25 mRem/yr dose would be if the risk associated with the dose fell within the risk range" (emphasis added).

Some in the community are of the opinion that an RSAL based on the CERCLA risk range will always be more conservative than an RSAL based on a 25 mRem/yr dose, but this is not true in all cases. See attached memo.

9. *Institutional controls (ICs) are discussed, but not identified in detail, in the regulatory analysis.*

Institutional Controls will be addressed in other documents as appropriate, and decisions on institutional controls will consider the outcome of future discussions with local officials and members of the public.

10. *Clean up goals should be calculated in terms of risk, not dose, to comply with the OSWER directives that interpret the NCP and CERCLA. According to the EPA guidance, at Superfund sites dose assessments should generally not be performed to assess risk or to establish clean up levels.*

While it's true that EPA guidance has a strong preference for using risk rather than dose for the purpose of establishing cleanup levels, the guidance does not do a good job of anticipating a situation such as the one at Rocky Flats where the State of Colorado has identified its decommissioning rule as an ARAR. In order to be certain we're meeting that ARAR, the agencies have to calculate a contaminant-in-soil value that corresponds to the 25 mRem/yr dose. But again the regulatory analysis is clear that the agencies will not chose an RSAL based on 25 mRem if it is less conservative than one based on the CERCLA risk range.

11. *Attachment 1 contains the statement that "EPA believes that the Dose Conversion Method is fine for calculating the risks of exposure to low LET radiation ... but does not work well for internal exposure to alpha and beta emitting radionuclides. In the case of internal exposure, the Dose Conversion Method generally overestimates the risk ..." (page 3). While EPA says "[e]stimates of cancer risk from radionuclide exposures may also be computed by multiplying the effective dose equivalent computed using the DFCs by a risk-per-dose factor. EPA recommends that this method **not** be used at CERCLA sites to estimate risks for PRGs or cleanup levels, and estimates computed using this method may tend to inaccurately estimate potential risks, with the magnitude of discrepancy dependent on the dominant radionuclides and exposure pathways for the site specific conditions." These two statements seem to conflict.*

Actually, these two statements are in perfect agreement. This issue is addressed in attachment 1 of the regulatory analysis.

12. *Additional important information would greatly assist in analyzing the public health protectiveness and appropriateness of the RSALs. The regulatory analysis would be more useful if it addressed the following:*

- *a fuller discussion linking the 9 Superfund criteria, especially the modifying and balancing criteria, with ALARA.*

The Superfund remedy selection criteria have been discussed in some detail with the Focus Group, and discussions will continue with local officials and members of the public in the course of developing an ALARA process for determining the final cleanup levels.

if uranium is a contaminant of concern at Rocky Flats, a discussion of whether an RSAL for toxicity (based perhaps on the uranium Red) would be appropriate;

This is a good suggestion. The agencies will add a discussion of this to the regulatory analysis. But the short answer is that uranium poses a cancer risk at levels well below those that would pose a toxicity risk so that by developing an RSAL based on uranium carcinogenicity, one is also being protective from the perspective of uranium toxicity.

- *a complete discussion of exposure pathways, and how RSALs are related to these exposure pathways (see page 2, RESRAD model);*

This discussion will be found in the Task 3 chapter of the RASL report.

- *a discussion and analysis of RME in the context of the eight scenarios set out in the table on page 13; and*

This discussion will also be found in the Task 3 chapter.

- *a discussion of the time factor, especially as it relates to long lived radionuclides, restricted releases and maintenance of ICs.*

These issues will be addressed to some degree in the Introduction section of the RSAL report. They will be addressed in more depth in the coming years as the discussions occur on how IC's will be utilized at Rocky Flats what long-term stewardship will look like.

Comments from reviewer 2:

13. The regulatory analysis is still tentative in a number of important respects –

There is no decision on the risk level (10^{-4} , 10^{-5} , or 10^{-6}) to be used for the RSALs;

The agencies staff will make a recommendation on a dose or risk level when the first draft of the Task 3 chapter is completed.

14. A future use as a wildlife refuge is assumed, though the necessary legislation has not yet been passed;

The agencies may have to reconsider their proposal for an RSAL/cleanup level if the Rocky Flats National Wildlife Refuge Act of 2001 fails to become law. However, it should be noted that the anticipated future land user that the agencies have chosen as the basis for RSALs (the wildlife refuge worker) is a more conservative future use scenario than either the light industrial/office worker or open space user envisioned in the Rocky Flats Cleanup Agreement (RFCA). The refuge worker would spend more time at the site, engage in more strenuous activity, disturb more contaminated soil and therefore have greater potential exposure to contaminants than the anticipated future users currently considered in the RFCA.

15. The RSALs could be entirely negated (in the direction of becoming more stringent) by characterization of subsurface soils and surface water;

While this is a possibility, the agencies don't believe this situation is very likely unless new characterization comes to light that suggests the nature and extent of contamination at Rocky Flats is substantially different from our current understanding.

16. The possibility of a two-tier system of RSALs is left open;

The possibility of retaining a two-tier system was left open in the regulatory analysis because, at that time, there was some sentiment among the various agency staff that a tiered system would have utility. To date, we do not have a specific proposal to continue using a two-tiered system for RSAL's. The parties will consider the utility of retaining the tiered approach after the risk and dose calculations for the various scenarios are completed.

17. The ultimate clean-up levels, which are triggered by the RSAL, have yet to be determined.

This is true, as described in the regulatory analysis, the ultimate cleanup levels for projects that are triggered by the RSALs will be determined on a project-specific basis during the design of the project.

18. The Regulatory Analysis is a bit confusing on the role of alternatives analysis at the RSAL phase.

The alternatives analysis discussed in the Task 1 document is a consideration of remedial options for given contaminated area. DOE would conduct this during the design of a specific cleanup project after an action had been triggered by the RSAL. The alternatives analysis is not part of the RSAL setting process.

March 22, 2001

Dear Stakeholder:

The Rocky Flats Cleanup Agreement (RFCA) Stakeholder Focus Group will meet at the Broomfield Municipal Center at One DesCombes Drive on March 28, 2001 from **3:30 to 6:30 p.m.**

The agenda for the March 28, 2001 meeting is enclosed (Attachment A). We will discuss the following topics:

- RSAL Schedule Review Update
- RSAL Task 1 Peer Review Discussion
- Agenda Group Proposal, Path Forward
- Agency Where We Are, Progress Report

The meeting minutes for the March 14, 2001 meeting will be provided in a separate mailing early next week.

Attachment C presents the latest RSAL Review Schedule.

Attachment D is the agencies' response to the Peer Review comments for the RSALs Task 1 Report, Regulatory Analysis.

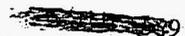
If you need additional information to prepare you for the Focus Group discussion on March 28, 2001, please contact Christine Bennett of AlphaTRAC, Inc. at 303 428-5670 (cbennett@alphatrac.com). Christine will help to find the appropriate resource for you.

You may call either Christine or me if you have any questions, comments, or suggestions concerning the RFCA Stakeholder Focus Group or the upcoming meeting.

Sincerely,

C. Reed Hodgins, CCM

ADMIN RECORD



RFCA Stakeholder

December 6, 2000

Page 2 of 2

Facilitator / Process Manager

Workers exposed to plutonium By Theo Stein Denver Post Environment Writer

Mar. 28, 2001 - Eleven cleanup workers at the former Rocky Flats nuclear weapons plant most likely breathed in plutonium dust dislodged during demolition work at the highly polluted Building 771 last fall, a new report has concluded.

The report, issued by cleanup contractor Kaiser-Hill, identified a number of potential causes ranging from crews handling items in the contamination area without respiratory protection to lax housekeeping and dusting practices.

It also identified a range of training and procedural recommendations designed to limit future exposures, but concluded that it's impossible to completely prevent workers from coming in contact with some radioactive waste.

The amount of radioactivity to which the 11 workers were exposed was within federal and Department of Energy guidelines, Kaiser-Hill spokeswoman Jennifer Thompson said. "Kaiser-Hill takes any worker exposure very seriously, and we remain fully committed to the safe, accelerated closure of Rocky Flats," said Marc Spears, vice president for Kaiser-Hill's engineering, environmental, safety and quality programs. Still, Thompson said that given the nature of the job, workers must expect they'll be exposed to small amounts of radioactivity. "We're not going to be able to get the job done with zero exposure," Thompson said. "There are things we can do to reduce the dose. But we're not going to eliminate exposures from nuclear decommissioning work." The radioactive dose received by 10 of the 11 exposed workers fell between 6 and 60 millirems, the report concluded. Results for the 11th worker are not yet available. The federal limit for radiation workers is 5,000 millirems a year. Thompson said Kaiser-Hill's internal guidelines specify workers should receive no more than 500 millirems in a single year. By contrast, people are ordinarily exposed to about 400 millirems of radiation from natural sources every year.

Workers were tested as a precaution after safety inspectors noted a minor paperwork error involving an air monitor. Tests on 11 employees working in the area revealed they had been exposed to radioactivity. The company said all 11 were wearing "the required level of personal protective equipment." The equipment apparently didn't include respiratory protection. The report also identified other factors that may have contributed to the problem, including a lack of adequate ventilation, the reuse of respiratory equipment by workers, and monitoring equipment not designed to detect the low levels of contamination that led to the dose received by the workers.

Dave Abelson, director of the Rocky Flats Coalition of Local Governments, said his members had not had time to review the report, which was submitted March 15 and

made available Monday. Abelson's group has urged the Energy Department and KaiserHill to vigorously investigate the source and scope of the problem. "We certainly intend to examine this report, as well as other investigations that are ongoing," he said.

DRAFT Focus Group Path Forward (through June 2001)

Meeting	Agenda
March 28	<ul style="list-style-type: none"> • RFCA RSAL Working Group Update • Agenda Group Debrief <ul style="list-style-type: none"> Focus Group Strategy (re: RSALs and ER briefings) Approach for Task 1 Peer Review Response Discussion • Integrated ER Decision-Making Overview
April 11	<ul style="list-style-type: none"> • RSALs: Regulatory Analysis (Task 1) <ul style="list-style-type: none"> RFCa Parties' Responses to Peer Review Comments Focus Group Summary of Task 1 Issues • ER: Stewardship
April 25	<ul style="list-style-type: none"> • RSALs: New Science (Task 4) <ul style="list-style-type: none"> Focus Group Summary of Task 4 Issues • ER: Surface Soils
May 9	<ul style="list-style-type: none"> • RSALs: Model Evaluation (Task 2) <ul style="list-style-type: none"> RFCa Parties' Responses to Peer Review Comments? Focus Group Summary of Task 2 Issues • ER: Water
May 23	<ul style="list-style-type: none"> • RSALs: Parameter Evaluation (Task 3) • ER: Subsurface Soils
June 7	<ul style="list-style-type: none"> • RSALs: Parameter Evaluation (Task 3) <ul style="list-style-type: none"> RFCa Parties' Responses to Peer Review Comments?

ADMIN RECORD

SW-A-006511

**COMPUTER MODEL SELECTION
TO SUPPORT DEVELOPMENT OF
RADIONUCLIDE SOIL ACTION LEVELS**

MARCH 22, 2001

1/22

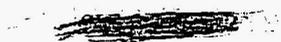


TABLE OF CONTENTS

<u>SECTION/TITLE</u>	<u>PAGE</u>
1. Introduction	3
2. Model Description	3
2.1 RESRAD 6.0	3
2.2 DandD 2.0	4
2.3 RAC Code	4
2.4 MEPAS/GENII/FRAMES/SUM3	4
2.4.1 MEPAS	5
2.4.2 GENII	5
2.4.3 FRAMES	5
2.4.4 SUM3	6
3. Model Selection Criteria	6
3.1 Criteria #1	6
3.2 Criteria #2	7
3.3 Criteria #3	7
3.4 Criteria #4	7
3.5 Criteria #5	8
3.6 Criteria #6	8
3.7 Criteria #7	8
4. Model Criteria Evaluation	8
4.1. RESRAD 6.0	9
4.1.1 Criteria #1	9
4.1.2 Criteria #2	9
4.1.3 Criteria #3	9
4.1.4 Criteria #4	9
4.1.5 Criteria #5	10
4.1.6 Criteria #6	10
4.1.7 Criteria #7	11
4.2 DandD 2.0	11
4.2.1 Criteria #1	11
4.2.2 Criteria #2	11
4.2.3 Criteria #3	12
4.2.4 Criteria #4	12
4.2.5 Criteria #5	12
4.2.6 Criteria #6	12
4.2.7 Criteria #7	13
4.3 RAC Code	13
4.3.1 Criteria #1	13
4.3.2 Criteria #2	13
4.3.3 Criteria #3	13
4.3.4 Criteria #4	14
4.3.5 Criteria #5	14
4.3.6 Criteria #6	14
4.3.7 Criteria #7	14
4.4 MEPAS/GENII/FRAMES/SUM3	15
4.4.1 Criteria #1	15
4.4.2 Criteria #2	15
4.4.3 Criteria #3	15
4.4.4 Criteria #4	17
4.4.5 Criteria #5	17
4.4.6 Criteria #6	17
4.4.7 Criteria #7	18
5.0 Conclusions	18
6.0 References	20

1. Introduction

The objective of developing Radionuclide Soil Action Levels (RSALs) is to estimate the soil concentration of radionuclides that equates to an acceptable radiation dose over a study period of 1,000 years. Task 2 of the RSAL report describes the process that was used to evaluate and select a computer model to calculate radiation dose and recommend soil action levels.

Computer models are used to calculate RSALs due to the complexity of calculating a radiation dose to numerous individuals for a range of future land uses. Computer modeling is an interactive series of questions and decisions. In this case, models are used to assess deterministic and probabilistic radiation doses. For a deterministic dose, an average or mean of a parameter is used in a simple mathematical form controlled by multiple assumptions to determine a single dose number. For a probabilistic dose, a series of parameters that have uncertain values with non-uniform properties are used to produce a probable distribution of dose values. Calculation of radiation dose from soils at Rocky Flats will involve multiple radionuclides (plutonium, americium, and uranium); multiple exposure pathways (ingestion, inhalation and external irradiation); and multiple exposure scenarios over a 1,000-year period. Therefore it is important that the model selected be able to calculate a probabilistic dose.

Several computer models were candidates to calculate the RSALs. These models include: 1) RESRAD 6.0; 2) DandD 2.0; 3) Risk Assessment Corporation (RAC) Code; and 4) the MEPAS/GENII/FRAMES/SUM3 package of computer codes. These computer models were selected for consideration because they can assess radiation dose from soils in a probabilistic manner and they can trace the movement of radionuclides in the environment over the 1,000-year assessment period.

Task 2 of the RSAL report outlines the model selection criteria that were used to select the best model for determining RSALs. It also describes the capabilities of each of the computer models chosen for assessment and evaluates each of the models with respect to the selection criteria. The results of the evaluation and conclusions are included at the end of the section.

2. Model Descriptions

2.1. RESRAD 6.0

RESRAD is a computer code developed by Argonne National Laboratory for the U.S. Department of Energy to calculate site-specific residual radioactive material guidelines using radiation dose and radiation risk. These residual radioactive material guidelines can be developed on a deterministic or probabilistic basis. Residual radioactive material guidelines are equivalent to an RSAL at RFETS.

RESRAD uses a pathway analysis method in which the relation between radionuclide concentrations in soil and the dose to a member of a critical population group is

expressed as a pathway sum, which is the sum of products of "pathway factors." Pathway factors correspond to pathway segments connecting compartments in the environment between which radionuclides can be transported or radiation emitted. The nine environmental pathway segments assessed by RESRAD are direct exposure, inhalation of particulates and radon, and ingestion of plant foods, meat, milk, aquatic foods, water and soil.

2.2. DandD 2.0

DandD (Decontamination and Decommissioning) is a computer code developed by the Nuclear Regulatory Commission to support decommissioning under their License Termination Rule. Screening level cleanup concentrations are calculated by DandD for surface soils and building surfaces using probabilistic analysis. The DandD computer code software was developed using the environmental pathways and exposure scenarios documented in Volumes 1 and 3 of NUREG/CR-5512, "Residual Radioactive Material From Decommissioning."

DandD assesses a residential exposure scenario for soils and a building occupancy scenario for building surfaces. The building occupancy scenario relates volume and surface contamination levels in existing buildings (presumably released following decommissioning for unrestricted commercial or light industrial use) to estimates of the total effective dose equivalent (TEDE) received during a year of exposure with the conditions defined in the scenario. The more complex and generalized residential scenario is meant to address sites with contamination in soils and groundwater. Input parameter distributions for each scenario and exposure pathway were developed consistent with conducting screening dose assessments, increasing the likelihood of overestimating rather than underestimating potential dose.

2.3. RAC Code

The Risk Assessment Corporation (RAC) wanted to assess exposure scenarios and exposure pathways in a probabilistic manner. RAC also wanted to calculate the amount of radioactive material in the air differently than previous RESRAD models. Using RESRAD 5.82 as the baseline, RAC developed probabilistic computer codes and air modeling computer codes to generate it's own computer model. The RAC developed computer model should not be considered associated with RESRAD since the modifications made do not have the endorsement of ANL, nor can all the changes that RAC made guarantee the initial integrity of the original RESRAD code.

The RAC code can assess multiple exposure scenarios and exposure pathways in a probabilistic manner.

2.4. MEPAS/GENII/FRAMES/SUM3

The MEPAS/GENII/FRAMES/SUM3 set of computer codes works as a unit to calculate radiation dose to individuals associated with multiple exposure scenarios. FRAMES is the shell in which all of the other computer codes run. MEPAS and GENII contain the source term definition component, the fate & transport component and the radiation dosimetry component of the set of computer models. SUM3 is the package that allows the use of probabilistic analysis within the set of computer codes. These four computer codes are further discussed in the sections below.

2.4.1. MEPAS

The MEPAS (Multimedia Environmental Pollutant Assessment System) computer code assesses the impact to individuals from radionuclides and chemicals in the environment. MEPAS integrates environmental transport and exposure pathways to determine their potential impact on the surrounding environment, individuals, and populations. MEPAS is a deterministic computer code that can assess multiple exposure pathways and exposure scenarios.

MEPAS provides a user-friendly interface for setting up cases and analyzing results. This interface provides on-line help, units conversions, pictorial depiction of the Conceptual Site Model, ability to reference all data, ability to edit most default parameters and graphical views of input and output data. MEPAS is applicable to a wide range of multimedia transport and consequence analysis.

2.4.2. GENII

The GENII computer code was developed at Pacific Northwest National Laboratory (PNNL) to integrate radionuclide dosimetry models with environmental pathway analysis models. The resulting second generation of environmental dosimetry computer codes is compiled in the Hanford Environmental Dosimetry System (Generation II or GENII). Although the codes were developed for use at Hanford, they were designed with the flexibility to accommodate input parameters for a wide variety of generic sites.

The GENII system includes the capabilities for calculating radiation doses following chronic and acute releases, with options for annual dose, committed dose, and accumulated dose. Radionuclide transport via air, water, or biological activity may be considered. GENII is a deterministic computer code that can assess multiple exposure pathways and exposure scenarios.

2.4.3. FRAMES

FRAMES (Framework for Risk Analysis in Multimedia Environmental Systems) is a software platform used to link different computer codes required to perform an appropriate assessment. FRAMES is an open-architecture, object-oriented system that provides an environmental database. This software platform aids the

user in constructing exposure scenarios and exposure pathways applicable to site-specific situations. Furthermore, the software allows the user to choose the most appropriate codes to solve simulation requirements and presents graphical packages for analyzing results.

FRAMES currently contains sockets for a collection of computer codes that simulate elements of a source, fate & transport, exposure, and risk-assessment system. FRAMES provides data file specifications that describe how all site information is stored within the framework and passed between modules. These data file specifications are not associated with the model-specific information, only with the transfer of information between modules or other frameworks. The environmental transport and radiation dose computer codes currently available within the FRAMES software platform are MEPAS and GENII. SUM3 is an additional computer code available in the FRAMES software platform that supports probabilistic analysis.

2.4.4. SUM3

The FRAMES software is currently designed for deterministic environmental and human health impact models. The Sensitivity/Uncertainty Multimedia Modeling Module (SUM3) software product was designed to allow statistical analysis using the existing deterministic models available in FRAMES within the FRAMES platform. SUM3 randomly samples input variables and preserves the associated output values in an external file available to the user for evaluation. This enables the user to calculate deterministic values with variable inputs, producing a statistical distribution of results.

3. Model Selection Criteria

The following criteria will be used to assess the capabilities of 1) RESRAD 6.0, 2) DandD 2.0, 3) RAC Code and 4) MEPAS/GENII/FRAMES/SUM3 package of computer codes. These criteria will be applied to each of the computer codes independently. The computer code(s) that meets all or most of the criteria will be chosen for use over those computer models that meet few or none of the criteria.

These criteria were developed after reviewing the current literature on computer modeling and choosing criteria based on the literature. In general, the literature supported the use of computer models that comply with project-specific needs and that have been extensively tested. A major assumption in developing these criteria is that the RSALs will be developed based on radiation dose in a probabilistic manner in accordance with the NRC's License Termination Rule.

3.1. Criteria #1 - Does the model incorporate key processes from the Conceptual Site Model?

The Conceptual Site Model (CSM) is developed to illustrate how an individual can be exposed to radionuclides in the soil. This exposure is then translated into a radiation dose to the individual due to inhalation, ingestion and external irradiation from the radionuclides in the soils. The radiation dose caused by a certain soil concentration can then be translated into an RSAL.

The CSM must first show the configuration of radionuclides in soil so that the source term can be adequately modeled. At RFETS, the source of radionuclides in soils can be in either surface soils or subsurface soils. Therefore, the computer model must be able to assess these two soil horizons.

The CSM must then be able to trace the contaminant from the source to the exposed individual. At RFETS, the environmental transport mechanisms that must be assessed are surface water runoff, surface water stream transport, air resuspension, leaching in the vadose zone and ground water transport. Therefore, the computer model must be able to assess all of these environmental transport mechanisms.

The CSM must show all the exposure pathways through which an individual could be exposed. At RFETS, the exposure pathways of ingestion of soil, inhalation of resuspended soils, external irradiation of soils, ingestion of homegrown fruits/vegetables/grains and ingestion of meat and milk are the exposure pathways of interest at RFETS. Therefore, the computer model must be able to assess all of these exposure pathways.

The CSM has to include all the exposure scenarios associated with an individual. The exposure scenarios of interest at RFETS are the industrial office worker, recreational open space user, wildlife refuge worker, hypothetical future resident and hypothetical future resident rancher. The individuals associated with these exposure scenarios may be an adult, child or infant. Therefore, the computer model chosen to calculate the RSAL must be able to assess these exposure scenarios.

3.2. Criteria #2 - Does the model satisfy study objectives?

The study objective is to estimate the soil concentration that equates to an acceptable radiation dose for all applicable radionuclides over a study period of 1,000 years. Therefore, the chosen computer model must be able to trace a radionuclide through the environment to each applicable exposure scenario for a 1,000 year period. The maximum radiation dose in this period must be calculated, and the RSAL associated with this maximum concentration must be delineated. It would be ideal if the computer code chosen would perform this calculation automatically.

3.3. Criteria #3 – Has the model been verified using published analytical equations in scientific and technical journals?

Verification is the process of comparing model outputs with the solutions to analytical equations under the same conditions as the model was run. These results

need to be equivalent to assure that the analytical equations have been coded into the model correctly. The model chosen to calculate the RSAL should be verified.

3.4. Criteria #4 – Has the model been validated against known site conditions?

Validation is the process of determining how well the fate and transport model describes actual system behavior. Validation of the model can be achieved by matching model output to measurements. It involves the process of using a set of input parameter values and boundary conditions for a calibrated model to approximate, within an acceptable range, an independent set of measurements made under conditions similar to the model conditions. The model chosen to calculate the RSAL should be validated.

Benchmarking may be considered supporting information when assessing the validation of a model. Benchmarking is an exercise that consists of solving the same set of problems with several different computer models and comparing results.

3.5. Criteria #5 – Does the model have the capability to satisfy study objectives using probabilistic analysis?

There are two ways to assess radiation dose per the CSM requirements. The first method is to choose a single conservative value for each input parameter from the model. This is a deterministic analysis. Parameters chosen in a deterministic manner will produce a single conservative RSAL for each radionuclide in each exposure scenario. The second method is to choose a distribution of values for the most sensitive parameters from the model. This is a probabilistic analysis. Parameters chosen in a probabilistic manner will produce an output set of radiation dose distributions over time for each radionuclide in each exposure scenario. The model chosen to calculate the RSAL should have the capability to perform a probabilistic analysis.

3.6. Criteria #6 – Is the model well documented?

Documentation for each model should include: 1) A user's manual that discusses how to navigate through the model interface and 2) A technical basis document that outlines the technical aspects (including mathematical formulations) of the radiological source term, the environmental transport algorithms, the exposure pathways factors and the radiation dosimetry algorithms.

3.7. Criteria #7 – Is the model available in the public domain?

The model will need to be available in the public domain. This means that the model and its' documentation can be accessed either through a government agency or through a private company. There may also be a charge associated with the software. The model may not be experimental in nature and only available to select individuals.

4. Model Criteria Evaluation

The Model Selection criteria will now be applied to 1) RESRAD 6.0, 2) DandD 2.0, 3) RAC Code and 4) MEPAS/GENII/FRAMES/SUM3 package of computer codes independently. The results of applying these criteria to each computer model will be used to select the appropriate computer code to calculate the RSAL. The results of applying these model selection criteria are outlined in Table 1, "Model Selection Criteria Assessment," of Section 5.0.

4.1. RESRAD 6.0

4.1.1. Criteria #1 - Does the model incorporate key processes from the Conceptual Site Model?

RESRAD 6.0 can assess all aspects of the CSM applicable at RFETS. RESRAD 6.0 can trace a contaminant from its origin in soils to an exposed individual through all applicable exposure pathways. RESRAD 6.0 can assess radionuclides in surface soils and subsurface soils. RESRAD 6.0 can assess the exposure pathways of ingestion of soil, inhalation of resuspended soils, external irradiation of soils, ingestion of homegrown fruits/vegetables/grains and ingestion of meat and milk. RESRAD 6.0 can assess the industrial office worker, recreational open space user, wildlife refuge worker, hypothetical future resident and hypothetical future resident rancher exposure scenarios. RESRAD 6.0 can assess an adult, child and infant within the appropriate exposure scenarios.

4.1.2. Criteria #2 - Does the model satisfy study objectives?

RESRAD 6.0 can estimate the soil concentration that equates to an acceptable radiation dose for all applicable radionuclides over a study period of 1,000 years. RESRAD 6.0 can trace a radionuclide through the environment to each applicable exposure scenario for a 1,000 year period. The maximum radiation dose in this period can be calculated by RESRAD 6.0, and the RSAL associated with this maximum concentration can be delineated by RESRAD 6.0. RESRAD 6.0 can perform this calculation automatically.

4.1.3. Criteria #3 - Has the model been verified using published analytical equations in scientific and technical journals?

The series of RESRAD computer code has been extensively verified. Verification of RESRAD has included the following:

1. Argonne National Laboratory performed an internal verification of the RESRAD computer code using hand calculations before its initial release in 1989.
2. An independent verification of RESRAD was performed in 1994 and is documented in "Verification of RESRAD, A Code for Implementing Residual

Radioactive Material Guidelines, Version 5.03," HNUS-ARPD-94-174, Halliburton NUS Corporation, June 1994

3. Argonne National Laboratory is in the process of contracting for an independent Verification of RESRAD 6.0 that should be concluded in early summer 2001

4.1.4. Criteria #4 – Has the model been validated against known site conditions?

The RESRAD computer code has been extensively validated. Validation of RESRAD is documented in the following reports:

1. Analysis of BIOMOVs II Uranium Mill Tailings Scenario 1.07 with the RESRAD Computer Code, ANL/EAD/TM-66, Argonne National Laboratory, August 1997
2. Application of the RESRAD Computer Code to VAMP Scenario S, ANL/EAD/TM-70, Argonne National Laboratory, March 1997

BIOMOVs (BIOSpheric MOdel Validation Study) II is an international cooperative study to test models designed to quantify the environmental transfer and bioaccumulation of radionuclides and other trace substances. Scenario 1.07 of the BIOMOVs study is the culmination of numerous iterations among the members of this working group in developing a hypothetical scenario, comparing predictions of the intermediate scenarios, and refining and clarifying the scenario to arrive at a reasonably well-defined scenario to serve as the basis for comparison of deterministic predictions of the models participating in the study.

VAMP (Validation of Environmental Model Predictions) is an international program established by the International Atomic Energy Agency (IAEA) in 1988 to use data from the Chernobyl fallout to test and improve biospheric models. Scenario S involved the prediction of the radiological consequences of cesium-137 from Chernobyl-driven fallout in southern Finland.

RESRAD has been extensively benchmarked.

4.1.5. Criteria #5 – Does the model have the capability to satisfy study objectives using probabilistic analysis?

RESRAD 6.0 can assess radiation dose per the CSM requirements using deterministic and/or probabilistic analysis. RESRAD 6.0 has the capability to choose a single conservative value for each input parameter for the model to support a deterministic analysis. RESRAD 6.0 also has the capability to choose a distribution of values for the most sensitive parameters for the model to support a probabilistic analysis. RESRAD 6.0 can perform sensitivity analyses so that the most sensitive parameters can be delineated. RESRAD 6.0 has the capability to

produce an output set of radiation dose distributions over time for each radionuclide in each exposure scenario.

4.1.6. Criteria #6 – Is the model well documented?

RESRAD 6.0 is very well documented. The following reports have been published to support the use of RESRAD 6.0:

1. Probabilistic Modules for RESRAD and RESRAD-BUILD Computer Code, ANL/EAD/TM-91, Argonne National Laboratory, June 2000
2. Manual for Implementing Residual Radioactive Material Guidelines Using RESRAD, Version 5.0, Working Draft For Comment, ANL/EAD/LD-2, Argonne National Laboratory, September 1993
3. Data Collection Handbook to Support Modeling the Impacts of Radioactive Material in Soil, ANL/EAIS-8, Argonne National Laboratory, April 1993
4. Evaluation of the Area Factor Used in the RESRAD Code for the Estimation of Airborne Contaminant Concentrations of Finite Area Sources, ANL/EAD/TM-82, Argonne National Laboratory, July 1998
5. External Exposure Model Used in the RESRAD Code for Various Geometries of Contaminated Soil, ANL/EAD/TM-84, Argonne National Laboratory, September 1998

4.1.7. Criteria #7 – Is the model available in the public domain?

RESRAD 6.0 is available in the public domain. RESRAD 6.0 and its' documentation can be accessed through the Nuclear Regulatory Commission website at <http://www.nrc.gov/RES/rescodes.htm>. There is no charge associated with this software. The computer codes themselves can only be obtained with special permission from Argonne National Laboratory.

4.2. DandD 2.0

4.2.1. Criteria #1 - Does the model incorporate key processes from the Conceptual Site Model?

DandD 2.0 is a screening level computer code and therefore cannot assess all aspects of the CSM applicable at RFETS. DandD 2.0 can trace a contaminant from its origin in soils to an exposed individual through all applicable exposure pathways. DandD 2.0 can assess radionuclides in surface soils only and not subsurface soils. DandD 2.0 can assess the exposure pathways of ingestion of soil, inhalation of resuspended soils, external irradiation of soils, ingestion of homegrown fruits/vegetables/grains and ingestion of meat and milk. DandD 2.0 cannot assess the industrial office worker, recreational open space user, wildlife refuge worker, hypothetical future resident and hypothetical future resident rancher exposure scenarios. DandD 2.0 cannot assess an adult, child and infant

within the appropriate exposure scenarios. DandD only assesses an adult in a residential setting.

4.2.2. Criteria #2 - Does the model satisfy study objectives?

DandD 2.0 can estimate the soil concentration that equates to an acceptable radiation dose for all applicable radionuclides over a study period of 1,000 years. DandD 2.0 can trace a radionuclide through the environment to each applicable exposure scenario for a 1,000 year period. The maximum radiation dose in this period can be calculated by DandD 2.0, and the RSAL associated with this maximum concentration can be delineated by DandD 2.0. DandD 2.0 can perform this calculation automatically.

4.2.3. Criteria #3 – Has the model been verified using published analytical equations in scientific and technical journals?

DandD 2.0 has not been verified in a manner that can be documented.

4.2.4. Criteria #4 – Has the model been validated against known site conditions?

DandD 2.0 has not been validated or benchmarked. However, during the RSAL Working Group meetings in the past years DandD was compared to earlier versions of RESRAD, but no report validating its use was published.

4.2.5. Criteria #5 – Does the model have the capability to satisfy study objectives using probabilistic analysis?

DandD 2.0 cannot assess radiation dose per the CSM requirements per Criteria #1, but DandD 2.0 has the capability to incorporate deterministic and/or probabilistic analyses. DandD 2.0 though is meant to be a screening level computer model that has no inputs changed and gives a conservative cleanup level as output. DandD 2.0 has the capability to choose a single conservative value for each input parameter for the model to support a deterministic analysis. DandD 2.0 also has the capability to choose a distribution of values for the most sensitive parameters for the model to support a probabilistic analysis. The sensitivity analysis has already been performed for DandD 2.0, and distributions of values have been incorporated into the model for the most sensitive parameters. DandD 2.0 has the capability to produce an output set of radiation dose distributions over time for each radionuclide in each exposure scenario.

4.2.6. Criteria #6 – Is the model well documented?

DandD 2.0 is very well documented. The following reports have been published to support the use of DandD 2.0:

1. Residual Radioactive Contamination From Decommissioning: Technical Basis for Translating Contamination Levels to Annual Effective Dose Equivalent, Final, Volume 1, NUREG/CR-5512, US Nuclear Regulatory Commission, October 1992
2. Residual Radioactive Contamination From Decommissioning: User's Manual, Draft, Volume 2, NUREG/CR-5512, US Nuclear Regulatory Commission, May 1999
3. Residual Radioactive Contamination From Decommissioning: Parameter Analysis, Draft, Volume 3, NUREG/CR-5512, US Nuclear Regulatory Commission, April 1996

4.2.7. Criteria #7 – Is the model available in the public domain?

DandD 2.0 is available in the public domain. DandD 2.0 and its' documentation can be accessed through the Nuclear Regulatory Commission website at <http://www.nrc.gov/RES/rescodes.htm>. There is no charge associated with this software.

4.3. RAC Code

4.3.1. Criteria #1 - Does the model incorporate key processes from the Conceptual Site Model?

RAC Code can assess all aspects of the CSM applicable at RFETS. RAC Code can trace a contaminant from its origin in soils to an exposed individual through all applicable exposure pathways. RAC Code can assess radionuclides in surface soils and subsurface soils. RAC Code can assess the exposure pathways of ingestion of soil, inhalation of resuspended soils, external irradiation of soils, ingestion of homegrown fruits/vegetables/grains and ingestion of meat and milk. RAC Code can assess the industrial office worker, recreational open space user, wildlife refuge worker, hypothetical future resident and hypothetical future resident rancher exposure scenarios. RAC Code can assess an adult, child and infant within the appropriate exposure scenarios.

4.3.2. Criteria #2 - Does the model satisfy study objectives?

RAC Code can estimate the soil concentration that equates to an acceptable radiation dose for all applicable radionuclides over a study period of 1,000 years. RAC Code can trace a radionuclide through the environment to each applicable exposure scenario for a 1,000 year period. The maximum radiation dose in this period can be calculated by RAC Code, but the RSAL associated with this maximum concentration cannot be delineated by RAC Code (See Criteria #5).

4.3.3. Criteria #3 – Has the model been verified using published analytical equations in scientific and technical journals?

RAC Code has not been verified as a set of computer codes. The RESRAD baseline portion of RAC Code that has not been modified has been verified, but the RAC generated computer code has not been verified. The documentation listed in Criteria #3 for RESRAD 6.0 are applicable to this version of RESRAD. The RAC generated portion of RAC Code has not been verified in a manner that can be documented.

4.3.4. Criteria #4 – Has the model been validated against known site conditions?

RAC Code has not been validated as a set of computer codes. The RESRAD baseline portion of RAC Code that has not been modified has been validated, but the RAC generated computer code has not been validated. The documentation listed in Criteria #4 for RESRAD 6.0 are applicable to this version of RESRAD. The RAC generated portion of RAC Code has not been validated.

RAC Code has not been benchmarked as a set of computer codes. The RESRAD portion of RAC Code that has not been modified has been benchmarked though (See RESRAD 6.0, Criteria #4).

4.3.5. Criteria #5 – Does the model have the capability to satisfy study objectives using probabilistic analysis?

RAC Code can assess radiation dose per the CSM requirements using deterministic and/or probabilistic analysis. RAC Code has the capability to choose a single conservative value for each input parameter for the model to support a deterministic analysis. RAC Code also has the capability to choose a distribution of values for the most sensitive parameters for the model to support a probabilistic analysis. RAC Code can perform sensitivity analyses so that the most sensitive parameters can be delineated by using RESRAD 5.82 only. RAC Code, as presented, does not appear to have the capability to produce an output set of radiation dose distributions over time for each radionuclide in each exposure scenario.

4.3.6. Criteria #6 – Is the model well documented?

RAC Code is not a well documented set of computer codes. The RESRAD baseline portion of RAC Code that has not been modified is very well documented, but the RAC generated computer code is not well documented. The documentation listed in parts 2 through 5 of Criteria #6 for RESRAD 6.0 are applicable to this version of RESRAD. RAC Code is only documented through a

1.5 page README file that comes with the code. RAC Code is also documented through comments within the raw computer coding. This README file with the raw computer code comments is insufficient to run the RAC Code computer model.

4.3.7. Criteria #7 – Is the model available in the public domain?

RAC Code is available in the public domain. RAC Code and its' documentation can be obtained through the Rocky Flats Citizens Advisory Board. There is no charge associated with this software.

4.4. MEPAS/GENII/FRAMES/SUM3

4.4.1. Criteria #1 - Does the model incorporate key processes from the Conceptual Site Model?

MEPAS/GENII/FRAMES/SUM3 can assess all aspects of the CSM applicable at RFETS. MEPAS/GENII/FRAMES/SUM3 can trace a contaminant from its origin in soils to an exposed individual through all applicable exposure pathways. MEPAS/GENII/FRAMES/SUM3 can assess radionuclides in surface soils and subsurface soils. MEPAS/GENII/FRAMES/SUM3 can assess the exposure pathways of ingestion of soil, inhalation of resuspended soils, external irradiation of soils, ingestion of homegrown fruits/vegetables/grains and ingestion of meat and milk. MEPAS/GENII/FRAMES/SUM3 can assess the industrial office worker, recreational open space user, wildlife refuge worker, hypothetical future resident and hypothetical future resident rancher exposure scenarios. MEPAS/GENII/FRAMES/SUM3 can assess an adult, child and infant within the appropriate exposure scenarios.

4.4.2. Criteria #2 - Does the model satisfy study objectives?

MEPAS/GENII/FRAMES/SUM3 can estimate the soil concentration that equates to an acceptable radiation dose for all applicable radionuclides over a study period of 1,000 years. MEPAS/GENII/FRAMES/SUM3 can trace a radionuclide through the environment to each applicable exposure scenario for a 1,000 year period. The maximum radiation dose in this period can be calculated by MEPAS/GENII/FRAMES/SUM3, and the RSAL associated with this maximum concentration can be delineated by MEPAS/GENII/FRAMES/SUM3.

4.4.3. Criteria #3 – Has the model been verified using published analytical equations in scientific and technical journals?

The MEPAS/GENII/FRAMES/SUM3 computer code has been extensively verified. Verification of MEPAS/GENII/FRAMES/SUM3 has included the following:

1. Test Plan and Baseline Testing Results for the MEPAS 4.1 - Computed Source Term Release Module, Pacific Northwest National Laboratory, R. Taira, December 1999
2. Test Plan and Baseline Testing Results for the MEPAS 4.1 - Vadose Zone Transport Module, Pacific Northwest National Laboratory, J. McDonald, December 1999
3. Test Plan and Baseline Testing Results for the MEPAS 4.1 - Saturated Zone (Aquifer) Transport Module, Pacific Northwest National Laboratory, J. McDonald, December 1999
4. Test Plan and Baseline Testing Results for the MEPAS 4.1 - Surface Water (Non-Tidal River) Transport Module, Pacific Northwest National Laboratory, J. McDonald, December 1999
5. Test Plan and Baseline Testing Results for the MEPAS 4.1 - Atmospheric Transport Module, Pacific Northwest National Laboratory, J. McDonald & C. Fosmire, December 1999
6. Test Plan and Baseline Testing Results for the MEPAS 4.1 - Chronic Exposure Module, Pacific Northwest National Laboratory, R. Taira & S. Snyder, December 1999
7. Test Plan and Baseline Testing Results for the MEPAS 4.1 - Intake Module, Pacific Northwest National Laboratory, R. Taira, December 1999
8. Test Plan and Baseline Testing Results for the MEPAS 4.1 - Human Health Impact Module, Pacific Northwest National Laboratory, R. Taira, December 1999.
9. GENII "Conversion Testing, Verification, and Validation of Software" plan listing 42 tests performed as of 2/7/1989, Napier, 1990
10. Hand calculations performed to support acute models in GENII, Sawyer, L.H., T.A. Ikenberry, 1991
11. Hand Calculations performed on GENII to support NPR-EIS program, Nelson, I.C., L.H. Sawyer, T.A. Ikenberry. 1990.
12. GENII Hand Calculation Worksheets, version of February 2, 1994 , Peloquin, R.A., 1994.
13. Test Plan and Baseline Testing Results for the FRAMES User Interface, Pacific Northwest National Laboratory, R Tiara, December 1999
14. Test Plan and Baseline Testing Results for the FRAMES Viewers, Pacific Northwest National Laboratory, R Lundgren, December 1999
15. Test Plan and Baseline Testing Results for the FRAMES User Defined Source Module, Pacific Northwest National Laboratory, M. Eslinger, August 1999
16. Test Plan and Baseline Testing Results for the FRAMES User Defined Water Transport Module, Pacific Northwest National Laboratory, M. Eslinger, August 2000
17. Test Plan and Baseline Testing Results for the FRAMES User Defined Air Transport Module, Pacific Northwest National Laboratory, M. Eslinger, August 2000
18. Test Plan and Baseline Testing Results for the FRAMES User Defined Exposure Pathway Module, Pacific Northwest National Laboratory, M. Eslinger, August 2000

19. Test Plan and Baseline Testing Results for the Sensitivity/ Uncertainty Multimedia Modeling Module (SUM3). Pacific Northwest National Laboratory, R Taira, September 2000
20. An Approach to Ensuring Quality In Environmental Software, PNNL-11880, Pacific Northwest National Laboratory, G.M. Gelston, R. E. Lundgren, J.P. McDonald, B.L. Hoopes, May 1998

4.4.4. Criteria #4 – Has the model been validated against known site conditions?

The MEPAS & GENII computer codes have been extensively validated. Validation of MEPAS & GENII is documented in the following reports:

1. A Demonstration of the Applicability of Implementing the Enhanced Remedial Action Priority System (RAPS) for Environmental Releases, PNL-7102, Pacific Northwest National Laboratory, G. Whelan, J.G. Droppo, D.L. Strenge, M.B. Walter, J.W. Buck, December 1989
2. Summary Technical Review of the Multimedia Environmental Pollutant Assessment System (MEPAS), Prepared for the Office of Federal Facilities Enforcement US EPA, ICF Incorporated, November 1991
3. Validation of Models using Chernobyl Fallout Data from the Central Bohemia Region of the Czech Republic: Scenario CB (GENII Validation), IAEA-TECDOC-795, First Report of the VAMP Multiple Pathways Assessment Working Group, International Atomic Energy Agency, 1995
4. A Comparison of Environmental Radionuclide Concentrations Calculated by a Mathematical Model with Measured Concentrations (GENII Validation), PNL-SA-14720, In Proceedings of ANS Topical Conference on Population Exposure from the Nuclear Fuel Cycle. Oak Ridge, Tennessee. Jaquish, R. E., and B. A. Napier. 1987

MEPAS & GENII have been extensively benchmarked.

4.4.5. Criteria #5 – Does the model have the capability to satisfy study objectives using probabilistic analysis?

MEPAS/GENII/FRAMES/SUM3 can assess radiation dose per the CSM requirements using deterministic and/or probabilistic analysis. MEPAS/GENII/FRAMES/SUM3 has the capability to choose a single conservative value for each input parameter for the model to support a deterministic analysis. MEPAS/GENII/FRAMES/SUM3 also has the capability to choose a distribution of values for the most sensitive parameters for the model to support a probabilistic analysis. MEPAS/GENII/FRAMES/SUM3 can perform sensitivity analyses so that the most sensitive parameters can be delineated. MEPAS/GENII/FRAMES/SUM3 does have the capability to produce an output

set of radiation dose distributions over time for each radionuclide in each exposure scenario.

4.4.6. Criteria #6 – Is the model well documented?

MEPAS/GENII/FRAMES/SUM3 is very well documented. The following reports have been published to support the use of MEPAS/GENII/FRAMES/SUM3:

1. Multimedia Environmental Pollutant Assessment System (MEPAS) Guidance, Guidelines for Evaluating MEPAS Input Parameters for Version 3.1, Pacific Northwest Laboratory, June 1997
2. Multimedia Environmental Pollutant Assessment System (MEPAS) Formulations, Compilation of Mathematical Formulations for MEPAS Version 3.2, Pacific Northwest National Laboratory, February 1997
3. GENII Version 2 User's Guide, Pacific Northwest National Laboratory, January 1999
4. GENII Version 2 Software Design Document, Pacific Northwest National Laboratory, January 1999
5. Concepts of a Framework for Risk Analysis in Multimedia Environmental Systems (FRAMES), Pacific Northwest National Laboratory, October 1997
6. GENII Version 2 Sensitivity/Uncertainty Multimedia Modeling Module User's Guidance, Draft, Pacific Northwest National Laboratory, December 1998
7. Sensitivity/Uncertainty Multimedia Modeling Module (SUM3) User's Guide, Pacific Northwest National Laboratory, <http://mepas.pnl.gov:2080/earth/sum3/sum3ug/sum3ug.htm>.

4.4.7. Criteria #7 – Is the model available in the public domain?

MEPAS/GENII/FRAMES/SUM3 is available in the public domain. MEPAS/GENII/FRAMES/SUM3 and its' documentation can be accessed through the Pacific Northwest National Laboratory website at <http://mepas.pnl.gov:2080/earth/earth.htm>. There is no charge associated with this software for Department of Energy contractors. There is a charge for these computer models and documentation to the general public.

5. Conclusions

RESRAD 6.0 and MEPAS/GENII/FRAMES/SUM3 are the computer codes that satisfy all of the selection criteria. Therefore RESRAD 6.0 and MEPAS/GENII/FRAMES/SUM3 may be used to calculate RSALs at RFETS. Both of these computer models would produce accurate results for Rocky Flats parameters if selected. Results from using RESRAD 6.0 would be directly comparable to the results of past calculations of RSALs at the Site. Since RESRAD has previously been used at

RFETS to derive RSALs and the Public reviewing the RSALs is familiar with RESRAD, RESRAD 6.0 should be used to calculate RSALs at RFETS.

Table 1, "Model Selection Criteria Assessment," outlines each of the four computer models with the model selection criteria.

In February 2001 a report was prepared titled "RESRAD AIR CALCULATIONS" that compared the various air pathway calculations found in different versions of RESRAD and RAC-RESRAD. The study was designed to identify the differences in air pathway calculations and the resulting affect on the generation of a RSAL. The conclusion of the report was that the different implementations of RESRAD produce different RSALs, partly due to differences in the air pathway calculations, but more importantly, differences due to other factors and assumptions. The report states that "the new RESRAD formulation is based on more supportable assumptions that were derived using a well accepted dispersion formula. RAC Code's implementation produces air pathway calculation's **in the range** (emphasis mine) of new RESRAD but the resulting RSALs are highly sensitive to collateral assumptions, including the location of the receptor, the size of the contaminated area, and most importantly fire effects." In can then be concluded that the RAC Code and the new RESRAD are similar with respect to the air pathway calculations, and therefore should not be the deciding criteria.

Since RESRAD has been used at RFETS to derive RSALs and the Public reviewing the RSALs is familiar with RESRAD, RESRAD 6.0 should be used to calculate RSALs at RFETS.

In addition, it should be noted that the RFCA parties have agreed to calculate a matrix of potential RSALs using various scenarios, which fit in the risk range of 10^{-4} , 10^{-5} and 10^{-6} . The risk levels will be calculated using the standard slope factor method that has been employed by EPA for over 10 years. The method for performing this type of calculation is provided in EPA's "Risk Assessment Guidance for Superfund (RAGS)" Volume I (1989). This method of risk calculation has been reviewed by the National Research Council since 1983. The RESRAD model has the capability to calculate risk, is utilized to calculate risk-based action levels or cleanup levels, has been used at more than 50 sites in the U.S., and is used in EPA's proposed cleanup rule. The developers of RESRAD used EPA radiation slope factors referenced in RAGS in order in to construct this model. Thus, in addition to using RESRAD to calculate a dose-based action level, the agencies will also use the program to calculate risk-based values. However, as a check on the computer model, the agencies will input the standard slope factor equations into a spreadsheet utilizing a probabilistic interface called "Crystal Ball," and will perform the RSAL calculations in that manner. The Task 3 report will list all equations and parameters used for the spreadsheet calculations.

**TABLE 1
MODEL SELECTION CRITERIA ASSESSMENT**

Computer Model vs Selection Criteria	RESRAD 6.0	DandD 2.0	RAC Code	FRAMES MEPAS GENII SUM3
Criteria #1	YES	NO	YES	YES
Criteria #2	YES	YES	NO	YES
Criteria #3	YES	NO	NO	YES
Criteria #4	YES	NO	NO	YES
Criteria #5	YES	NO	NO	YES
Criteria #6	YES	YES	NO	YES
Criteria #7	YES	YES	YES	YES

6. References

ASTM, Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites, E1739-95e1, November, 1995

ASTM Technical & Professional Training, RBCA Fate and Transport Models: Compendium and Selection Guidance, 1999

DOE, Rocky Flats Environmental Technology Site, Human Health Risk Assessment Model Description, Operable Unit 3, Technical Memorandum No. 3, March 6, 1995

DOE, Rocky Flats Environmental Technology Site, Draft Description of Models for the Human Health Risk Assessment, Operable Unit 4, Technical Memorandum No. 5, March 1993

DOE, Rocky Flats Environmental Technology Site, Final Human Health Risk Assessment Model Description, Operable Unit 5, Technical Memorandum No. 13, November 17, 1994

EPA Fact Sheet: Documenting Ground-Water Modeling at Sites Contaminated with Radioactive Substances, EPA 540-F-96/002, January, 1996

EPA Fact Sheet: Computer Models Used to Support Cleanup Decision making at Hazardous and Radioactive Waste Sites, EPA/540/F-94-022, January, 1996

EPA Fact Sheet: Environmental Characteristics of EPA, NRC, and DOE Sites Contaminated with Radioactive Substances, EPA 540-F-94-023, January, 1996

EPA Fact Sheet: Environmental Pathway Models – Ground-Water Modeling in Support of Remedial Decision Making at Sites Contaminated With Radioactive Material, EPA/540/F-94-024, January, 1996

EPA Fact Sheet: A Technical Guide to Ground-Water Model Selection at Sites Contaminated with Radioactive Substances, EPA/540/F-94-025, January, 1996

Risk Assessment Corporation, Task 2: Computer Models, Final Report, July 1999

RESRAD AIR CALCULATIONS, Prepared for KH by Radian International, February 2001

~~128~~
~~128~~