# RFCA Stakeholder Focus Group
# Meeting Agenda

**When:** **May 9, 2001 3:30 - 6:30 p.m.**

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

| | |
|---|---|
| 3:30-3:40 | Agenda Review, 4/25 Meeting Minutes Review, Objectives for this Meeting |
| 3:40- | RSAL Working Group Update |
| | RSALs Task 4 Report, New Science |
| | End State Discussion, Options (Continued) |
| | Health Effects Workshop Update |
| | Break |
| 6:20-6:30 | Set Future Agendas and Review Meeting |
| 6:30 | Adjourn |



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# RFCA Stakeholder Focus Group
# Attachment A

| | |
|---|---|
| Title: | Agenda for April 11, 2001 Focus Group Meeting |
| Date: | April 5, 2001 |
| Author: | C. Reed Hodgin<br>AlphaTRAC, Inc. |
| Phone Number: | (303) 428-5670 |
| Email Address: | cbennett@alphatrac.com |

# RFCA Stakeholder Focus Group
# April 25, 2001
# Meeting Minutes

## INTRODUCTION AND ADMINISTRATIVE

A participants list for the April 25, 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.

Reed then asked if there were any questions or comments regarding the March 28, 2001 meeting minutes. There were none cited.

Reed reviewed the meeting revised agenda, which included:

- Radioactive Soil Action Level (RSAL) Working Group Workshop Update
- RSAL Workshop (4/27-28/01) Update
- Health Effects Workshop Update
- Task 1 Peer Review and Response
- End State Management Discussion
- Set Future Agendas and Review Meeting

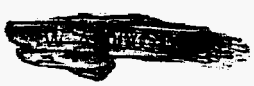
## RSAL WORKING GROUP WORKSHOP UPDATE

Reed identified the objectives for the RSAL Working Group Workshop Update:

- Inform Focus Group About Workshop Results
- Get Feedback From Focus Group

Tim Rehder, U.S. Environmental Protection Agency (EPA), updated the Focus Group on the RSAL Working Group and its progress in establishing parameters for RESRAD model input. Tim distributed a summary table showing the values currently agreed upon by the Working Group (Appendix B). The values in the table apply to two of the





land use scenarios being evaluated: the rural resident scenario and the wildlife refuge worker scenario.

Tim noted that each input parameter had been identified as a point value or a probability distribution function (PDF). Where PDFs are applied, the type of distribution is noted. References and sources of data are also indicated.

Tim stated that the results for mass loading (used in air resuspension) had just been determined and are attached to the summary table.

Tim indicated that the parameters would be discussed in detail at the April 27 – 28, 2001 Workshop.

Tim stated that, with internal agreement on the parameters, the RSALs Working Group would proceed to the dose and risk calculations. He expects the analyses to be completed in the next two weeks, with a draft report ready for distribution to the Focus Group by the end of May 2001.

A member of the Focus Group asked if the input values resulting from new science would be addressed in the RSALs Task 4 report. Tim responded that the development of parameter values from the new science would be documented in the RSALs Task 3 report.

Reed asked that the RSAL Working Group update the RFCA Focus Group on its progress in setting the input parameters and calculating dose and risk values at the next Focus Group meeting.

## RSAL WORKSHOP (4/27-28/01) UPDATE

Ken Korkia updated the group on the upcoming Public Workshop on RSALs, planned for April 27 – 28, 2001 at the Westin Hotel in Westminster. Workshop planning is complete and success is expected. The agenda for the two-day meeting is:

Day 1 (4/27/01)

- Informational / educational presentations
- Two case studies: John Till's work at RFETS and Dr. Higley's study at Johnson Atoll
- Demonstration of the RESRAD 6.0 code
- General presentations on the development of models and their bases
- A more focused presentation and discussion on the specific application at RFETS

Day 2 (4/28/01)

- Identification and discussion of specific modeling issues of concern
- Conclusions and next steps

Ken distributed workshop notebooks to those attending the event.

## HEALTH EFFECTS WORKSHOP

Mary Harlow, City of Westminster, presented the results of an initial planning session for a Health Effects Workshop (Appendix C). She indicated that the purpose of the Health Effects Workshop would be to examine the current state of the science of radiation health effects, with a focus on recent developments.

The members of the Focus Group discussed possible topics and presenters for the Workshop.

Suggested topics for the workshop included:

- Relation Of Risk To Health Effects
- What Are Allowable/Acceptable Risks
- The Science and Politics of Dose Models (ICRP30 & ICRP72)
- The Epidemiology of Health Effects

Potential presenters at the workshop might include Dr. Antone Brooks, Dr. Owen Hoffman and Dr. Steve Wing. Information may also be obtained from or presented by John Till, Dr. Robert Bistline, and possibly from presenters on a recent similar panel at Brookhaven National Laboratory.

Mary closed the discussion with a note that the planning would continue. All members of the Focus Group were invited to participate. Mary promised to get the word about planning discussions out through AlphaTRAC's distribution channels.

## RSAL TASK 1 PEER REVIEW

Reed began the topic by listing objectives for the discussion:

- Hear Agency Responses to the Task 1 Peer Reviews
- Hear Key Issues and Changes Made to the Task 1 Report
- Discuss the Revised Report as a Group
- Get "Final Word" From Focus Group Members
- Close the Discussion of the Task 1 Report at the Focus Group.

Tim Rehder briefed the Focus Group (Appendix D) on the current status of the Task 1 (Regulatory Analysis) report. He also identified key comments made by the peer reviewers and members of the Focus Group.

Tim summarized significant aspects of the regulatory analysis:

- It did identify the National Regulatory Commission (NRC) rule or the State's decommissioning rule as an Applicable or Relevant and Appropriate Requirement (ARAR); it is not applicable to the site, but it is relevant and appropriate. EPA and the U.S. Department of Energy (DOE) agree.
- With respect to the regulatory analysis and the proposal for an RSAL, the RSAL does have to meet the 25 mrem dose requirement; that is, 25 mrem to an anticipated future user.

- When the RSAL is triggered, an As Low As Reasonably Achievable (ALARA) analysis will be required for each project. It recognizes the fact that there is a preference for unrestricted release.
- The RSAL must also meet the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) protectiveness requirement; that is, 10-4 to 10-6 risk range.
- The only way the RSAL will be based on the 25-mrem dose is if in fact the risk associated with that dose falls inside the risk range.
- The RSAL proposed in the regulatory analysis is based on an anticipated future user; that being a wildlife refuge worker. When an action is triggered, an ALARA analysis will be conducted to determine if the ALARA goal can be reached, which will be based on a rural resident scenario.

Tim reminded the Focus Group that the RSALs being calculated in this activity are for surface soils only. RSALs for subsurface soils will also have to be determined, but in a separate, later process. Tim also noted that the RSALs are not intended to be protective of water quality – protection of water quality will also be addressed separately. He also reminded the group that RSALs are action levels and do not necessarily represent final cleanup levels.

A brief discussion followed this part of Tim's presentation. The discussion focused on the choice of land use scenario for an anticipated future user. Some members of the Focus Group indicated that the resident rancher would be a more appropriate scenario because it is a more conservative (protective) scenario and the lifetime of the contamination is very long. The questions of what time period is associated with "reasonably anticipated" was brought up and discussed. Tim indicated that the intended time period could be identified, but was unavailable for today's meeting.

Tim then identified key review comments from the peer reviewers and Focus Group members:

- Who is the RSAL intended to protect?
- How does the RSAL relate to water protection?

- Is it appropriate to use the NRC rule? In that, it was primarily on the subject of whether the NRC rule and the dose limits within the NRC rule are in fact protective.
- Institutional controls are not discussed in detail in the report.
- The choice of risk level - 10-4, 10-5, and 10-6 - remains open.
- The wildlife refuge worker scenario is not a done deal yet.
- Subsurface and surface water.
- Multiple Tiers. Right now the proposal doesn't talk about retaining a two-tiered system for RSALs. There is sentiment among DOE and the Colorado Department of Public Health and Environment (CDPHE) as well as some members of the community that a multi-tier system would be useful.
- The ultimate cleanup levels would not be decided in this document.
- The concept of dose and its applicability.
- The issue of what are permitted exposures, assuming institutional control failure.
- The concept of the average member of the critical group.
- Is the proposal consistent with the Wildlife Refuge Act?
- Should the resident rancher be the driving scenario?
- What sort of periodic reviews will / should be conducted?

Tim referred the Focus Group to the peer review response document for a more detailed analysis. He indicated that no significant changes had been made to the most recent revision of the Task 1 report in response to the comments.

The members of the Focus Group then held a discussion about the Regulatory Analysis.

One important topic was the time period associated with "foreseeable future" for the "reasonably anticipated land user." The CERCLA 5-year review and the NRC rule's mention of 1,000 years were both noted. Members of the Focus Group noted that this was important because it is expected that contamination will remain and institutional controls will be in place. The eventual failure of institutional controls – before the lifetime of the contamination is over – was a major concern to the members of the community.

The issue of ALARA was also discussed at length. Tim indicated that the RFCA parties agree that the approach to ALARA is an open issue. ALARA has historically been a workplace concept and its application to cleanup is relatively new. The Focus Group agreed that ALARA and its place in the regulatory picture for cleanup should be further addressed.

The issue of when to apply ALARA was also discussed. A Focus Group member asked, and the agencies confirmed, that ALARA would be applied in almost every cleanup action. However, it was a concern for several Focus Group members that ALARA will apparently only be addressed in contaminated areas that exceed the RSAL. It was felt important that ALARA also be examined for locations that are contaminated but do not exceed the RSAL. It was felt by some that the uncertainties in long-term future land use and dose / risk estimates would argue for application of ALARA at lower contamination levels than the RSAL. This led to a discussion of multiple tiers.

The history of multiple tiers, their introduction into the RFCA process, and their intent for use in prioritizing accelerated cleanup for an interim end state were discussed. The potential utility in the use of multiple tiers to trigger ALARA was investigated. The basic idea was to establish an RSAL that would trigger cleanup action, and a lower RSAL number that would trigger an examination of other actions and ALARA. The Group agreed that the issue of multiple tiers should be placed on the table for detailed discussion by the Focus Group.

The issue of "conservative" vs. "anticipated" land use was addressed further. Several members of the Focus Group reemphasized their support for the use of the resident rancher scenario as a conservative approach to setting the RSAL. One member noted that a "ranchette" scenario had been identified and suggested that it was a realistic alternative to the historically defined resident rancher scenario.

The issue of RSALs and water quality protection was addressed as well. The agencies confirmed that the RSAL was intended to be protective of human health, and that the RSAL alone will not be protective of water quality. The agencies are anticipating a combination of remediation and re-grading in specific areas for protection of water quality.

A member of the Focus Group asked if the agencies were regulatorily required to set the RSAL at a risk level of 10-4. Tim responded that there was precedent for working at a lower risk level (more toward the 10-6 end of the range).

The Focus Group next conducted a Round Robin to get each member's "last word" on the Task 1 Regulatory Analysis report. Reed emphasized that this was not the end of public input, but only closure of the discussion at the RFCA Focus Group so that it could move on in its agenda.

John Ciolek: When I started here, I was interested in the RSAL process. I came in a little bit late. Listening to the regulatory analysis was informative. I think what I learned from that was it really doesn't matter because the RSAL is just a value that you're going to choose. Many people have brought up in the past they're more concerned about what the final cleanup level is going to be. Once you choose an RSAL, you go in there and start cleaning that up, the 903 Pad is the best example, you're going to be down to below that level. They're going to have the soil cleaned up well below any future land use scenario you can imagine. However, right next to it is contamination that they haven't touched or considered and that's going to be there.

Having not combined the cleanup level and the RSAL level, I think you're at pretty huge risk at upsetting many of the public around there.

Hank Stovall: From a regulatory standpoint, regulators migrate toward the upper end of the risk spectrum as opposed to the lower end. I'm not sure I understand why there's a range of 10-4 to 10-6 risk, but it's unacceptable to migrate to the bottom end of the range and try to fly that. People always want the highest range, which is the highest density. In this case, the regulators would have to apply the highest risk, 10-4, as a cleanup level. My view is it should be more of a higher range [toward the 10-6 risk level] as opposed to the lower end range. And I think the way we get there is through the ALARA process.

Gerald DePoorter: I think the approach that's outlined in that report is a good approach. My only concern is that there should be a multi tier system where you've got an RSAL and how you treat the areas that aren't at that level. I would favor going to a

2-tiered system, where you base one tier at one end of the risk range and the other tier at the other end of the risk range, and when you reach that first tier, that's where you apply ALARA.

Jerry Henderson: I think it [the Task 1 Report] answers a lot of questions but raises two big ones we see up on the board [multi-tiers and RSALs]. This group needs to prioritize those and discuss them so those questions can be answered before the public comment period of the RSAL review.

Ken Korkia: I second what Hank Stovall said.

Leroy Moore: I will second the comment that Hank Stovall made and add something. The topic we haven't really talked about is the relation between the RSAL and the cleanup level. I hoped what the agencies move toward is to make those as close to each other as possible in all cases so that there's not confusion and so that it's not a necessity to go back and clean something that met the RSAL, but maybe doesn't meet the cleanup level.

Mary Harlow: I think that there is difficulty with the NRC rule being applied to a plutonium cleanup site. I don't think we've covered some of the areas with that NRC rule as to what applied and what didn't apply to Rocky Flats. That would get into the ALARA discussion. I also think that we should be using 10-6 as the risk level to reach. I would like to see us get the best cleanup we can get without bankrupting the country. I don't want them to have to come back and do it again. Make sure that we're protected as an offsite community. Make sure that we're not going to have continual migration in our surface waters and that we're not going to have air emissions flowing into our communities. That's our big concerns.

Joe Goldfield: I think the regulatory analysis has to be rigorous and define its terms and have definite coordination between risk, between mrem's, and between the soil left in the ground. We're talking ephemeral things. We want numbers. I, with Hank, want to see what the RSAL results are at a risk level of 10-6. We need a definition. When we say 10-4 risk, how does that translate to mrem's? Also, the soil cleanup level must be coordinated with the risk factor and the mrem.

Tom Marshall: I'll also join the Hank club. In that vein, I wonder if applying the NRC rule at Rocky Flats is really the right thing to do. What we're doing is picking a higher-level action number and then seeing how low you can go from there. I think it would be better if you pick a very conservative action value and see how much of that you can contain.

John Marler: I think the people around the room know where the Coalition board members who participate in this forum are coming from. I would say that many of the principles that we discuss here are shared by the entire Coalition board. We will continue to need to work and try to better understand, once we have the numbers, how ALARA can be applied and what this means in terms of the Rocky Flats site.

The Focus Group discussed their path forward following the Round Robin. The members agreed that two regulatory-related issues remained open and needed discussion by the group:

- ALARA,
- Multiple Tiers.

The Focus Group asked its Agenda Group to place these issues on future Focus Group agendas.

## ROCKY FLATS END STATE - STEWARDSHIP

Reed listed objectives for the end state discussion at today's meeting:

- Inform Focus Group About Stewardship Thinking And "Baseline"
- Identify Options And Get Initial Feedback
- Identify Issues To Track/Discuss

Reed then summarized the intent and scope of the end state discussion. He indicated that the Focus Group would be defining the end state of the Rocky Flats Environmental Technology Site (RFETS) by first looking at key areas and examining the end state

implications of each of those areas. When those discussions are finished, the group will examine the interrelationships among the areas and get a holistic sense of the options and their implications. The first thing to do is to get information and data on each of these subjects:

- Surface contamination,
- Subsurface contamination,
- Surface water standards and management,
- Stewardship and post-closure obligations, and
- Groundwater.

John Rampe of DOE then began a presentation on "End State and Stewardship Overview" (Appendix E). He introduced four building blocks for end state decisions:

- RFCA,
- The Contract with Kaiser-Hill,
- The Baseline, and
- Other Regulatory Requirements.

John presented project baseline assumptions in four areas:

- Buffer Zone,
- Industrial Area,
- Surface Water,
- Stewardship.

The Focus Group discussed the end state options as the presentation was made.

The issue of building floor removal and evaluation of below-floor contamination was addressed. Kaiser-Hill indicated that contaminated floors would be removed, and that floors would be taken up as necessary to remove below-floor contamination. Uncontaminated floors would generally be left in place.

In the surface soil discussion, Kaiser-Hill stated that transportation and disposal costs will dominate the cost of surface soil remediation. DOE and Kaiser-Hill noted that some soil removed under ALARA might be sufficiently clean to use as fill at the site, avoiding the transportation and disposal costs.

This discussion led to concern on the part of some members about the degree to which the baseline and contract are being determined by assumptions about funding availability from Congress. They suggested that an alternative approach would be to put together the most technically sound cleanup plan, then sell the cost to Congress.

There was also discussion of the ability to use cost savings in other closure areas (such as Decontamination & Decommissioning (D&D) for remediation. DOE and Kaiser-Hill noted that this might be difficult, as the expectation is that cost savings would be returned to DOE for application at other cleanup sites (this being a premise of accelerated cleanup).

The time allocated to the end state dialog ran out while the group was partway through the discussion. The group decided to continue the discussion at the next Focus Group meeting.

## NEXT MEETING AGENDA

The Focus Group made the following agenda decisions:

- Discuss the New Science (Task 4) report at the 5/9/01 meeting (as already planned),
- Continue and conclude the End State Options and Stewardship discussion begun today at the 5/9/01 meeting,
- Discuss ALARA and multi-tiered RSALs at the 5/23/01 and 6/6/01 meetings,
- Defer the end state discussions planned for the 5/23/01 and 6/6/01 meetings as necessary to make room for the ALARA and multi-tiered RSAL discussions.

The Focus Group asked their Agenda Group to revise the ongoing agenda accordingly.

## ADJOURNMENT

The RFCA Focus Group meeting was adjourned at 6:35 p.m.

# RFCA Stakeholder Focus Group
# April 25, 2001
# Meeting Minutes

## Appendix A
## Participants List

# RFCA Stakeholder Focus Group
# April 25, 2001
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## Appendix B
## Tim Rehder: PDF Summary Table

# RFCA Stakeholder Focus Group
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## Appendix C
## Mary Harlow: Health Effects Workshop Presentation

# RFCA Stakeholder Focus Group
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## Appendix D
## Tim Rehder: RSALs Task 1 - Regulatory Analysis Presentation

# RFCA Stakeholder Focus Group
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## Appendix E
## John Rampe: End State and Stewardship Overview Presentation

# RFCA Stakeholder Focus Group
# April 25, 2001
# Participants List

| NAME | | ORGANIZATION / COMPANY |
|---|---|---|
| David | Abelson | RFCLOG |
| Christine | Bennett | AlphaTRAC, Inc. |
| Kent | Brakken | U.S. DOE - RFFO |
| Laura | Brooks | Kaiser-Hill Company, LLC |
| Lane | Butler | Kaiser-Hill Company, LLC |
| Kimberly | Chleboun | RFCLOG |
| John | Ciolek | AlphaTRAC, Inc. |
| John | Corsi | Kaiser-Hill Company, LLC |
| Carol | Deck | Kaiser-Hill Co, LLC |
| Gerald | DePoorter | RFCAB |
| Shirley | Garcia | City of Broomfield |
| Joe | Goldfield | RFSALOP |
| Steve | Gunderson | CDPHE |
| Mary | Harlow | City of Westminster |
| Jerry | Henderson | RFCAB |
| Reed | Hodgin | AlphaTRAC, Inc. |
| Ken | Korkia | RFCAB |
| Ann | Lockhart | CDPHE |
| Carol | Lyons | City of Arvada |
| John | Marler | RFCLOG |
| Tom | Marshall | Rocky Mountain Peace and Justice Center |
| Dan | Miller | Natural Resources and Environment Section<br>Colorado Department of Law |
| LeRoy | Moore | RMPJC |
| John | Rampe | U.S. DOE - RFFO |
| Tim | Rehder | US EPA |
| Mark | Sattelberg | US Fish and Wildlife Service |
| Kathy | Schnoor | City of Broomfield |
| Dave | Shelton | Kaiser-Hill Company, LLC |



**RFCA Stakeholder Focus Group**
**Participants List**

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

| | | |
|---|---|---|
| Noelle | Stenger | RFCAB |
| Honorable Hank | Stovall | City of Broomfield |
| Scott | Surovchak | US DOE |
| Alexander | Willliams | DOE-HQ |

**MEMORANDUM**

TO: RFCA Focus Group Members

FROM: Shirley Garcia
Mary Harlow
LeRoy Moore

SUBJECT: First Meeting of Health Effects Workshop Planning Committee

DATE: April 18, 2001

Shirley, LeRoy and Mary met on April 12, 3:30 p.m. at the Rocky Flats Coalition of Local Governments Office to start outlining a process for a one day Workshop geared to providing a community, as well as focus group, education on radiation science, (health effects of high and low energy exposures to radiation) and to focus in on what is currently known and what is not known in this area as well as ongoing studies. Focus group members have expressed an interest in having a workshop on this important topic as a part of the current regulator Radionuclide Soil Action Level review process. Focus group members that are interested in helping to plan this workshop are urged to attend the next meeting which will be set after the April 25th focus group meeting. (Bring your calendar)

Outlined Below are some of our thoughts. We would appreciate your review of this information and feedback at the next Focus Group meeting on April 25, 2001 as to the who, what, when, where addressed in this memorandum. We would like to minimize expenses as much as possible. The goal is to provide a forum where workshop attendees will have the opportunity to hear top national scientists provide current information on what science currently knows and does not know about radiation health effects and how to compensate for the uncertainty

**When**: Saturday June 2 or Saturday June 9

**Where**: City of Westminster or City of Broomfield facilities. Whichever is available.

**Who** (Possible List of Presenters…Others?)
We are proposing three presenters with perspectives from current research, epidemeology and policy for the proposed workshop. Having three speakers would allow enough time for good presentations and follow-up discussion.

**Dr. Antone Brooks**, Science Advisor to the DOE Low Dose Research Program Professor, Environmental Science Department, Washington State University at Richland. He is a Member National Council on Radiation Protection and Measurement Member of the National Academy of Sciences Committee, "Biological Effects of Ionizing Radiation (BIER VI)" Bio for Dr. Brooks will be sent out by email.



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**Dr. Steve Wing**, Associate Professor, Department of Epidemiology, University of North Carolina, Chapel Hill. Dr. Wing has an extensive Bio, that will be emailed.

**Dr. Owen Hoffman**, President, SENES Oak Ridge Inc. Center for Risk Analysis. He has worked for both the public and private sectors in quantifying risk from exposure to radiation. Member of the National Council on Radiation Protection and Measurements and a corresponding member of the International Commission on Radiological Protection. Bio will be forwarded when received.

**WHAT** (proposed topic areas, others?)

- Biological response to low doses of radiation and plutonium exposures. Topic will be focused on what science currently knows and does not know about health effects of exposures

- Current information that is known about the genetic factors that affects the susceptibility of individuals and populations to damage from low-dose radiation.

- Possible pathways for exposure.

- Radiation protection standards ICRP 72 and ICRP 30 – Differences between the two and justification for changes made to ICRP 30.

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# Regulatory Analysis

- NRC Rule is a Relevant and Appropriate Requirement
  - So 25 mRem/yr dose requirement must be met
  - ALARA Analysis will be required for each project
  - There is a preference for unrestricted use.





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# Regulatory Analysis

- The RSAL must also meet the CERCLA protectiveness requirement (RSAL must fall within the risk range of 10-4 to 10-6)
- If 25 mRem/yr is not within the risk range, the RSAL will be based on a value within the Range

# RSAL/Cleanup Level Proposal (surface soil)

- RSAL will be based on the anticipated future user (wildlife refuge worker)
- When an action is triggered

  (contamination > RSAL) ALARA analysis will be performed to determine if cleanup can be achieved that will support unrestricted use.
- An ALARA Goal will be calculated using a rural resident scenario.

# RSAL/Cleanup Level Table

| Land Use | 25 mRem | 10-4 | 10-5 | 10-6 |
|---|---|---|---|---|
| **Refuge Worker** | **?** | **?** | **?** | **?** |
| Open Space User | ?/? (child/adult) | ? | ? | ? |
| Office Worker | ? | ? | ? | ? |
| **Rural Resident** | **?/? (child/adult)** | **?** | **?** | **?** |
| Resident Rancher | ?/? (child/adult) | ? | ? | ? |

# The RSAL is Not the End All Number

- This RSAL is meant to apply to surface contamination. A subsurface RSAL will be developed later
- The RSAL is not meant to protect surface water. A comprehensive strategy protecting surface water will be developed.
- In most cases it does not represent a cleanup level for surface soils.

# Comments on the Regulatory Analysis

- What is the purpose of the RSAL (who is it meant to protect)
- How does RSAL relate to water protection
- Is it appropriate to use NRC Rule (especially the dose limit)
- Institutional Controls are not discussed in detail

# Comments continued

- There are still open issues such as:
  10-4, 10-5 or 10-6
- Wildlife Refuge not a done deal
- Subsurface and surface water
- Multiple Tiers
- Ultimate Cleanup Levels

# Comments Continued

- Concept of Dose
- Permitted Exposure assuming IC failure
- Average Member of Critical Group
- Is Proposal Consistent with Wildlife Refuge Act?
- Shouldn't Resident Rancher be the driving scenario?
- What about periodic reviews?

# End State and Stewardship Overview

Joe Legare and Jeremy Karpatkin

RFCA Focus Group

April 25, 2001

# The Situation

- How much contamination will remain at Rocky Flats at the conclusion of the cleanup? What steps will be taken to assure that this residual contamination does not pose a health risk to a future user or an offsite individual in the short and long run?
- How can DOE, the regulators and the community work together to understand interrelated end state issues and make better informed, holistic decisions on end state?
- Funding limitations are real. The Site is unlikely to receive funds beyond the ~$4 billion currently budgeted for contract completion.

# Building Blocks for Decisions

- RFCA
- The Contract
- The Baseline
- Other regulatory requirements

# RFCA Intermediate Site Condition (2008 to 2021)

(from RFCA preamble)

- All nuclear material and TRU waste removed
- all buildings down or reused
- all other waste safely stored or removed
- cleanup consistent with presumed land use of open space and/or limited industrial use
- surface and ground water leaving site safe for any and all uses
- surface water on site safe for any and all uses

# Contract End State -- Physical Completion (for target cost, schedule and scope.)

- Buildings down (except those with mission)
- All IHSSs remediated according to RFCA
- All waste removed
- Closure caps for landfills, solar ponds and 700 area or other remediation per RFCA
- Building foundations & other structures covered by minimum of three feet of fill after final grade
- Surface water on site will meet health based standard based on open space use
- Water leaving site meets current WQCC water standards
- Assumptions regarding overall quantities of waste generated throughout project

# Project Baseline Assumptions

- Buffer Zone
  - Remediated to Tier 1 (651 pCi/g Pu for 903 pad)
  - Ponds B1, B2 and B3 sediments removed
  - no other major surface rad remedial actions beyond 903 pad
  - Evapo-transpiration caps over old and current landfills
  - enhancement of SID south of the 903 pad
  - all unneeded groundwater monitoring wells abandoned
  - continued operation and maintenance of passive groundwater treatment systems
  - Remove contents of ash pits

# More project baseline assumptions

- Industrial Area -- clean to Tier 1
  - Original Process Waste Lines
    - ~20% of lines removed
    - balance left in stable condition (no pathway or no contamination)
  - Under building contamination -- clean to Tier 1
  - Building Foundations
    - all removed to three feet below final grade
    - below three feet removed if contaminated
    - below three feet left in place if free-releaseable
  - Solar pond evapo-transpiration cap
  - clean building rubble used as fill
  - no cosmetic regrading

# More Baseline Assumptions

- Surface Water
  - ponds --
    - in place; passive management
    - additional retaining structure at Indiana Street
  - standards
    - 0.15 pCi/l offsite
    - 141 pCi/l on site
  - wetlands
    - not used for water protection
    - no funds for offsets or maintenance

# More baseline assumptions

- Stewardship -- post closure infrastructure
  - Ponds in place with New Dam at Indiana
  - South Interceptor Ditch in place
  - 3 caps (landfills and Solar Ponds Area)
  - Some Original Process Waste Lines
  - clean rubble recycled as fill
  - clean foundations
  - passive groundwater treatment systems
  - Roads
    - east and west access roads remain
    - other paved roads and parking lots removed
    - buffer zone dirt roads remain but not maintained
- Post closure obligations outside of KH scope

# Other Regulatory Considerations

- Final Site Record of Decision
- Post RFCA Agreement
- CERCLA Five Year Review
  - maintenance of engineered barriers
  - environmental monitoring
  - review of remedies for protectiveness
  - review of Institutional Controls
  - public involvement

# The Cleanup Options that Affect End State

- Surface Soil Remediation
- Subsurface Soil Remediation
- Surface Water Protection
- Stewardship (post closure oversight, maintenance, monitoring and communication.)
- Other

# Options -- Surface Soil

- No excavation (engineered controls only)
  - tilling
  - enhanced vegetation
  - application of fixatives
  - covers
  - fencing
- Excavation levels for 903 pad (most of surface soil scope)
  - 651 pCi/gram Baseline (RFCA Tier 1)
  - 115 pCi/gram (RFCA Tier 2: ~ $13-$17 mil.)
  - 80 pCi/gram (RAC: ~$18 - $23.5 mil.)
  - 35 pCi/gram (RAC: ~$47 - $61 mil.)

# More Options -- Surface Soil

- Alternatives to offsite disposal
  - big cost of removal is shipping and disposal, not excavation
  - use excavated soil at low RSALs for fill in building basements, or use CAMU (the lower the RSAL, the more options may become available)
- Other factors -- water management options, ecological impacts and mitigation
- Precise costs for these factors not known

# Options -- Surface Water Management

- Standards
  - Change standard to reflect new EPA cancer slope factors, or actual uses
  - measured at current Points of Compliance or elsewhere
  - go to mass loading
  - go to longer averaging periods
- Configuration of final water management system
  - maintain ponds as is
  - focus offsite with additional retention facility (~$10 mil)
  - focus on site with regrading, ditches, wetlands, etc.

# More Options - Surface Water Management

- Additional remediation as a surface water management strategy
- Recontouring/revegetation of Industrial Area
- Basic studies (water balance, land configuration, AME, others) will help better define the range of options.

# Options -- Sub-surface soil

- Main targets are process waste lines and under building contamination
- Should we employ different cleanup levels at different depths (higher standard at surface, lower standard deeper below ground)?
- Should we undertake different actions based on extent of contamination, volume of contamination and presence of pathway?

# Options -- Stewardship

- Implementation of any of the options discussed affects the DOE stewardship profile
- What form should the DOE presence take?
  - Rocky Flats museum
  - Renewable Energy
  - Ownership of residual contamination
- CERCLA Review
  - Frequency, intensity and independence of review
  - Citizen oversight and involvement in review
- Institutional Controls: is a wildlife refuge enough?
- Information Retention and accessibility

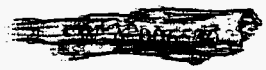
# Other

- How to ensure that remediation and management scope isn't lost if other portions of the project overrun cost and schedule?
- How to apply cost savings from other parts of project to remediation and management?
- How much sampling is enough?

# RFCA Stakeholder Focus Group
# Attachment B

| | |
|---|---|
| Title: | Meeting Minutes for April 25, 2001 Focus Group Meeting |
| Date: | May 8, 2001 |
| Author: | C. Reed Hodgin<br>AlphaTRAC, Inc. |
| Phone Number: | (303) 428-5670 |
| Email Address: | cbennett@alphatrac.com |





**Attachment**
**National Defense Authorization Act (NDAA) Long-Term Stewardship Report**

Comments/Issues on the NDAA Report Rocky Flats Environmental Technology Site (RFETS) section provided by the City of Broomfield.

1. Page 85, 1.1 Site Description and Mission, ¶2

   DOE has to perform a NEPA analysis for land use decisions and this process can be taking place now. The Comprehensive Risk Assessment (CRA) will play a major role with the NEPA process. Define the identified criteria DOE will have in the analysis and the process for determining the alternative analysis.

2. Page 87, 1.1 Site Description and Mission, ¶ 1

   The Closure Project Baseline assumes that three closure caps will be installed over the Solar Ponds, the Original Landfill, and the Present Landfill. The City of Broomfield cannot support the use of caps at this time. Broomfield has requested additional information pertaining to the type and use of proposed caps to formulate an informative decision on the subject.

   More information is required to determine the type of caps to be installed over the contaminated sites. The caps must meet the requirements of a "Subtitle C Landfill" or meet the equivalent criteria. We have yet to see any scientific data pertaining to evapo-transpiration caps utilized within this area. More information is needed such as:

   - ✓ Expected life-cycle of the proposed caps (evapo-transpiration & routine caps)
   - ✓ Required O&M
   - ✓ Specific engineering criteria
   - ✓ QA/QC criteria
   - ✓ Type of physical inspections (Checklist)
   - ✓ Preventive vector intrusion
   - ✓ Access restrictions
   - ✓ Security (include signs)
   - ✓ Sampling criteria (SAP, DQOs, Validation, Review of Data, Reporting)
   - ✓ Stakeholder annual review of identified parameters to guarantee the integrity of the engineered controls
   - ✓ Corrective Actions
   - ✓ Funding
   - ✓ Emergency Response (Identify all possible scenarios such as flooding, fires, accidents, etc.)
   - ✓ Identified Project Manager and core team
   - ✓ Training
   - ✓ Hold points to be identified in Burn Plan, Vegetation Plan, and any other identified plan that may impact the integrity of the cap(s)

1/15

- ✓ Identify specific modeling utilized to determine the migration path of the contaminant(s) and the length of time for the contaminant to be treated

The proposal for the use of evapo-transpiration caps is based on what science and/or technology? The issues with standard industry caps used within the area should be identified and alternative solutions should be explored to correct deficiencies with standard industry caps.

3. Page 87, 1.1 Site Description and Mission, ¶2

   The document states DOE, the EPA, and the CPHE are currently unable to commit to clean up to background levels. "These Agencies will continue to explore new technologies to make further cleanup possible." The document implies technology does not exist to clean up to background levels today. The technology does exist, but the budget does not allow for clean-up to background levels. Costs for short-term remedies should be compared against the costs to maintain long-term stewardship. We have yet to see the dollar values. Further cleanup in the long-term future is addressed, but there will be no funding to allow for additional remediation in the future. The process for procuring additional money has yet to be identified.

4. Page 87, 1.1 Site Description and Mission, ¶3

   The third paragraph addresses remaining contamination at the Site and states the contamination is derived from similar sources. Are the sources similar contaminants or similar sources of contamination? The sources of contamination are not similar in that they may come from beneath the Solar Ponds, landfills, PA, OPWLS, groundwater plumes, or 903 Pad. The document states the remaining contamination may be spread across various media, such as groundwater, soils, and facility foundations. We need to know the impacts and ramifications of the contamination associated with facility foundations. The foundations being porous may act as a sponge to capture the COCs for a length of time, thus reducing COCs within groundwater and soils during monitoring evolutions for a specific time period. At a later date, the foundations will degrade and release the COCs and due to previous analytical data, sampling may have been suspended. This scenario needs to be captured within the CAD/ROD and Contingency Plans. DOE must show due diligence in protection of human health and the environment.

5. Page 88, 1.2 Site Cleanup and Accomplishments, ¶3

   Characterization of the Buffer Zone is not identified. The process for the CRA needs to be clearly defined and must include COCs remaining within the groundwater, foundations, soils, and vegetation. How can the CRA be performed if there is insufficient modeling and characterization of the site? How will the site be delisted if COCs remain? At what time will delisting take place? The ROD needs to clearly define DOE as the responsible party for delisting of the site. In addition, DOE has to be the responsible party for perpetuity of the contaminants and the site.

6. Page 88, 1.2 Site Cleanup and Accomplishments, ¶ 4

The RFCA Integrating Decision Document (RIDD) will be completed in 2003. This document will define cleanup levels, establish the future land use scenarios, and describe the cleanup activities and remedial actions to close the site. Broomfield wants to ensure the RIDD is not a generic document, but a specific document that addresses each unique IHSS, PAC, or UBC area. The RIDD should include not only the range of activities, but also the choice of remedial activities and alternatives to the activities to envelop all scenarios if additional information is revealed. The RIDD as a minimum should include:

- ✓ Identified areas requiring remediation
- ✓ Level of contamination of each area
- ✓ Identified contaminants for each area
- ✓ Modeling performed for each area (such as AME, plume, water balance, etc)
- ✓ Identified corrective actions for each area (strategies, cleanup levels, holistic impact to the site, implications to long-term stewardship, O&M, training, etc.)
- ✓ Chosen remedy for each area and reasoning why the remedy was chosen (protection of human health and the environment, long-term stewardship implications, costs, public acceptance, life of the contaminant, etc)
- ✓ Alternative remedies for each area (may have new information/characterization and may need a backup plan)
- ✓ Determine if the actions meet the requirements of the CRA
- ✓ Contingency Plan

As new information about the site is made available or new science and technology is presented, can the RIDD be revised during the cleanup process? Clarify the RIDD process and stakeholder's input.

DOE should start compiling a list of long-term stewardship obligations and requirements for the CAD/ROD. Crucial to the document is the transition between K-H and the new subcontractor. Broomfield does not foresee Fish and Wildlife as the subcontractor of the areas with residual contamination. The subcontractor should be experienced with O&M and contingency plans associated with CERCLA/RCRA projects and programs. The Project Manager and team should be accessible to the activities and operations at all times.

7. Page 89, 1.2 Site Cleanup and Accomplishments, ¶ 2

Broomfield adamantly opposes the removal of the onsite detention ponds and conversion to wetlands after closure. It has been proven that the A, B, and C-Series Ponds have successfully acted as sedimentation ponds to capture radioactive contaminants. The removal of these ponds will take away the first line of defense for release of contaminants to offsite communities. Broomfield requests additional information related to the application of wetlands within an arid climate. To provide an more informative decision, Broomfield requests the following information:

- ✓ Provide historical data pertaining to the use of wetlands and the efficiency of radioactive contaminant removal (include sites, COCs, length of time used for treatment, etc.)
- ✓ Provide information on the amount of water needed to adequately maintain a viable ecological state for the wetlands
- ✓ Identify where additional water sources will come from if needed (water rights and costs to purchase the rights, funding, and the process)
- ✓ Identify the dormant season for wetlands and the length of the dormant season for this area
- ✓ Identify the season(s) of the year for this area in which there is a potential for high runoff, thus migration of contaminants
- ✓ Identify efficiency of wetlands during their dormant seasons
- ✓ Identify the efficiency of wetlands during periods of high runoff or flooding
- ✓ Identify the Contingency Plan for mitigation of releases offsite (funding, corrective actions, etc.)
- ✓ Identify the Contingency Plan if the wetlands do not function per assumptions

If the ponds are removed, how will they be remediated? Per the report, some of the ponds do have radioactive contaminants. Per the NDAA report, "the ponds are to be removed after closure." Who will perform the work? How will the project be funded? Will the "Site Water Balance Study" and the "Land Configuration Study" perform their studies with the proposed scenario of removal of onsite ponds? Broomfield requests the studies use several scenarios to evaluate the best strategy for final site closure and long-term stewardship. These decisions should be scientifically and technically sound. Broomfield requests that the Water Working Group be informed of the key issues and be part of the process to determine final closure activities at the site.

8. Page 89, Site Remediation Strategies, ¶ 1

"In IHSSs where it is technically or economically not possible to remove contamination to less than action levels identified in the RFCA, an engineered unit will be constructed to manage the residual hazard associated with the area." Define an example of where it is not technically possible to remove contamination at the site. Define the process for determining when remediation is not economically feasible. How are costs measured against long-term stewardship costs? Broomfield requests DOE provide the following information to better understand the decision making process for determining costs:

- ✓ Identified costs for remedy of an area with remaining residual contaminants
- ✓ Identified additional costs to remove additional residual contaminants (labor, equipment, disposal costs, etc.)
- ✓ Identified long-term stewardship costs
  - ➢ Project management
  - ➢ Subcontractor
  - ➢ O&M (sampling, inspections, preventive O&M, etc.)

- Training (Safety, Information, Qualifications/Certifications)
- Security
- Contingency Plans
- Replacement of filter media and disposal of media
- Plans and Procedures to use when treatment unit media is being replaced
- Ecological controls and monitoring
- Information and Records Management
- Review of engineered units operations and controls
- Review of new science and technology
- Annual review by stakeholders of analytical data, new science, and technology

Other remedy options are identified such as stabilization. Provide Broomfield with a scenario of where and how stabilization will be used.

9. Page 89, Site Remediation Strategies, ¶ 2

Groundwater engineered units are mentioned that represent a potential threat to surface water quality. Broomfield questions the efficiency of the Solar Ponds treatment unit. It is our understanding not all contaminated water is being captured by the unit. What are DOE's plans to correct this situation prior to closure? What measure is in place to identify any corrective actions? To address long-term stewardship issues and objectives, please provide the following information pertaining to the Solar Ponds treatment unit:

- ✓ Length of time required to operate the unit (include amount of times required to change out the filter media)
- ✓ Length of time for contaminants to migrate through the unit and be treated
- ✓ Modeling performed to determine how groundwater plumes migrate
  - Was the modeling performed with the revised location of the unit?
  - What other modeling was performed associated with this unit?
- ✓ The temporary modification allows for increased levels of nitrates through 2009. What are DOE's plans to ensure the water quality standard is meet by 2006? Will there be additional funding to ensure the standard is met?
- ✓ How will all the barriers and passive treatment systems be captured in the final CAD/ROD?
- ✓ Identify hold-points or associated issues with the treatment systems (sufficient flow for them to operate efficiently, change in final water balance, etc.)

Define the process for the placement of additional barriers and treatment systems for any other plumes. Identify alternative to the treatment units. Broomfield is apprehensive with the report stating additional barriers and treatment systems may be utilized to treat contaminated plumes from the Industrial Area. Until issues associated with the current treatment systems are resolved, the City does not have any confidence the additional barriers will function in their intended capacity. When treatment systems are utilized, Broomfield strongly believes the unit must meet water quality standards when the unit is in operation. With a limited amount of funding,

Broomfield wants to see the remediation done once. The objectives of the systems are to protect human health and the environment.

10. Page 90, Site Remediation Strategies, ¶ 1

If natural attenuation is proposed, define the modeling utilized to determine that natural attenuation will take approximately the same amount of time to treat contaminants as that of an active/passive treatment unit. Groundwater monitoring is conducted to monitor the progress of natural attenuation of the plumes. How are organic compounds that degrade into other compounds monitored? In the past, the process for monitoring contamination levels has not been clearly defined. The 881 Hillside CAD/ROD showed a linear reduction in levels of contamination, but the levels showed a routine seasonal spike in the data. The process needs to be clearly defined and understood to determine if natural attenuation is indeed occurring and is consistent with modeling parameters.

11. Page 90, Site Remediation Strategies, ¶ 1

The report discusses surface water management to include detention ponds and drainage ditches, which are monitored. When was the last time the sediment in the ditches and ponds were sampled? What were the concentrations of the contaminants? What are the depths of sediments within the ponds? What is the approximate sediment loading for the ponds? DOE has not been able to determine specific sources of contaminants in the past with elevated sampling results. How can Broomfield be assured the majority of sources have been removed by 2006 and the wetlands will stabilize the sediments during periods of high run-off or during dormant seasons? Artificial wetlands, if not adequately planned, are expensive and difficult to maintain. Provide information regarding the activities associated with maintaining wetlands and the success rate for survival of revegetated wetlands.

12. Page 90, Getting to Closure, ¶ 2, second bullet

The identified detention ponds will be dredged prior to 2006 per the NDAA report. Define the details of the dredging and the proposed schedule for the activity. If the sediment is radioactive by default, how will the material be dried to meet DOT criteria and disposal criteria? Are there any activities planned for the South Interceptor Ditch SID? What are the sediment loading parameters for the SID, or does most of the sediment settle-out in the C-series ponds? Has sediment within the SID ever been sampled? If sampling has occurred, what were the levels of contamination and the identified contaminants?

13. Page 90, Getting to Closure, ¶ 2, last bullet

What does the report infer by stating removal of all wastes and special nuclear materials from the site are subject to negotiation and agreement with the regulators? Is the plan referring to orphan wastes, SNM, or remediation wastes? How will the

regulators be part of the negotiation process if RFCA states all waste will be removed from the site prior to closure? Provide an example of waste type that may fit into this category. What plan is DOE currently drafting to address the disposition of orphan waste? Does the site have any waste streams that currently do not meet DOT requirements? Provide the City with an inventory of waste steams that do not have an identified disposal site or currently do not meet DOT or WAC criteria.

14. Page 91, Getting to Closure, ¶ 1

Define the process for characterizing and stabilizing process lines. The document states segments of lines with contamination levels below action levels identified in the RFCA will be stabilized in place. How will characterization inside pipes be performed? Characterization of pipelines per the IASAP is based on associated soil contamination. Incorporating long-term stewardship goals, contaminated pipes may break in the future and release contaminants into the environment or act as a pathway to contaminate groundwater. Again, the NEPA process is crucial because it evaluates soils and geology. If stabilization is performed, is the process going to be foaming? Will the foam be organic based? What is the life expectancy of the foam? At what depths will lines be left in place or removed? With process lines remaining, foundations remaining, and concrete rubble being dispositioned onsite, how will DOE evaluate residual contaminants for the CRA?

15. Page 91, Getting to Closure, ¶ 2

This paragraph contradicts the previous paragraph. The previous paragraph states the remediation strategy for underground lines will not focus on the integrity and precise location of each line. The second paragraph states characterization of UBC is based on the SAP that identifies underground lines and incorporates characterization needs associated with related contamination areas. If process lines are not identified or located, how can you develop a SAP? DOE should provide the needed details within the ERSAP and clarify the stewardship goals and objectives.

16. Page 91, Getting to Closure, ¶ 3

Broomfield wants to ensure the groundwater treatment systems' operations, maintenance, and associated activities are clearly identified within the final CAD/ROD to ensure protection of human health and the environment. Clearly defined parameters need to be acknowledged within the CAD/ROD to determine if and when corrective actions are required during the period of long-term stewardship. The report states "groundwater associated with all eight plumes is anticipated to require continued monitoring during the long-term stewardship period." Define the long-term stewardship period. The report shows funding will continue until the year 2070. The groundwater will still pose a health risk past 2070. Will the period end when all residual contamination and analytical data are below Tier I levels? Will treatment units be removed when they are no longer needed? Define the modeling utilized for groundwater plume migration and the length of time it will take for

residual contamination to no longer be a health risk. Parameters need to be identified for both treatment units and natural attenuation. With the information provided by DOE that contaminants will be left in place, the assumption the City formulates is *long-term stewardship will continue until perpetuity.* How does DOE draft a long-term stewardship plan to meet goals and objectives for perpetuity?

17. Page 91, Getting to Closure, ¶ 4

Define the timeframe for the concentration of contaminants in groundwater to meet regulatory limits, i.e. for three consecutive sampling evolutions, one year, or per a specified timeframe. What is the protocol when there is insufficient water to sample? Broomfield wants to ensure the sampling protocol and procedures meet the regulatory drivers and all sampling parameters are clearly identified to ensure chosen remedies meet water quality standards. The processes to establish timeframes for groundwater treatment system operations and monitored natural attenuation of groundwater will need to be clearly defined in the ROD. **The ROD will not be drafted until 2006 or later.** Broomfield is concerned DOE is not considering a boilerplate at this time for relevant items to be integrated into the ROD. Again, Broomfield is concerned with the allocation of funding after FY 2006.

18. Page 91, Getting to Closure, ¶ 5

Broomfield requests more information on the proposed controls to manage surface waters onsite. How are well-designed passive systems consistent with the stakeholders' visions for future site uses as open space? Again, long-term stewardship decisions appear to have been made without using the stewardship tools to formulate a responsible evaluation.

19. Page 92, Getting to Closure, ¶ 2

Broomfield understands the inventory is dynamic and requests generation rates for D&D. For the identified waste inventory, what percentage of the wastes are legacy wastes and/or orphan wastes?

20. Page 92, 2.1 Long-Term Stewardship Activities

The City is concerned the transition from K-H to the new subcontractor is not distinct. Broomfield understands Fish and Wildlife will not be responsible for the areas requiring long-term stewardship activities. The management of site lands and natural resources is the responsibility of both the subcontractor and Fish and Wildlife. It is crucial to bring in the subcontractor at least six months prior to K-H's exit to allow for an exchange of information and orientation.

Stakeholders need to assist with the identification of POEs and POCs after final land configuration. The POEs and POCs should be clearly identified in the ROD. Dialogue needs to be encouraged to determine if the IMP should support the ROD, or

if the POEs and POCs should be in the ROD along with other sampling criteria to make them legally binding.

"The Federal government currently owns, **and may continue to own**, the entire site, including the Industrial Area and the Buffer Zone." Broomfield is adamant DOE **shall** continue to own the site for perpetuity. Broomfield strongly believes DOE should be responsible for long-term surveillance and maintenance and other long-term stewardship activities at the site throughout the period of long-term stewardship. A successor agency will be unacceptable. DOE needs to define the Project Management team and associated long-term stewardship activities. Organization charts with corresponding responsibilities and activities should be generated during the transition period to ensure all activities have been addressed. The last sentence on page 93 of the first paragraph does not identify surface water monitoring.

This final stewardship plan should include a checklist to describe activities to maintain control of residual contamination and the stewardship tools utilized to maintain the controls. Examples: fences, erosion controls (ditches, SID, wetlands, ponds, etc.), signs, ecological monitoring (Burns, PMJM, weed control, vector intrusions, thatch build-up, population management, seeding, etc.), security, waste management (treatment systems, solid waste, disposal, training, characterization, etc), O&M (pumps, caps, subsidence, sluffing, access to LTS areas, freeze protection, sampling, shipping/transport of samples, certified labs, validation of data, review of data, presentation of data on an annual basis if routine, etc.), Contingency Plans, and corrective actions.

21. Page 93, 2.1 Engineered Units, ¶ 1

The document does not identify the inspection timeframe for caps/covers. The report assumes caps/covers will be used, but does not identify the IHSSs in this section. DOE has not identified specific monitoring and maintenance action or their respective frequencies. The 'basis of cost estimate' is not inclusive of all activities associated with engineered units. The acknowledged activities associated with the caps/covers do not include corrective actions or Contingency Plans. The City anticipates engineered units will fail and the plan does not address this crucial issue, which is key to long-term stewardship. The bulleted activities reflect the installation of the units, not the surveillance and maintenance activities. Procedures, including QA/QC guidance, and training are an integral part of surveillance and maintenance.

22. Page 93, 2.1 Engineered Units, ¶ 2

Operations of the passive groundwater treatment and leachate collection system are discussed for the Present Landfill. Broomfield is concerned site security activities will be limited to weekly inspections of the sensitive areas. Another concern is monitoring and sampling personnel will conduct the security inspections. Define sensitive areas for the City. Will the monitoring and sampling team have adequate training and equipment to address security deficiencies? Broomfield would like to

see a draft checklist for the security inspection incorporated into the Long-Term Stewardship Plan.

23. Page 93, 2.1 Engineered Units, ¶ 3

The document states air sampling will be performed for the engineered units, if installed. Broomfield is concerned additional air monitoring will not be performed during the long-term stewardship period. Project specific monitoring must be performed to ensure each unit is functioning properly and protecting the environment. Sampling and analysis will be conducted in accordance with an air quality sampling and analysis plan and procedures. Broomfield would like to be part of the development process of the plans and procedures. The City is concerned only two analytes will be monitored and this is insufficient. The proposed engineered units to be capped/covered contain volatile organics and Broomfield request the list of monitored analytes be expanded to capture organic analytes to ensure NESHAP compliance. Does the cost estimate for air quality include maintenance and replacement of equipment?

24. Page 94, 2.1 Groundwater Treatment Systems, ¶ 1

If DOE intends to install additional groundwater barriers to treat groundwater migrating for the Industrial Area, what modeling will be used to determine the time period required to treat the groundwater? Will DOE integrate the Water Balance Study and Final Land Configuration Study prior to the modeling? Does the long-term stewardship cost estimate include the removal of the filter media and disposal of the media? Additional cost for equipment and transportation will be required to maintain the operations of the units. It may be best to schedule the replacement of the filter media in all the units at one time to reduce labor, transportation costs, and disposal costs. The document uses the term "classified" to mean "characterize". How will the media be characterized and by whom? How will the media be dried prior to shipment? A health and safety technician is identified as part of the services required to remove the spent iron. Will the health and safety technician be a RCT? Will the subcontractor provide a separate RCT and DOT qualified person to assist with the removal of the spent iron? If fences are not enclosing the treatment cells, how will DOE secure the units? How will the units be identified to warn the public of their location? Who will identify and verify the complex training requirements for the subcontractor? Broomfield assumes the subcontractor will have to have OHSA, DOT, HazCOM, Rad Worker, etc. to perform the job.

25. Page 94, Table of Chemical Constituents Monitored in Groundwater

Why aren't Archlors identified on the list? Does the list include the range of pesticides used at the site?

26. Page 95, Groundwater Monitoring Systems, ¶ 1

The final ROD needs to clarify the frequency of sampling for the groundwater monitoring systems. The Water Working Group needs to be involved in the development of the specifics for groundwater monitoring, which will be incorporated into the ROD. The parameters need to be explicit to ensure stewardship goals and objectives are met. Stakeholders must be part of the process for finalizing the IMP to ensure the procedure and the sampling schedule reflects a robust stewardship program.

27. Page 95, Surface Water/Sediment Management Systems, ¶ 1

See previous comments related to the dredging of two of the C-Series ponds item # 7. See item # 7 discussing the removal of the sediment ponds. The NDAA report states "surface water in the streams and wetlands will be sampled on a monthly basis, as indicated in the Integrated Monitoring Plan (IMP) for the site. Surface water will be sampled from eight onsite locations, including three stream segment locations and five wetland locations, for plutonium, americium, tritium, beryllium, chromium, silver, and cadmium." The City has a strong stake in the management and monitoring of surface water entering Walnut Creek. There has not been any dialogue identifying the future POCs or POEs. How can a decision be made determining using eight onsite locations without the final studies of the Land Configuration Plan or the Water Balance Plan being finalized? Describe the long-term stewardship process DOE used to conclude eight sites will be sampled. Provide the City with the information DOE reviewed to conclude eight sites are sufficient to protect water quality both onsite and offsite. Due to the temporary standard DOE has for nitrates, why are nitrates not identified on the list of analytes for surface waters? There is no discussion of sediment sampling within the onsite ditches or within the SID. Will ditch or SID sampling occur during periods of high runoff due to the information provided by the AME Group, which indicates actinides migrate by sediment transport?

28. Page 95, Surface Water/Sediment Management Systems, ¶ 2

What document will identify the owner's responsibility for maintaining water conveyance systems? How will owners be identified as responsible parties for conveyance systems? Are any owners located with an area that contains habitat for the PMJM? Does DOE plan to develop a HCP for the PMJM specific to the site and its activities? If the Water Management Closure Plan identifies a need for additional water to maintain the proposed wetlands, where does DOE intend to acquire additional water? Please explain the options DOE may propose for closure of the site's wastewater treatment plant and detention ponds. Broomfield understands per the baseline, the wastewater plant will be decommissioned prior to 2006.

29. Page 95, Institutional Controls, ¶ 1

The City believes the RFCA parties should commence a list of institutional controls (ICs) to manage residual contaminants. A study should also be drafted to provide information pertaining to ICs and methods to ensure stewardship goals are attained.

30. Page 96, Environmental Monitoring, ¶ 1

Define surface water aquatic monitoring. If DOE intends to spray approximately five percent of the site with pesticides annually, what will be the impact to surface water? How will the surface water be monitored? The use of controlled burns for the control of noxious weeds and thatch buildup is not identified in this section. Add the use of control burns as a method utilized to correct documented deficiencies during environmental monitoring. Erosion control measures need to be expanded to include inspections after a major storm event within a specified timeframe.

31. Page 96, Environmental Monitoring, ¶ 2

Environmental sampling personnel conducting physical inspections of the site will not have the equipment to perform corrective actions when the integrity of treatment units, caps/covers, wells, or site conditions are breached. An annual inspection of the site features is inadequate to maintain site security and protection of human health and the environment. The final ROD must identify inspection criteria, which will include inspections after a major storm event. Again, actinide migration is a key concern for the City of Broomfield. Inspection reporting will be included in a Five-Year Review Report per the NDAA document. A five-year review is inadequate. Broomfield requests inspection and analytical data be reported on an annual basis to stakeholders to ensure long-term stewardship goals are sustained.

32. Page 96, Record Keeping

Broomfield is concerned records will be maintained out-of-state and stakeholders will not have access to vital documents impacting surrounding communities. Records should always have backups in the event the originals are destroyed. Stakeholders must have a process to have records available to ensure long-term stewardship activities at the site are successful and the public's safety is being protected.

33. Page 96, 2.2 Assumptions and Uncertainties, second bullet

Broomfield is concerned the document references the Federal Government may not maintain ownership of the entire site property. One of the key institutional controls DOE has proposed thus far is to maintain the property as federal land to ensure long-term stewardship of sites remaining with residual contaminants. **DOE has to be a responsible steward for perpetuity**.

34. Page 96, 2.2 Assumptions and Uncertainties, sixth bullet

Broomfield is concerned with the approach of having passive water management systems (wetlands) in place of maintaining the sediment ponds. The addition of more active water management systems to meet water quality standards needs to be clearly defined. Alternatives other than passive treatment units need to be identified. Issues with previously installed units have raised questions as to the adequate treatment of

contaminants. Broomfield will be requesting modeling to ensure all water is being treated onsite to protect water quality onsite and offsite.

35. Page 97, 2.2 Assumptions and Uncertainties, third bullet

The document states, "It is likely that the current number of groundwater wells (89) required for monitoring purposes may be reduced in the future." What is this statement based on? Again, a stewardship decision is made without utilizing stewardship tools to develop a robust long-term stewardship plan.

36. Page 97, 2.2 Assumptions and Uncertainties, fourth bullet

Vehicle access is necessary to perform inspections and sampling at the site. If roads are not maintained, personnel will not be able to access crucial areas of the site during critical periods to ensure containment of contaminants. Snow depths, muddy conditions, and runoff may prevent personnel from traveling onsite. Key roads to sensitive areas with residual contamination have to be maintained.

37. Page 97, 2.2 Assumptions and Uncertainties, eighth bullet

DOE shall maintain ownership of the site to ensure funding and management of the site for perpetuity. This section implies DOE may not maintain ownership of the site.

38. Page 97, 2.2 Assumptions and Uncertainties, tenth bullet

Broomfield will continue to be involved with the Water Working Group and the Surface Water Working Group to ensure required sampling is specified in the *Integrated Monitoring Plan* (IMP) and the ROD.

39. Page 97, 2.3 Estimated Site-Wide Long-Term Stewardship Costs

The City is concerned with the cost estimates for long-term stewardship. Funding is not available for well maintenance or groundwater modeling. Why are there travel, vehicle, and lodging costs associated with required air quality monitoring? The site has several local people that can perform this task. How did DOE arrive at the 35.0 percent contingency cost? Does the information systems cost include the validation and review of analytical data? Operations costs do not seem to reflect costs to change out filter media, package the media, transport the media, and dispose of the media.

40. Page 99, 3.1 Groundwater

Broomfield is concerned with the results of the current passive treatment units onsite and that the units are not treating contaminated groundwater as per the predictions of the models. Water treatment units should be built to treat contaminated water and meet water quality standards. We do not believe the site has the means of collecting data to ensure the units are performing per predicted modeling. Broomfield is very

concerned with the Solar Ponds Plume Treatment System, and questions if it meets the objectives of long-term stewardship or current water quality standards. It is unacceptable that modeling over a 100-year period indicates nitrate levels will continue to exceed 100 mg/liter. The temporary standard will expire in 2009, which is after the 2006 closure, and Broomfield worries funding will not exist during this time period and corrective actions will not occur. The City on several occasions has voiced its concern with this matter and strongly believes DOE must look at alternative treatment systems to treat the Solar Pond Plume. Nitrates breed algae blooms, and we do not know the impacts of actinides and algae as migratory paths within the watershed.

41. Page 100, Groundwater

The document states the 903 Pad/Ryan's Pit Plume will be monitored for natural attenuation and the plume is not migrating. Define how data reflects contaminant migration is not occurring.

42. Page 101, Groundwater

Each of the identified plumes in the document that is using natural attenuation as a means of treatment, states, "in the event that ongoing groundwater monitoring indicates that the plume is migrating toward surface water, additional mitigation may be required for this plume." If new information is known after the 2006 closure date, what will be the process for acquiring additional funding? Define the process for initiating corrective actions. The City expects to be apprised of any water issues as soon as possible.

43. Page 101, Solar Evaporation Ponds

Contaminants identified for the ponds include uranium, nitrate, and chromium. Why are plutonium and beryllium not specified as contaminants? Has a complete characterization been performed underneath all five solar ponds? Please provide Broomfield with the data. Broomfield requests more dialogue about the use of a single evapo-transpiration cover for the ponds. The ponds were RCRA units and the cap/cover will have to meet stringent RCRA closure criteria. Does the proposed evapo-transpiration cover meet the same criteria? Please provide the City with information related to the proposed caps such as where it has been deployed, life expectancy, engineering criteria, identified deficiencies, and comparison to normally used caps for CERCLA sites.

44. Page 103, Original Landfill

Define the engineering criteria for the buttressing of the structure to maintain a cap on the steep slope of the landfill area. What additional criteria will have to be maintained to ensure the integrity of the cap? Inspection criteria of the cap and buttress will have to be an integral part of the inspection checklist of the Original

Landfill area. What additional erosion controls will be in place to maintain the integrity of the buttress? Erosion control measures are not captured in the budget.

45. Page 103, Facility Foundations

Define "some level of groundwater monitoring" will be performed that is associated with the facility foundation throughout the long-term stewardship period. What additional analytes do DOE foresee being sampled? Define where and how the IASAP addresses facility foundations.

46. Page 103, Contamination Specific Long-Term Stewardship Activities, sixth bullet

Define the timeframe for regular briefings to citizen groups. It may be helpful to define the process now and finalize it at closure.

47. Page 104, Contamination Specific Long-Term Stewardship Activities

The document does not address "Contingency Plans", and they are crucial to stewardship activities. Due to the life expectancy of the contaminants, we know engineered controls will fail during the stewardship period, and DOE needs to be proactive to protect human health and the environment. Broomfield does not want to see personnel reacting to failures of engineered systems, but rather be prepared for potential failure of the systems and act accordingly.

48. Page 104, Contamination Specific Long-Term Stewardship Activities

The document states specific long-term stewardship activities for each media or specific sites have not been determined at this point. Broomfield believes DOE should start to identify fixed activities now and as remedies are chosen, the variable stewardship tools can be applied to solidify the activities and goals for long-term stewardship. Broomfield's ultimate goal is to protect the public and the environment.

49. Page 104, Future Site Use

The City understands there is no legal requirement for DOE to maintain ownership of the site, but DOE will forever be responsible and liable for contamination remaining at the site. We are concerned the statement of not maintaining ownership of the site has been made several times within this document.

15/15

March 15, 2001

Tom Lukow
U. S. Department of Energy
Rocky Flats Environmental Technology Site
Highway 93, Building 460
Golden, CO 80403-8200

Re: National Defense Authorization Act (NDAA) Long-Term Stewardship Report to Congress

Dear Mr. Lukow:

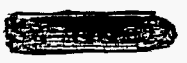
The City of Broomfield appreciates the opportunity to review and comment on the National Defense Authorization Act (NDAA) Long-Term Stewardship Report to Congress, addressing Rocky Flats Environmental Technology Site (RFETS) proposed long-term stewardship plans and activities. Broomfield considers this document to be the foundation for the *Long-Term Stewardship Plan* at RFETS. With remaining residual contamination onsite, Broomfield encourages a robust dialogue with stakeholders to ensure the site will remain in a safe configuration to protect human health and the environment for the life of the contaminants. The City staff has very thoughtfully and thoroughly reviewed this crucial document and has both general and specific concerns associated with this document.

**Transition between K-H and New Subcontractor**
The City is concerned the transition from Kaiser-Hill (K-H) to the new subcontractor is not distinct. Broomfield understands U. S. Fish and Wildlife Service will not be responsible for the areas requiring long-term stewardship activities. The management of site lands and natural resources is the responsibility of both the subcontractor and Fish and Wildlife. It is crucial to bring in the subcontractor prior to K-H's exit to allow for an exchange of information and orientation. The City requests a draft plan citing the specifics of the transition process and key issues to be addressed during the transition period.

**Funding for Long-Term Stewardship Activities**
The City has voiced concerns with the integration of D&D activities and ER activities to ensure the stewardship process is adequately being addressed. During this critical stage of closure, long-term stewardship decisions are a crucial part of the remedy selection process. Broomfield is concerned stewardship funding is not recognized in the project baseline, nor are there identified project managers or personnel with which Broomfield can dialogue or address issues







or concerns pertaining to long-term stewardship. As the Site nears closure, how will final stewardship decisions be made and by whom?

**Removal of Sediment Ponds**

Broomfield is opposed to the approach of having passive water management systems (wetlands) in place of maintaining the sediment ponds. Broomfield is concerned the proposed removal of the onsite sediment ponds and use of wetlands may provide a less effective method to manage surface water. History of the ponds reflects the positive removal of sediments from water being stored in the ponds prior to discharge offsite. If the ponds are breached and wetlands are anticipated to control migration of actinides, what studies or modeling have been performed to ensure actinides will not migrate offsite? Broomfield requests more information with the use of wetlands within this area. Please provide us with the following information: 1) viability of wetlands with an arid climate, 2) length of dormant period within this area, 3) wetlands' performance of sediment control during dormant periods, 4) effectiveness of wetlands during and after a major storm event, 5) active season for wetlands in this area, 6) maintenance criteria, 7) amount of water needed to maintain the proposed wetlands, 8) source of water to maintain the wetlands, and 9) success rate of revegetated wetlands within this area. It is Broomfield's understanding that this issue and all water management issues will be discussed and resolved in the Water Working Group.

**Federal Ownership of the Site**

The City is concerned with the possibility of DOE not maintaining "Federal Ownership" of the site. Several sections in the NDAA report elude to the fact DOE or any other federal entity may not maintain ownership of the land. Broomfield contends DOE will always be responsible for any residual contamination remaining at the site for the life of the contaminants.

**Sampling/Monitoring Criteria**

Broomfield is concerned with the results of the passive treatment units onsite and that the units are not treating contaminated groundwater as per the predictions of the models. The treatment units are to treat water to meet water quality standards, and we do not believe the site has the means of collecting data to ensure the units are performing as well as other treatment systems. Broomfield is very concerned with the Solar Ponds Plume Treatment System and questions if it meets the objectives of long-term stewardship or current water quality standards. It is unacceptable that modeling over a 100-year period indicates nitrate levels will continue to exceed 100 mg/liter. The temporary standard will expire in 2009, which is after the 2006 closure, and Broomfield worries funding will not exist during this time period and corrective action will not occur. The City of Broomfield will continue to be part of technical working groups to guarantee the Integrated Monitoring Plan (IMP) is continually revised to ensure all sampling criteria is identified to meet the end state requirements. As DOE drafts the Long-Term Stewardship Plan, Broomfield will continue to act as a team member to assist with the identification of points-of-compliance, points-of-evaluation, sampling criteria for surface water, air, groundwater, and ecological monitoring.

**Security**
The NDAA report states that an annual physical inspection of the site will be required and the sampling team will perform the inspections. Annual inspections are not sufficient. Broomfield is concerned the sampling team will not have adequate equipment or knowledge to perform crucial physical inspections.

**Final ROD**
Broomfield understands final remedies have not been determined, but DOE can start to generate a list of fixed long-term stewardship tools and associated criteria that will be required in the final ROD. A well-defined Contingency Plan will also have to be drafted to address potential deficiencies in engineered controls. The City wants to reinforce the need to have all stewardship activities and documents documented in the ROD.

In addition to these general comments, comments for specific sections of the NDAA report are provided in the attachment.

Thank you for the opportunity to comment on this crucial document. The City of Broomfield expects that we will continue to be involved, informed, and allowed to participate in the development of Rocky Flats Environmental Technology Site's Long-Term Stewardship Plan. The City anticipates the formation of a long-term stewardship technical group to address stakeholders' issues, concerns, and ideas. If you have any questions, please feel free to call me at 303-438-6329.

Sincerely,

*(Original signed by Shirley Garcia)*

Shirley Garcia
Environmental Services

Attachment

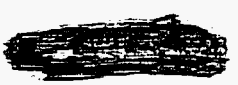
Pc: Hank Stovall, Broomfield City Council
Kathy Schnoor, City of Broomfield
Mike Bartleson, City of Broomfield
Mary Harlow, City of Westminster
Steve Gunderson, CDPHE
Steve Tarlton, CDPHE
Tim Rehder, EPA
Joe Legare, DOE
Ken Korkia, CAB
David Abelson, RFCLOG

# RFCA Stakeholder Focus Group
# Attachment C

| | |
|---|---|
| Title: | **City of Broomfield's Comments Regarding the Energy National Defense Authorization Act's (NDAA) Long-Term Stewardship Report to Congress, dated March 15, 2001, to Tom Lukow** |
| Date: | April 5, 2001 |
| Author: | Shirley Garcia<br>City of **Broomfield** |
| Phone Number: | (303) 438-6329 |
| Email Address: | sgarcia@ci.broomfield.co.us |

**Bolded = Revised**





# Summary

It is now becoming clear that relatively few U.S. Department of Energy (DOE) waste sites will be cleaned up to the point where they can be released for unrestricted use. "Long-term stewardship" (activities to protect human health and the environment from hazards that may remain at its sites after cessation of remediation) will be required for over 100 of the 144 waste sites under DOE control (U.S. Department of Energy, 1999). After stabilizing wastes that remain on site and containing them as well as is feasible, DOE intends to rely on stewardship for as long as hazards persist—in many cases, indefinitely. Physical containment barriers, the management systems upon which their long-term reliability depends, and institutional controls intended to prevent exposure of people and the environment to the remaining site hazards, will have to be maintained at some DOE sites for an indefinite period of time.

The Committee on Remediation of Buried and Tank Wastes finds that much regarding DOE's intended reliance on long-term stewardship is at this point problematic. The details of long-term stewardship planning are yet to be specified, the adequacy of funding is not assured, and there is no convincing evidence that institutional controls and other stewardship measures are reliable over the long term. Scientific understanding of the factors that govern the long-term behavior of residual contaminants in the environment is not adequate. Yet, the likelihood that institutional management measures will fail at some point is relatively high, underscoring the need to assure that decisions made in the near term are based on the best available science. Improving institutional capabilities can be expected to be every bit as difficult as improving scientific and technical ones, but without improved understanding of why and how institutions succeed and fail, the follow-through necessary to assure that long-term stewardship remains effective cannot reliably be counted on to occur.

Other things being equal, contaminant reduction is preferred to contaminant isolation and the imposition of stewardship measures whose risk of failure is high. While DOE can do much to assure that stewardship considerations become more pervasive in all aspects of DOE operations, many of the limitations in current capabilities pointed to in this report will likely require higher-level attention. Prominent among these are assured funding for long-term institutional management. Moreover, the current regulatory framework for waste site remediation appears to encourage a constrained and piecemeal approach that makes it difficult to assure that the broader needs of effective long-term institutional management get the consideration they deserve.

This study examines the capabilities and limitations of the scientific, technical, and human and institutional systems that compose the measures that DOE expects to put into place at potentially hazardous, residually contaminated sites. The committee finds that, at a minimum, DOE should plan for site disposition and stewardship

much more systematically than it has to date. At many sites, future risks from residual wastes cannot be predicted with any confidence, because numerous underlying factors that influence the character, extent, and severity of long-term risks are not well understood. Among these factors are the long-term behavior of wastes in the environment, the long-term performance of engineered systems designed to contain wastes, the reliability of institutional controls and other stewardship measures, and the distribution and resource needs of future human populations.

Because uncertainty is inherent in many of these areas, and because DOE's preferred solutions—reliance on engineered barriers and institutional controls—are inherently failure prone, step-wise planning for DOE legacy sites must be *systematic, integrative, comprehensive, and iterative* in its execution through time, *adaptive* in the face of uncertainty, and *active* in the search for new and different solutions. Planning for long-term institutional management should commence while remediation is underway. Ideally, its needs are taken into account as facilities are being designed and waste management operations initiated.

To the extent that long-term stewardship imposes costs and risks on future generations, questions of intergenerational equity are raised that should be recognized in current planning. Waste site remediation is appropriately left to future generations if risks are low, if it is impractical with currently available technology, or if it would impose unacceptable costs on society were it to be undertaken today. Remediation is inappropriately left to future generations if the risks are such that what is a tractable remediation problem today becomes much less so in the future as a result of events or changes in conditions that could reasonably have been foreseen. Unfortunately, for most waste sites, little information is presently available that facilitates well-considered examination of such tradeoffs. To the extent that long-term institutional management becomes a logical extension of today's waste management activities, as the committee believes it should, the need to confront such difficult tradeoffs should lessen. Developing new facilities and managing today's wastes with the needs of long-term stewardship in mind is an important aspect of the integrative approach embodied in the committee's framework for long-term institutional management.

This study uses the term *long-term institutional management* to refer to a planning and decision-making approach that strives to achieve an appropriate balance in the way it employs contaminant reduction measures, engineered barriers that isolate residual contaminants from the human environment and retard their migration, and places reliance on institutional controls and other stewardship measures. Decisions are guided by consideration of contextual factors that include:

- risks to members of the public, workers, and the environment;
- legal and regulatory requirements;
- technical and institutional capabilities and limitations, and the current state of scientific knowledge;
- values and preferences of interested and affected parties;
- costs and related budgetary considerations; and
- impacts on and activities at other sites.

To the extent that the above contextual factors constrain decisions, a well-functioning long-term institutional management system works to curtail those constraints that compromise the basic goal of containing and minimizing the risks that prevent unrestricted release of DOE sites.

The limitations of "hardware" systems and supporting scientific understanding are amplified by the inherent fallibility of the human and organizational systems upon which stewardship ultimately depends. For this reason, emphasis is placed in this report on the management systems for long-term planning and decision making at individual DOE sites. The report recommends that DOE apply five planning principles to the management of residually contaminated sites: (1) plan for uncertainty, (2) plan for fallibility, (3) develop appropriate incentive structures, (4) undertake necessary scientific, technical, and social research and development, and (5) plan to maximize follow-through on phased, iterative, and adaptive long-term institutional management approaches. For this purpose, a long-term commitment to both basic and applied research is needed. This research must address not only improvement of technical and human systems performance, but also basic scientific questions about the behavior of wastes in the diverse environments of the nation's nuclear waste sites. While there is no assurance that management systems will continue to be effective for the future, even short-term effectiveness cannot be assured without continued, adequate funding.

Numerous measures are necessary to assure that the integrity of engineered barriers intended to isolate wastes from the environment is maintained, that the behavior of unconfined wastes in the environment is as expected, and that unanticipated exposure pathways to humans or other sensitive species do not develop. Experience to date, both at DOE sites and at hazardous waste sites elsewhere, suggests that the tools available for these purposes are of doubtful technical effectiveness. The building of an effective long-term program for DOE legacy waste sites poses a substantial challenge to "remediation technology," broadly construed. It challenges the basic science upon which technological advance depends, as well as the knowledge of organizational and human behavior upon which our ability to design effective long-term management systems ultimately rests.

*The committee believes that the working assumption of DOE planners must be that many contamination isolation barriers and stewardship measures at sites where wastes are left in place will eventually fail, and that much of our current knowledge of the long-term behavior of wastes in environmental media may eventually be proven wrong. Planning and implementation at these sites must proceed in ways that are cognizant of this potential fallibility and uncertainty.*

How site planning and management should proceed, given this working assumption, is a primary focus of this report. DOE has not as yet developed in any detail the institutional arrangements through which long-term site management would be implemented. Nor have these arrangements been discussed very much among DOE and its partners in state and federal regulatory agencies, site host communities, affected Indian tribes, and environmental organizations. It is important that DOE involve its Site Specific Advisory Boards in its long-term stewardship planning as early as possible. Although the rationale for long-term stewardship at DOE waste sites has been put forward in a general way in several recent studies (Probst and McGovern, 1998; U.S. Department of Energy, 1999), no coherent framework for long-term planning at individual DOE waste sites has as yet emerged. This report tackles the question of the character of the management systems that the committee believes are necessary, applying information gleaned from numerous sites to develop a general conceptual approach that can be applied on a site-specific basis. While complex-wide integration and planning are also needed, the committee's framework is intended to apply primarily on the individual, site-specific level.

## WHAT IS LONG-TERM INSTITUTIONAL MANAGEMENT OF WASTE SITES?

Long-term institutional management is the committee's conception of an approach to planning and decision making for the management of contaminated sites, facilities, and materials. It represents the framework in which tradeoffs among contaminant reduction, reliance on contaminant isolation, and stewardship measures are made. The framework represents a synthesis of the committee's examination of what is and is not likely to work in long-term waste site management. It incorporates the measures available to site managers as remediation or stewardship planning moves forward, the factors that influence the site management choices made at particular points in time, and the iterative character of decision making through time as new information emerges or planned site end state goals are adjusted.

The committee's metaphor for balancing the three basic elements that waste-site managers have at their disposal—contaminant reduction, physical isolation of residual contaminants, and deployment of stewardship activities—is a "three-legged stool." These three basic sets of measures are represented by the stool's "legs." The goals or end state they are trying to achieve are represented by the stool's "seat," and the contextual factors listed earlier that constrain their use are represented by the "rungs." Metaphorically, the rugged terrain upon which the stool rests represents the variability of contamination scenarios within and among sites. This framework is developed in anticipation of the numerous questions DOE will face as it develops long-term plans for contaminated sites. *In all cases reviewed by the committee, current DOE remediation planning and planning for post-remediation stewardship can fit within the conceptual framework developed in this study. In no case, however, was planning and management as highly developed as the committee's framework suggests it should be.*

## WHY IS LONG-TERM INSTITUTIONAL MANAGEMENT NECESSARY AT DOE WASTE SITES?

For reasons that are technical, social, fiscal, and political, most DOE sites will not be cleaned up well enough to allow unrestricted release of the land. In a few cases the rationale for leaving contaminants in place includes a

judgment that the collateral environmental damage of available remediation technologies outweighs the benefits likely to be achieved. According to recent departmental estimates, 109 of the 144 DOE waste sites, including its largest sites (such as the Hanford Site in Washington, Oak Ridge Reservation in Tennessee, Savannah River Site in South Carolina, and Idaho National Engineering and Environmental Laboratory) are unlikely to become available for site-wide unrestricted use (U.S. Department of Energy, 1999). *The large inventory of sites requiring long-term management, the nature and complexity of many of these sites, coupled with the limitations of subsurface science, requires comprehensive and systematic planning that embraces the principles of long-term institutional management described in this report.*

The fiscal limitations that preclude more complete remediation are largely a matter of national policy. At some sites the preferred land uses following completion of DOE's mission are still being debated, while at others the future roles of the sites are under discussion (Probst and Lowe, 2000). Total cleanup costs are very sensitive to the nature of the cleanup end states selected, with large increments in estimated costs associated with moving sites from a restricted-access "iron fence" condition to the point where they can be released for unrestricted use (U.S. Department of Energy, 1996). Roughly $50 billion has been spent on remediation to date; a recent report prepared by the U.S. Department of Energy (2000b) estimates that the life-cycle costs yet to be incurred are approximately $151 to $195 billion.

By contrast, DOE officials view the long-term stewardship efforts, which are likely to rely heavily on land control, site surveillance, monitoring, maintenance, record keeping, and related activities, as inherently low cost. *The real long-term costs of site stewardship cannot be estimated with any confidence, however. Even after the details of a comprehensive long-term institutional management plan are in place, large uncertainties are likely to cloud true economic costs. In addition, equating long-term management costs with the costs of the specific stewardship activities envisioned over as long a peroid as several thousands of years fails to account for the societal costs of stewardship system failures (e.g., aquifers becoming contaminated by residual wastes whose propensity for off-site migration was not understood at the time active remediation ended). A well-designed long-term institutional management system should have as a goal the anticipation of stewardship failures and minimization of the costs and risks associated with them. It accomplishes this through investment in improving the management system itself, and in improved scientific understanding and improved remediation technology, each of which is capable of reducing these potentially large costs and risks to society in the future.*

At the larger DOE sites where local economic, political, and environmental factors already exert a strong influence on site decision making, the necessity for an integrated and forward-looking approach to long-term planning becomes especially clear. For example, growth in the Denver metropolitan region that is encroaching upon the Rocky Flats site, or the rapidly growing Las Vegas area that might one day look to areas around the Nevada Test Site for water. A different approach to long-term institutional management planning might be appropriate for sites where significant changes in the pattern of future uses are less likely. However, projections of future land uses and the values of members of the public must receive careful consideration, no matter where the site is located. At some sites, subsurface contaminants are now known to be migrating further from their sources than originally predicted, with future consequences that are not well understood at present.

## IMPLICATIONS OF SCIENTIFIC, TECHNICAL, AND INSTITUTIONAL CAPABILITIES AND LIMITATIONS FOR LONG-TERM INSTITUTIONAL MANAGEMENT

The site management measures that DOE has at its disposal, whether they are the "hardware" systems used for waste remediation and containment or the institutional systems under which all site activities occur, share the characteristic of being limited in what they can accomplish. Were contaminant reduction efforts able to perform at anything like their theoretical ideal, many of the site custodianship problems that DOE now faces would disappear. As a general rule, however, the greater the degree of decontamination, the greater the cost and, in some cases, the greater the worker risk and adverse environmental effects. Groundwater contamination is pervasive at DOE sites, and "pump and treat" operations, whether intended to reduce contamination levels or to retard migration, are expected to run for decades—or even centuries—to achieve their desired results.

In some cases, the lack of sufficient pre- or post-remediation characterization of either the wastes or the

environments into which they have been placed can render realistic estimation of the effectiveness of contaminant reduction measures nearly impossible. A key question for each site must be "How much characterization is sufficient to overcome this impasse?" A major concern is the adequacy of understanding of the physical and chemical properties of the environment in which contaminants reside and their transport through the environment over time. Mathematical modeling of contaminant fate and transport is an essential tool for long-term institutional management, but its track record to date at DOE sites, particularly where contaminants reside in the unsaturated, or "vadose" zone, has been mixed. This necessitates integration of a science and technology program into both site remediation planning (National Research Council, 2000b) and the activities that follow after remediation activities cease.

In situ engineered barriers are likely to be widely applied as the need for them is closely coupled to the extent to which contaminant reduction measures are effective. Once in place, the ongoing effectiveness of the systems that are emplaced to isolate and prevent the movement of contaminants depends on institutional management, typically in the form of monitoring and maintenance. Knowledge of the effective lifetimes of the materials and systems used in barrier design is limited, however, and comparatively little performance monitoring data exists. *The lack of experience with the long-term performance of engineered barriers, coupled with the heavy reliance being placed upon them at DOE sites, is another factor that necessitates an approach to long-term institutional management that actively seeks out and applies new knowledge.*

In situ barriers used to isolate long-lived contaminants from the environment will have to be not only maintained, but in some instances completely replaced. Initial emplacement of barrier systems must therefore take that possibility into account. *Irrespective of the management systems put in place in support of other aspects of long-term stewardship programs, physical barrier systems to keep hazardous wastes in isolation will require their own ongoing support from the institutional management system.*

Stewardship in its broadest sense includes all of the activities that will be required concerning potentially harmful contamination left on site following the completion of remediation. The issues for long-term institutional management include not only what will be done, but how, and when, and by whom. Institutional controls, often especially important elements of stewardship, consist mainly of land use or access restrictions, and they can take the form either of legal restrictions imposed through covenants, easements, and the like, or of physical restrictions, such as fences, warning signs, or the posting of guards. Stewardship is not limited to institutional controls, however. It also includes information management and dissemination, oversight and enforcement, monitoring and maintenance, periodic reevaluation of protective systems, and cultivating new remediation options.

Without constant attention, stewardship measures imposed today are not likely to remain effective for as long as residual contamination presents risks. It will, however, be very difficult to assure that proper attention continues over time. This means that stewardship and science—both basic science and applied science and technology research and development—are interdependent and must be managed together. *Site stewardship that includes the monitoring and encouragement of emerging new technologies and scientific breakthroughs for their relevance to further reducing the risks associated with residual contaminants would, over the long run, decrease the potential consequences of stewardship failures.*

Many weaknesses in institutional controls and other stewardship activities stem from inherent institutional fallibilities. Understanding and predicting the nature and pervasiveness of institutional fallibility, particularly where long-term attention to mission is required, is essential if the organizations charged with long-term management of waste sites are to be designed in ways that make them resistant to failures that compromise the safety of sites with residual wastes. *Because the organizational systems charged with long-term care and custodianship of hazardous materials and for some types of public goods have proven so fallible in the past, the research and development efforts that are part of long-term institutional management need to extend to the social, institutional, and organizational aspects of long-term management systems as well.*

## "BIGGER PICTURE" FACTORS THAT ARGUE FOR A LONG-TERM INSTITUTIONAL MANAGEMENT APPROACH

Long-term institutional management decisions are often constrained by contextual factors not easily controllable by site managers. These include risks, the state of scientific understanding, technical and institutional

capabilities, costs, laws and regulations, the views of interested and affected parties, and activities at other sites. The latter includes nearby contaminated sites, nearby lands outside the facility, receptor sites, and similar sites, particularly similar sites within the DOE complex.

The status of lands around a contaminated site, including the presence of other contaminated sites nearby, can strongly affect site disposition decisions. Often, however, the separation of sites for administrative purposes (e.g., into operable units or solid waste management units) conflicts with the logic suggested by a site's natural geography, hydrology, and geology. Changing land uses or resource consumption patterns beyond the administrative boundaries of a site, but within its natural environment, can both affect and be affected by the conditions of the site. Human-induced changes in hydrologic conditions, for example, may affect the ability of isolation technologies to keep soil contaminants out of groundwater. The combination of changing human demand for water, coupled with the induced change in the availability of contaminants to the same groundwater system, can thus create risks that might not otherwise exist. *Successful management of risks will require that the institutional management system be able either to anticipate and prevent such problems before they occur, or to detect and reverse the underlying changes before harm is done.* Whether either of these can be done reliably over the long term is open to question.

One way to attempt to overcome both technical and institutional limitations is to forge links between technical and institutional capabilities. The two can be mutually reinforcing in (1) the periodic reevaluation of site disposition decisions, and (2) the development of new technologies that lessen the dependence on fallible institutional arrangements that were necessitated by the technical limitations of the past.

## DESIGNING AND IMPLEMENTING A SITE'S INSTITUTIONAL MANAGEMENT SYSTEM

General design criteria exist that can help assure that a site's system of institutional management reflects an appropriate balance in the reliance it places on each of the three "legs" of the long-term institutional management "stool." Nine such criteria (discussed in Chapter 8) emerge from this study.

- *Defense in depth* refers to layering by using more than one measure to accomplish basically the same purpose, and redundancy by having more than one organization responsible for basically the same task.
- *Complementarity* refers to the support that each measure provides to the others.
- *Foresight* refers to the ability, despite uncertainties, to anticipate how the components of the system will or will not work individually and as a whole. Adjustments are then made beforehand or contingencies planned for accordingly.
- *Accountability*, which extends to both the public and government authorities, requires both a willingness to be made answerable and the technical means to identify and correct performance defects.
- *Transparency* means that the basis for site management decisions is clear and that the public has the opportunity to review and comment on these decisions before they are finalized. Transparency lays the groundwork for accountability.
- *Feasibility* refers to having an institutional management system that is technically, economically, and institutionally possible to implement within a specific time period.
- *Stability through time* refers to the likelihood that, based on reasonable estimates, the individual components of the site management system and the system as a whole will continue to perform as initially configured.
- *Iteration* refers to the concept that the whole system requires periodic reexamination to determine whether the various parts of a site's protective system are functioning as expected and whether system performance can be improved.
- *Follow-through* and *flexibility* refer to a commitment to taking innovative action to correct or redirect a site's management system when a need is identified.

In addition to these design criteria, there are other characteristics that institutional management systems should have that fall into the category of implementation criteria—that is, attributes of the system that, if included, increase chances that it will be successfully implemented and maintained over time. These include:

- *Clear objectives* and a desire on the part of those responsible for institutional management to carry out those objectives with *diligence over time*.
- A *clear system of governance* that specifies what is to be done and by whom and is founded on precepts that are enduring on the one hand and flexible on the other.
- An *integrated overall approach* that coordinates activities across the responsible entities and assures that site management measures are complementary rather than conflicting.
- *Incentives* both within and outside the institutional management organization to encourage diligence in carrying out mission objectives.

The mechanisms for creating and implementing effective long-term institutional management do not necessarily have to be created "from scratch." Some mechanisms with at least some of the attributes mentioned here already exist, both within and outside of DOE, and others, such as the program within the DOE Environmental Management Office of Long-Term Stewardship, are coming into being. Nevertheless, a systematic approach is needed for the many challenges that such mechanisms will have to face to be overcome. By the same token, a number of other factors that do not appear as specific characteristics of institutional mechanisms are essential to maintain their effectiveness through time. These include, for example, positive incentive structures that encourage system personnel to behave in ways that reinforce the management system's basic purpose, and stable funding through time.

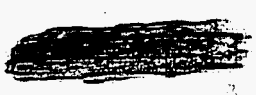
In conclusion, given that unrestricted use will not be possible for many DOE legacy waste sites, and given that decisions that affect sites' futures are often made under conditions of considerable uncertainty, the best decision strategy overall appears to be one that avoids foreclosing future options where sensible, takes contingencies into account wherever possible, and takes seriously the prospects that failures of engineered barriers, institutional controls, and other stewardship measures in the future could have ramifications that a good steward would want to avoid. A forward-looking strategy is essential because today's scientific knowledge and technical and institutional capabilities are insufficient to provide much confidence that sites with residual risks will continue to function as expected for the time periods necessary. "Cookbook" approaches are unlikely to be successful, and there is no "one size fits all" formula for successful institutional management. In designing long-term institutional management systems, flexibility, equity, efficiency, and environmental and human health protection objectives must be attended to, more or less simultaneously. Management strategies that are iterative and provide "follow-through" on these objectives over time enhance the chances that the ultimate health and safety objectives will be met.

7/7

# RFCA Stakeholder Focus Group
# Attachment D

| | |
|---|---|
| Title: | *Long-Term Institutional Management of U.S. Department of Energy Legacy Waste Sites* by the National Academy of Sciences |
| Date: | April 5, 2001 |
| Author: | Committee on the Remediation of Buried and Tank Wastes, Board on Radioactive Waste Management, National Research Council |
| Phone Number: | N/A |
| Website Address: | http://books.nap.edu/catalog/9949.html |





Date: Aug. 7, 2000
Contacts: Bill Kearney, Media Relations Associate
Shelley Solheim, Media Relations Assistant
(202) 334-2138; e-mail <news@nas.edu>

FOR IMMEDIATE RELEASE

# Long-Term Management of DOE 'Legacy' Waste Sites Presents a Significant Challenge

WASHINGTON -- The government's intended reliance on long-term stewardship to oversee its contaminated nuclear weapons sites is, at this point, problematic, says a new report from the National Academies' National Research Council. Details of the U.S. Department of Energy's (DOE) stewardship plans have yet to be specified, adequate funding has not been assured, and there is no convincing evidence that institutional controls -- such as surveillance of radioactive and other hazardous wastes left at sites, security fences, and deeds restricting land use -- will prove reliable over the long run.

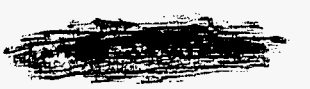
"Many weaknesses in institutional controls and other stewardship activities arise from institutional fallabilities," said Thomas Leschine, associate professor at the University of Washington, Seattle, and chair of the committee that wrote the report. "Understanding this and developing a highly reliable organizational model that anticipates failure while taking advantage of new opportunities for further remediation and isolation of contaminants remains a significant challenge for DOE."

"Moreover," added committee vice chair Mary English, research leader at the University of Tennessee, Knoxville, "DOE must undertake long-term institutional management of residually contaminated sites with the expectation that plans developed today will need to be periodically revisited."

Nearly 150 sites around the country are contaminated, a nagging reminder of the nuclear arms race. DOE has concluded that even after planned remediation activities are completed -- or found to be infeasible -- at these so-called "legacy" waste sites, 109 of them will never be clean enough for unrestricted use. The department recently established the Office of Long-Term Stewardship to protect indefinitely the people and environment surrounding these sites -- which are located in 27 states, Puerto Rico, and territorial islands in the Pacific.

DOE should begin immediately to plan for a broader institutional management





framework that equally balances contaminant reduction, physical isolation of waste, and custodial activities such as surveillance of waste migration, changes in the landscape, and human activity around the site, the committee said. Currently, DOE defines stewardship as something that begins after "closure" of a site when remediation is deemed finished, but ideally it should be considered while remediation strategies are still being formulated. The Office of Long-Term Stewardship has just begun its planning, though it is required by law to report to Congress on DOE's responsibilities by October 1.

Because the long-term behavior of contaminants in the environment is unpredictable and physical barriers may break down at some point, the committee urged DOE to develop its stewardship plans under the assumption that contaminant isolation eventually will fail. When institutional controls and other stewardship activities are required because of the fallibility of isolation, a precautionary approach should be adopted in which contaminant reduction is emphasized to address risks to human health and the environment.

No "one size fits all" formula exists for successful institutional management and decisions are likely to be made under conditions of considerable uncertainty, the reports notes. The best long-term management strategy overall appears to be one which avoids foreclosing future options, takes contingencies into account, and considers seriously the prospects of failure. It needs to be forward-looking because today's scientific knowledge and institutional capabilities do not provide much confidence that containment of sites with residual risks will function as expected indefinitely.

The long-term institutional management approach outlined in the report also calls for periodic re-evaluation of plans and research and development of new remediation technologies. Scientific breakthroughs outside DOE need to be monitored as well for their relevance to further reducing risks associated with residual contaminants. Equal attention should be given to social research that can be applied to the institutional and organizational aspects of this approach.

DOE officials view the long-term stewardship efforts that they have proposed so far -- which are likely to rely heavily on surveillance, maintenance, and record keeping -- as relatively inexpensive compared with the cost for initial remediation. But real costs cannot be estimated with any confidence since failures are likely to occur, the committee said. The goal of long-term institutional management should be to anticipate such failures and minimize the costs and risks associated with them.

Ongoing surveillance and environmental monitoring need to go beyond the boundaries of
a site, the committee emphasized. For example, DOE has begun annual checking of building permit requests around the Oak Ridge Reservation site in Tennessee after a nearby golf course attempted to use water from a contaminated aquifer. In addition, proposed land-use changes inside a site, perhaps for the "reindustrialization" of the former facility for a new manufacturing purpose, need to be carefully considered.

DOE should frankly acknowledge gaps in its technical capabilities and organizational deficiencies when explaining long-term institutional management plans to the public, the committee said. In addition, the scientific basis for decisions should be clear, and the public should be actively engaged in the development of stewardship plans.

The report was sponsored by the U.S. Department of Energy. The National Research Council is the principal operating arm of the National Academy of Sciences and National Academy of Engineering. It is a private, nonprofit institution that provides scientific and technical advice under a congressional charter. A committee roster follows.

# RFCA Stakeholder Focus Group
## Attachment E

| | |
|---|---|
| Title: | Article: *From Waste to Wilderness, Maintaining Biodiversity on Nuclear-Bomb-Building Sites* |
| Date: | April 5, 2001 |
| Author: | Robert H. Nelson |
| Phone Number: | N/A |
| Website Address: | http://www.cei.org/MonoReader.asp?ID=1411 |



# RFCA Stakeholder Focus Group
# Attachment F

| | |
|---|---|
| Title: | Task 2, Model Evaluation Questions Sent to Peer Reviewers |
| Date: | April 5, 2001 |
| Author: | RFCA Stakeholder Focus Group |
| Phone Number: | N/A |
| Email Address: | N/A |



**PEER REVIEW OF**

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

# Specific Areas, Issues, and Questions of Interest to the RFCA Stakeholder Focus Group

## Revision 0: April 5, 2001

The Peer Reviewers should conduct an overall evaluation of the draft report. This overall evaluation should address the questions:

- Is the approach for evaluating models for development of Radioactive Soil Action Levels (RSALs) at the Rocky Flats Environmental Technology Site (RFETS) sound and appropriate for the application?

- If the model evaluation approach is inadequate in any way, why is it inadequate and what approaches would be appropriate?

- Is the list of candidate models evaluated in the report appropriate for this site and application? Have any appropriate candidate models been excluded from the list (and why should they be included)? Have any inappropriate models been included in the list (and why are they inappropriate)?

- Is the analysis of models against evaluation criteria as presented in the draft report sound? If not, in what specific ways is the analysis incorrect?

- Are the conclusions of the model selection process supported by the analysis? Is the modeling methodology chosen appropriate for the site and application? If not, which approach would be a better choice and why?





1/2

The Peer Reviewers may also go beyond the questions listed above to review and discuss the merits of the document as they deem appropriate.

# End State and Stewardship Overview

Joe Legare and Jeremy Karpatkin

RFCA Focus Group

April 25, 2001

1/18



# The Situation

- How much contamination will remain at Rocky Flats at the conclusion of the cleanup? What steps will be taken to assure that this residual contamination does not pose a health risk to a future user or an offsite individual in the short and long run?
- How can DOE, the regulators and the community work together to understand interrelated end state issues and make better informed, holistic decisions on end state?
- Funding limitations are real. The Site is unlikely to receive funds beyond the ~$4 billion currently budgeted for contract completion.

# Building Blocks for Decisions

- RFCA
- The Contract
- The Baseline
- Other regulatory requirements

# RFCA Intermediate Site Condition (2008 to 2021)

(from RFCA preamble)

- All nuclear material and TRU waste removed
- all buildings down or reused
- all other waste safely stored or removed
- cleanup consistent with presumed land use of open space and/or limited industrial use
- surface and ground water leaving site safe for any and all uses
- surface water on site safe for any and all uses

# Contract End State -- Physical Completion (for target cost, schedule and scope.)

- Buildings down (except those with mission)
- All IHSSs remediated according to RFCA
- All waste removed
- Closure caps for landfills, solar ponds and 700 area or other remediation per RFCA
- Building foundations & other structures covered by minimum of three feet of fill after final grade
- Surface water on site will meet health based standard based on open space use
- Water leaving site meets current WQCC water standards
- Assumptions regarding overall quantities of waste generated throughout project

# Project Baseline Assumptions

- Buffer Zone
  - Remediated to Tier 1 (651 pCi/g Pu for 903 pad)
  - Ponds B1, B2 and B3 sediments removed
  - no other major surface rad remedial actions beyond 903 pad
  - Evapo-transpiration caps over old and current landfills
  - enhancement of SID south of the 903 pad
  - all unneeded groundwater monitoring wells abandoned
  - continued operation and maintenance of passive groundwater treatment systems
  - Remove contents of ash pits

# More project baseline assumptions

- Industrial Area -- clean to Tier 1
  - Original Process Waste Lines
    - ~20% of lines removed
    - balance left in stable condition (no pathway or no contamination)
  - Under building contamination -- clean to Tier 1
  - Building Foundations
    - all removed to three feet below final grade
    - below three feet removed if contaminated
    - below three feet left in place if free-releaseable
  - Solar pond evapo-transpiration cap
  - clean building rubble used as fill
  - no cosmetic regrading

# More Baseline Assumptions

- Surface Water
  - ponds --
    - in place; passive management
    - additional retaining structure at Indiana Street
  - standards
    - 0.15 pCi/l offsite
    - 141 pCi/l on site
  - wetlands
    - not used for water protection
    - no funds for offsets or maintenance

# More baseline assumptions

- Stewardship -- post closure infrastructure
  - Ponds in place with New Dam at Indiana
  - South Interceptor Ditch in place
  - 3 caps (landfills and Solar Ponds Area)
  - Some Original Process Waste Lines
  - clean rubble recycled as fill
  - clean foundations
  - passive groundwater treatment systems
  - Roads
    - east and west access roads remain
    - other paved roads and parking lots removed
    - buffer zone dirt roads remain but not maintained
- Post closure obligations outside of KH scope

# Other Regulatory Considerations

- Final Site Record of Decision
- Post RFCA Agreement
- CERCLA Five Year Review
  - maintenance of engineered barriers
  - environmental monitoring
  - review of remedies for protectiveness
  - review of Institutional Controls
  - public involvement

# The Cleanup Options that Affect End State

- Surface Soil Remediation
- Subsurface Soil Remediation
- Surface Water Protection
- Stewardship (post closure oversight, maintenance, monitoring and communication.)
- Other

# Options -- Surface Soil

- No excavation (engineered controls only)
  - tilling
  - enhanced vegetation
  - application of fixatives
  - covers
  - fencing
- Excavation levels for 903 pad (most of surface soil scope)
  - 651 pCi/gram Baseline (RFCA Tier 1)
  - 115 pCi/gram (RFCA Tier 2: ~ $13-$17 mil.)
  - 80 pCi/gram (RAC: ~$18 - $23.5 mil.)
  - 35 pCi/gram (RAC: ~$47 - $61 mil.)

# More Options -- Surface Soil

- Alternatives to offsite disposal
  - big cost of removal is shipping and disposal, not excavation
  - use excavated soil at low RSALs for fill in building basements, or use CAMU (the lower the RSAL, the more options may become available)
- Other factors -- water management options, ecological impacts and mitigation
- Precise costs for these factors not known

# Options -- Surface Water Management

- Standards
  - Change standard to reflect new EPA cancer slope factors, or actual uses
  - measured at current Points of Compliance or elsewhere
  - go to mass loading
  - go to longer averaging periods
- Configuration of final water management system
  - maintain ponds as is
  - focus offsite with additional retention facility (~$10 mil)
  - focus on site with regrading, ditches, wetlands, etc.

# More Options - Surface Water Management

- Additional remediation as a surface water management strategy
- Recontouring/revegetation of Industrial Area
- Basic studies (water balance, land configuration, AME, others) will help better define the range of options.

# Options -- Sub-surface soil

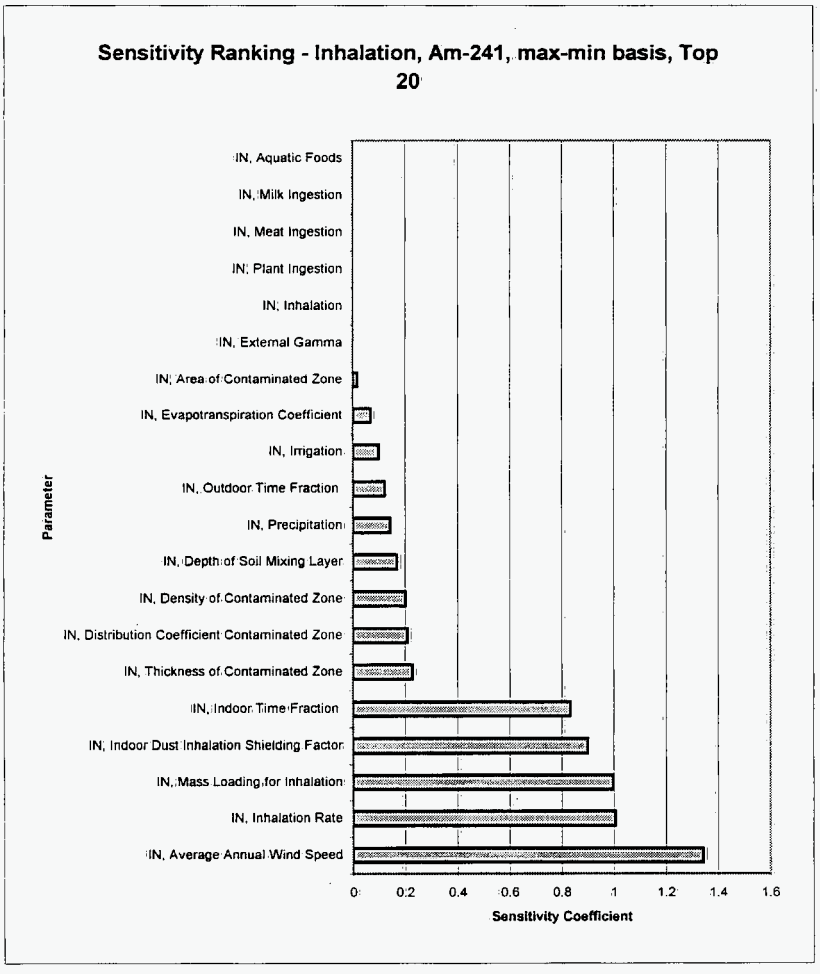
- Main targets are process waste lines and under building contamination
- Should we employ different cleanup levels at different depths (higher standard at surface, lower standard deeper below ground)?
- Should we undertake different actions based on extent of contamination, volume of contamination and presence of pathway?

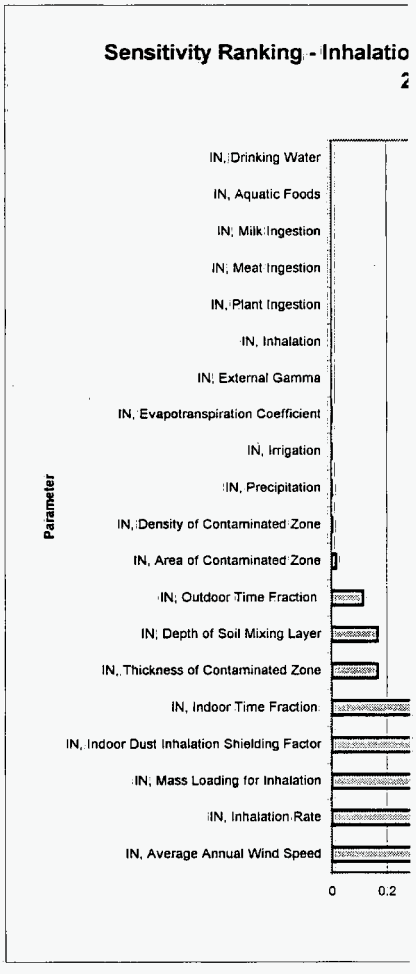
# Options -- Stewardship

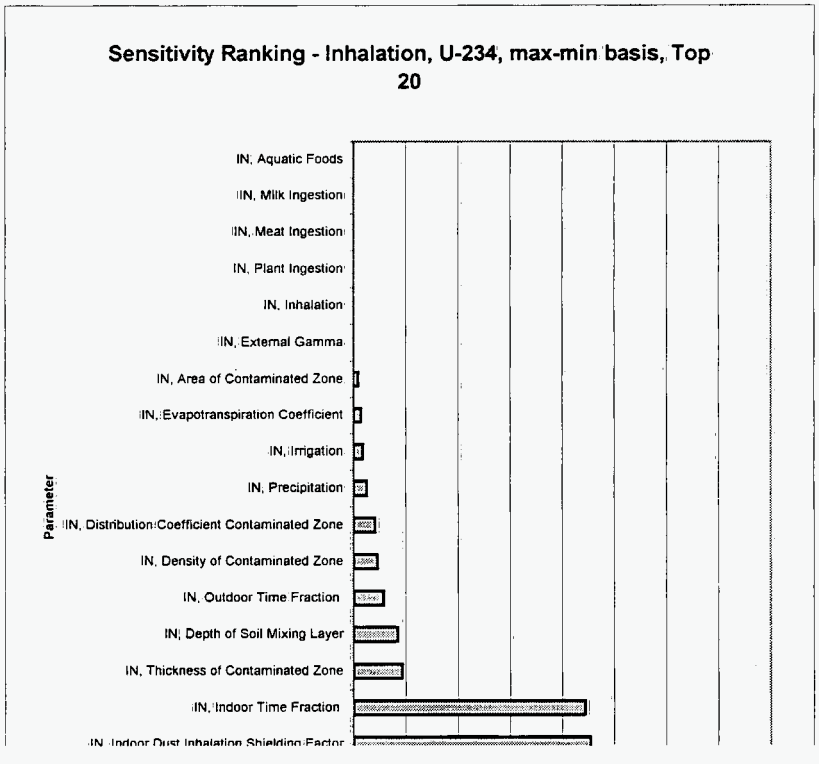
- Implementation of any of the options discussed affects the DOE stewardship profile
- What form should the DOE presence take?
  - Rocky Flats museum
  - Renewable Energy
  - Ownership of residual contamination
- CERCLA Review
  - Frequency, intensity and independence of review
  - Citizen oversight and involvement in review
- Institutional Controls: is a wildlife refuge enough?
- Information Retention and accessibility

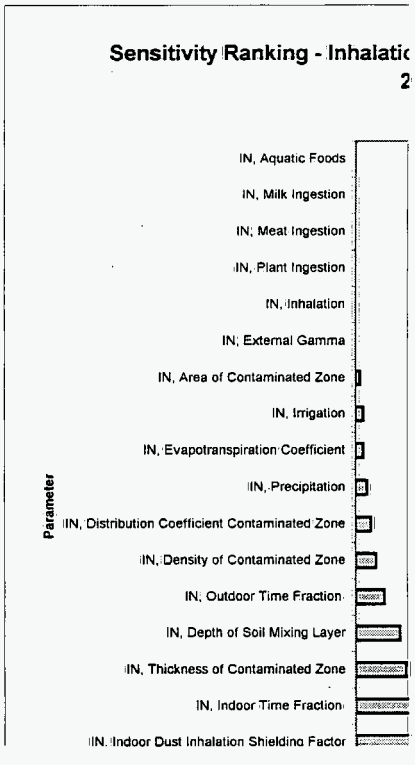
# Other

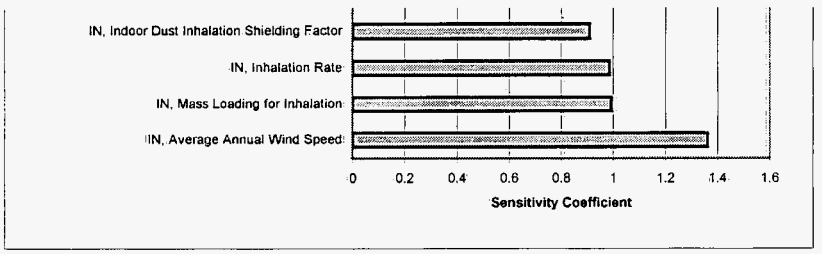
- How to ensure that remediation and management scope isn't lost if other portions of the project overrun cost and schedule?
- How to apply cost savings from other parts of project to remediation and management?
- How much sampling is enough?

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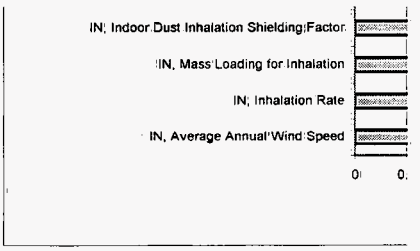
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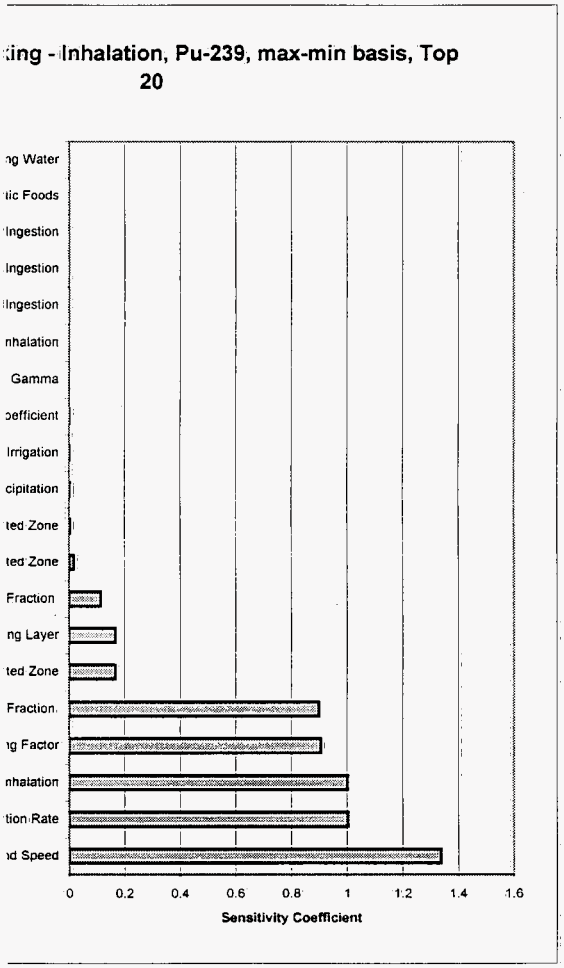
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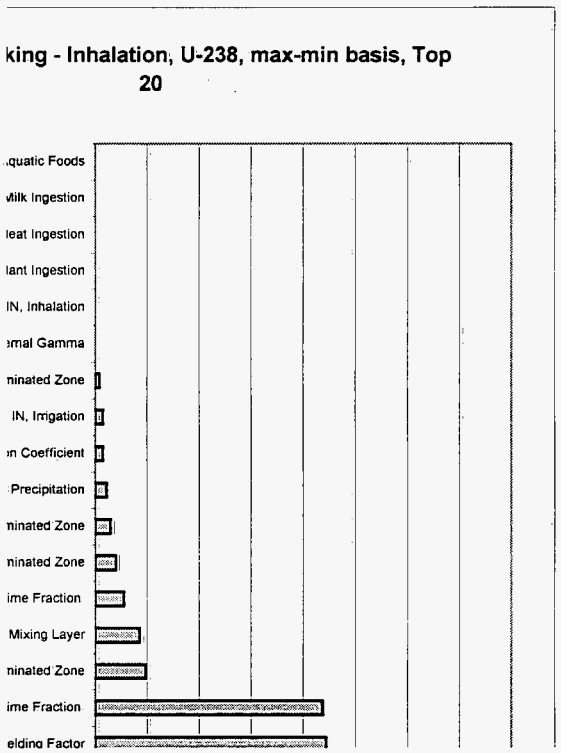
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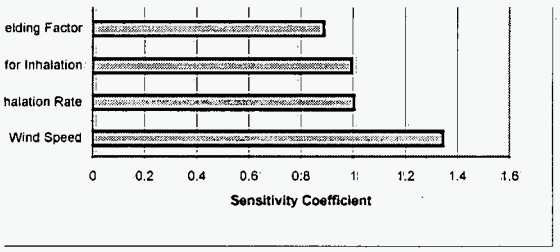
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# RFCA Stakeholder Focus Group
# Meeting Agenda

**When:** **April 11, 2001 3:30 - 6:30 p.m.**

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

| | |
|---|---|
| 3:30-3:40 | Agenda Review, 3/28 Meeting Minutes Review, Objectives for this Meeting |
| 3:40-4:25 | RSAL Working Group Workshop Update |
| 4:25-5:30 | Task 1 Peer Review and Response<br>- Agencies key issues and responses<br>- Focus Group discussion<br>- Task 1 closure – Round Robin |
| 5:30-5:40 | Break |
| 5:40-6:20 | End State Management Discussion:<br>- Introduction<br>- Post Closure Management and Options – Overview and Issues Identification |
| 6:20-6:30 | Set Future Agendas and Review Meeting |
| 6:30 | Adjourn |

April 13, 2001

Dear Stakeholder:

Enclosed are tables depicting the sensitivity of different parameters within RESRAD 6.0 model for different pathways and different radioisotopes.

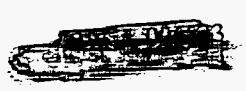
You may call either Sandi MacLeod or me if you have any questions, comments, or suggestions concerning the enclosed.

Also enclosed is the first peer reviewer's comments on Radioactive Soil Action Level (RSAL) Task 2, Model Evaluation.

Sincerely,

Christine Bennett
Process Administrator





May 23, 2001
To: Joe Legare, DOE
Steve Gunderson, CDPHE
Tim Rehder, EPA
RFCA Focus Group members
From: LeRoy Moore
Re: Decision-making for RSALs

On the latest agenda-setting conference call for the RFCA Focus Group I raised a concern of my own which I've also heard from others, namely, who's making the decisions re. the Rocky Flats RSALs and when. Are decisions being made by the key persons we meet with from DOE, EPA, CDPHE -- Joe Legare, Tim Rehder, Steve Gunderson? Or are they being made by parties behind the scenes nor readily available to the Focus Group? What is the role of the "principals," the three leading figures from the government agencies who will make the final decision re. the RSALs? Are they playing a role now? Or are they waiting until they receive a final report with a recommendation? One outcome of the ensuing conversation was agreement to have the principals meet with the Focus Group at one of our upcoming meetings. Another outcome was Joe Legare's comment that decisions are being made all along the way by the Working Group, especially for the parameters to be used in the calculations. Joe also asked me to put my concerns in writing. Hence this memo.

1) Early on in the current RSAL process the agencies decided to opt for the NRC decommissioning rule, evidently with a push from the state people because the state had adopted the NRC rule for non-DOE radioactive facilities in Colo and thus wanted it applied as an ARAR for Rocky Flats. This decision fundamentally changed the rules of the game from 1996 and from RAC's work, both of which were based on the draft EPA 15/85 mrem/y rule. Who really made this decision? Steve Gunderson and people within CDPHE first, then Tim Rehder and Joe Legare? Or was it made by someone else or by one or more of the principals? The decision in any case was made somewhere and imposed upon the current process; it would help for the record of a strained effort to get a bit more democracy in a non-democratic realm to find out when and where the decision was made.

To comment a bit further on this one, it's not clear to me whether the Focus Group, in spending a huge quantity of time on this issue, actually affected the outcome or not. The outcome, as I understand it, is

that, though the 25/100 mrem/y + ALARA NRC rule will be applied, the RSALs will be calculated from this approach as well as for the CERCLA risk range (10-4 to 10-6), with the most conservative value used for the actual RSAL. I do not know whether this approach to doing the calculation was always in the cards, or whether it is a response to public concerns. If it was always in the cards, it seems to me much time might have been saved had the Focus Group been told very clearly at the start that, though the NRC rule would be utilized, the calculation would be made for the CERCLA risk range numbers with the intent of selecting the most conservative number. One other thing not quite clear, of course, is what it means to choose the most conservative value, since 10-4 is obviously more conservative than 10-6. Of course, we also still don't know the meaning of ALARA; Tim Rehder seems favorable to defining ALARA in some manner other than strictly from a cost-benefit perspective, which suggests there may be room for the Focus Group to influence the decision on this point.

2) What about the scenario that will be used to calculate the RSALs? Who made the evidently operative decision to go with the wildlife refuge worker scenario? Is this a decision of Gunderson, Rehder, and Legare? Or did someone higher up dictate that this is the scenario to use? Again, since this decision hardly has the universal support of the engaged public, said public is entitled to know who is deciding and why, since this scenario is almost certainly not the most protective scenario for the long term.

To comment a bit more on this one, sometimes it appears that a final decision has been made on the scenario; at other times, I get the impression this is not the case -- that, for instance, the RSALs calculations will also be run for a rural resident scenario, which, I suspect, will produce a more conservative result than the refuge worker. Thus it would help to know who's deciding, when, and why. From my perspective, I wish the agencies would approach this issue like they evidently are approaching the dose/risk question, with an intent to run several calculations and to choose the most conservative.

3) Finally, I am aware that the Working Group, which consists now primarily of CDPHE and EPA personnel, is making numerous little decisions about parameters for the calculations soon to be run. Working Group meetings, as often mentioned by members of the Focus Group, are not held at the convenience of the engaged public, especially in terms of location. And Focus Group members were told early on that, though we are free to attend these meetings, we are not free to comment and to question what is

going on. We are welcome as observers, not as participants. I personally attended a few of these sessions, admired some of what I saw but generally found these meetings frustrating and decided ongoing attendance was a poor use of my time. I don't doubt that this choice means I've missed some things.

Though the Working Group is making parameter decisions as they go along, what about decisions on the more crucial parameters -- the ones that will significantly affect the final calculation? Will the content of these parameters be aired with the Focus Group? I trust this will happen so those of us closely involved in the RSAL process can understand the rationale for possible decisions and at least have the chance to affect the outcome.

In conclusion, we all recognize that certain key decisions will determine the eventual RSALs. It is essential for the engaged public, especially as represented in the Focus Group, to be fully aware of how these decisions are being made, when and by whom with what likely effect. And it is essential for this engaged public not simply to be aware but also to have ample opportunity to weigh in and possibily to influence the decisions that are being made, the effects of which will redound to them and, long term, not only to their children and their children's children but to unknown others. The affected public was utterly excluded from the opportunity to influence key decisions in 1996. As a result DOE and the regulators suffered a severe loss of public trust. No one wants a repeat of this. In addition, what is happening regarding cleanup of Rocky Flats is setting a precedent for DOE sites nationally. We need a result we can all point to with pride, not one that will shame us in the eyes of our peers elsewhere or of those who succeed us locally.

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LeRoy Moore, Ph.D.
Rocky Mountain Peace and Justice Center
P. O. Box 1156, Boulder, Colorado 80306-1156 USA
Phone 303-444-6981; FAX 303-444-6523
E-mail address: leroymoore@earthlink.net

April 4, 2001

Dear Stakeholder:

The Rocky Flats Cleanup Agreement (RFCA) Stakeholder Focus Group will meet at the Broomfield Municipal Center at One DesCombes Drive on April 11, 2001 from **3:30 to 6:30** p.m.

The agenda for the April 11, 2001 meeting is enclosed (Attachment A). We will discuss the following topics:

- RSAL Working Group Workshop Update
- Task 1 Peer Review and Response
- End State Management Discussion

The meeting minutes for the March 28, 2001 meeting are enclosed as Attachment B.

Attachment C is a copy of the City of Broomfield's Comments to the U.S. Department of Energy (DOE) regarding the Energy National Defense Authorization Act's (NDAA) Long-Term Stewardship Report to Congress, dated March 15, 2001, to Tom Lukow, DOE.

The Summary from the report, *Long-Term Institutional Management of U.S. Department of Energy Legacy Waste Sites* by the National Academy of Sciences is Attachment D.

Attachment E is an article: *From Waste to Wilderness, Maintaining Biodiversity on Nuclear-Bomb-Building Sites*, Robert H. Nelson, April 2001. We are including this document in the packet because it is getting wide distribution in Washington and may be useful as background information for the Focus Group. It has not been brought forward or endorsed by any member of the Focus Group.

Questions for Peer Reviewers of RSAL Task 2, Model Evaluation are listed in Attachment F.

If you need additional information to prepare you for the Focus Group discussion on April 11, 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 Hodgin, CCM
Facilitator / Process Manager



**DRAFT**

## Summary of Exposure Variable PDFs for use in RESRAD Modeling

| Exposure Variable | Input Type | | Input for RESRAD* | Units[1] | Input for RAGS (units) | Units | Source and Comments |
|---|---|---|---|---|---|---|---|
| | Point | PDF | | | | | |
| Soil Ingestion Rate (IRs) | X | | Triangular (0, 17.5, 35) | gm/year | Triangular (0, 50, 100) | mg/day | The RME value reported in RMA is 106 mg/day, which is similar to the residential adult soil ingestion rate RME of 100 mg/day; therefore, the PDF from residential scenario is applied here. Note that the RME for contact intensive scenario is 330 mg/day (115.5 kg/yr) per EPA Soil Screening Guidance |
| Inhalation Rate (IRa) | | X | 8.8 + (16.0 - 8.8) x Beta (1.79, 3.06) | $m^3$/day | 1.1 + (2.0 - 1.1) x Beta (1.79, 3.06) | $m^3$/hr | Insufficient data from EPA EFH to generate PDF of breathing rates; PDF generated by varying the weighting factors for light, medium, and heavy activity (1.1, 1.3, and 2.0 $m^3$/hr)- see Table B.2-14 of RMA report and CDPHE analysis (Diane Niedzwiecki); Best-fit for beta (chi-square = 0.175), shape parameters are given and yields values between 0 and 1.0; for Crystal Ball, modify for scale using: min + (max-min)x beta; for @Risk, modify for scale using: min + beta; unit conversion m3/day = $m^3$/hr x 8 hr/day |
| Occupancy Factor | X | | 1.0 | unitless | NA | | Intake rates are specific to the Wildlife Refuge worker, therefore, intake rates do not need to be adjusted. |
| Exposure Time (ET) | X | | NA | | 8.0 | hrs/day | professional judgment that all of the potential exposure occurs during a full workday |
| Exposure Frequency (EF) | | X | NA | | Truncated Normal (225, 10.23, 200, 250) | days/year | RMA report summarizing survey data for biological workers (n=20) (pp. B.3-149 - 150); truncation limits are professional judgment that minimum full time work is 4 days/wk x 50 wk/yr; max is 5 days/wk x 50 wk/yr |
| Exposure Duration (ED) | | X | Truncated Normal (7.18, 7, 0, 40) | years | Truncated Normal (7.18, 7, 0, 40) | years | RMA report summarizing survey data for biological workers (n = 20) (pp. B.3-172-175); truncation limits are professional judgment that values are nonnegative and within 5 SD's of the mean |
| Mass Loading for Inhalation (MLI) | X | | pending | $m^3$/kg | NA | | B. Nininger to present site-specific EDF, see comment for PEF |
| Particulate Emission Factor (PEF) | X | | NA | | 1.32E+09 | $m^3$/kg | EPA, 2000 Soil Screening Guidance for Radionuclides; Value is entered as (1/PEF) or 7.58E-10 |
| Indoor Time Fraction ($F_{in}$) | X | | 0.5 | unitless | 0.5 | unitless | RMA survey states ~ 0.5 time spent indoors |
| Outdoor Time Fraction ($F_{out}$) | X | | 0.5 | unitless | 0.5 | unitless | |
| Indoord Dust Filtration Factor | X | | 0.7 | unitless | NA | | average of indoors (0.4) described in EPA Soil Screening Level Guidance for Radionuclides and Default in RESRAD, and outdoors (1.0); assumes worker will spend time indoors, where windows and doors will be open during summer months |
| External Gamma Shielding Factor (see comment) | X | | 0.4 | unitless | 0.4 | unitless | EPA 2000, Soil Screening Guidance for Radionuclides |

* ED may be entered as a random variable is RESRAD 6.0; the set of input values for all exposure variables are determined for Year 1, and applied across all years throughout the ED

Date: Aug. 7, 2000
Contacts: Bill Kearney, Media Relations Associate
Shelley Solheim, Media Relations Assistant
(202) 334-2138; e-mail <news@nas.edu>

FOR IMMEDIATE RELEASE

Long-Term Management of DOE 'Legacy' Waste Sites
Presents a Significant Challenge

WASHINGTON -- The government's intended reliance on long-term stewardship to oversee its contaminated nuclear weapons sites is, at this point, problematic, says a new report from the National Academies' National Research Council. Details of the U.S. Department of Energy's (DOE) stewardship plans have yet to be specified, adequate funding has not been assured, and there is no convincing evidence that institutional controls -- such as surveillance of radioactive and other hazardous wastes left at sites, security fences, and deeds restricting land use -- will prove reliable over the long run.

"Many weaknesses in institutional controls and other stewardship activities arise from institutional fallabilities," said Thomas Leschine, associate professor at the University of Washington, Seattle, and chair of the committee that wrote the report. "Understanding this and developing a highly reliable organizational model that anticipates failure while taking advantage of new opportunities for further remediation and isolation of contaminants remains a significant challenge for DOE."

"Moreover," added committee vice chair Mary English, research leader at the University of Tennessee, Knoxville, "DOE must undertake long-term institutional management of residually contaminated sites with the expectation that plans developed today will need to be periodically revisited."

Nearly 150 sites around the country are contaminated, a nagging reminder of the nuclear arms race. DOE has concluded that even after planned remediation activities are completed -- or found to be infeasible -- at these so-called "legacy" waste sites, 109 of them will never be clean enough for unrestricted use. The department recently established the Office of Long-Term Stewardship to protect indefinitely the people and environment surrounding these sites -- which are located in 27 states, Puerto Rico, and territorial islands in the Pacific.

DOE should begin immediately to plan for a broader institutional management

framework that equally balances contaminant reduction, physical isolation of waste, and custodial activities such as surveillance of waste migration, changes in the landscape, and human activity around the site, the committee said. Currently, DOE defines stewardship as something that begins after "closure" of a site when remediation is deemed finished, but ideally it should be considered while remediation strategies are still being formulated. The Office of Long-Term Stewardship has just begun its planning, though it is required by law to report to Congress on DOE's responsibilities by October 1.

Because the long-term behavior of contaminants in the environment is unpredictable and physical barriers may break down at some point, the committee urged DOE to develop its stewardship plans under the assumption that contaminant isolation eventually will fail. When institutional controls and other stewardship activities are required because of the fallibility of isolation, a precautionary approach should be adopted in which contaminant reduction is emphasized to address risks to human health and the environment.

No "one size fits all" formula exists for successful institutional management and decisions are likely to be made under conditions of considerable uncertainty, the reports notes. The best long-term management strategy overall appears to be one which avoids foreclosing future options, takes contingencies into account, and considers seriously the prospects of failure. It needs to be forward-looking because today's scientific knowledge and institutional capabilities do not provide much confidence that containment of sites with residual risks will function as expected indefinitely.

The long-term institutional management approach outlined in the report also calls for periodic re-evaluation of plans and research and development of new remediation technologies. Scientific breakthroughs outside DOE need to be monitored as well for their relevance to further reducing risks associated with residual contaminants. Equal attention should be given to social research that can be applied to the institutional and organizational aspects of this approach.

DOE officials view the long-term stewardship efforts that they have proposed so far -- which are likely to rely heavily on surveillance, maintenance, and record keeping -- as relatively inexpensive compared with the cost for initial remediation. But real costs cannot be estimated with any confidence since failures are likely to occur, the committee said. The goal of long-term institutional management should be to anticipate such failures and minimize the costs and risks associated with them.

Ongoing surveillance and environmental monitoring need to go beyond the boundaries of
a site, the committee emphasized. For example, DOE has begun annual checking of building permit requests around the Oak Ridge Reservation site in Tennessee after a nearby golf course attempted to use water from a contaminated aquifer. In addition, proposed land-use changes inside a site, perhaps for the "reindustrialization" of the former facility for a new manufacturing purpose, need to be carefully considered.

DOE should frankly acknowledge gaps in its technical capabilities and organizational deficiencies when explaining long-term institutional management plans to the public, the committee said. In addition, the scientific basis for decisions should be clear, and the public should be actively engaged in the development of stewardship plans.

The report was sponsored by the U.S. Department of Energy. The National Research Council is the principal operating arm of the National Academy of Sciences and National Academy of Engineering. It is a private, nonprofit institution that provides scientific and technical advice under a congressional charter. A committee roster follows.

Action List for 4/11/01 RFCA FG packet

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.]

Broomfield Stewardship Letter and attachment to Tom Lukow, DOE-RFFO

Executive Summary of Stewardship by the Nation al Academy of Sciences

Questions for Peer Reviewers of RSAL Task 2, Model Evaluation