TRAC
Meeting the Challenge of the Atmosphere

June 26, 2002

Dear Stakeholder:

This correspondence transmits copies of Rocky Flats Cleanup Agreement (RFCA) Stakeholder Focus Group meeting minutes for:

- January 9, 2002
- February 6, 2002
- February 20, 2002
- March 20, 2002
- April 17, 2002

This completes the minutes for the RFCA Stakeholder Focus Group meetings. If you have any corrections to these meeting minutes, please email Christine Bennett (cbennett@alphatrac.com) or call us.

We are continuing to work with the agencies to schedule a closure meeting for the Focus Group.

Sincerely,

C. Reed Hodgin, CCM
Facilitator / Process Manager

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RFCA Stakeholder Focus Group
January 9, 2002
Meeting Minutes

INTRODUCTION AND ADMINISTRATIVE

A participants list for the January 9, 2002 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 and the meeting rules. Introductions were made.

AGENDA

Reed reviewed the agenda:

- Task 3 Peer Review - Update
- Group Discussion of Options

TASK 3 PEER REVIEW - UPDATE

To date, AlphaTRAC, Inc. has received one Task 3 peer review. There are a total of three and the second and third Task 3 peer reviews will be completed January 11, 2002 and January 14, 2002, respectively.

GROUP DISCUSSION OF OPTIONS

The U.S. Department of Energy (DOE) made opening remarks regarding the *Summary of End State Options - Surface Contamination*. References were made to the *Pu-239 Isoplot (pCi/g) 1999 Kriging Analysis* map. This map illustrates surface soil contamination at Rocky Flats ranging from < = 0.1 pCi/g to > 10000.0 pCi/g, showing surface contamination existing almost exclusively in the buffer zone. There is very little surface contamination in the industrial area. The 903 Pad is of notable concern. The map shows recognizable, measurable contamination from the 903 Pad extending two to three miles to the east. Also noted by DOE was a Record of Decision (ROD) for Operable Unit 3 (OU3), which speaks to the offsite area east of Rocky Flats. As it currently stands, the ROD for Operable Unit 3 was a "no-action ROD."

The Focus Group held a discussion with the following objectives:

- Review and understand surface contaminant situation;
- List and understand options for surface contaminants cleanup;
- Identify additional information needed to understand options; and

- Discuss and understand the relationship between options and other issues and / or influences.

Review and Understand Surface Contaminant Situation

It was concluded that surface contaminants were almost exclusively located in the buffer zone, and very little existed in the industrial area, with one exception. This exception involved the monitoring and detection of plutonium in the surface water located in the industrial area. The Focus Group felt that remediation for water protection might be necessary.

List and Understand Options for Surface Contaminants Cleanup

Baseline Assumptions

A discussion regarding baseline assumptions was conducted. It was determined that baseline assumptions included a Radionuclide Soil Action Level (RSAL) of 651 pCi/g representing Tier 1 Action Levels, with a budget of $40,000,000. Other factors included in baseline assumptions were an estimate of 11,000/m^3 of low-level waste and low-level, mixed waste requiring clean up that would impact about 5 acres.

Tier 2 Action Levels for surface cleanup are based on an RSAL of 110 pCi/g and would affect 18 acres.

A different baseline assumption was discussed based on an RSAL of 35 pCi/g. The RSAL Oversight Panel (RSALSOP) originally developed this particular RSAL in late 1990. For this baseline assumption, 45,000/m^3 of waste impacting approximately 50 acres would cost $82,000,000. The original baseline was ~$75,000,000. The Focus Group requested a breakdown of the new budget projections.

903 Pad / Lip Area

The Focus Group reviewed bounding options for the 903 Pad / Lip Area. Cleanup options ranged from cleanup of 500 pCi/g to 5 pCi/g, with a risk range of ~10^{-4} to 10^{-6} respectively. Specific details regarding surface contamination may be found in the document titled *Summary of End State Options – Surface Contamination*. This document speaks to the following:

- The situation
- Baseline assumptions

- Surface Cleanup to Be Conducted Under all Scenarios (Not Optional)
  - 903 Pad Cleanup
  - B-Series Pond Sediments
- Surface Cleanup Activity Where Cleanup Options Exist
  - 903 Lip Area
    - Bounding Options for 903 Lip Area
      - Cleanup to 500 pCi/g
      - Cleanup to 50 pCi/g
      - Cleanup to 5 pCi/g
        - Area
        - Cost
        - Health Risk
        - Ecological Impacts
        - Stewardship
    - Ideas for Reducing Cleanup Costs to Allow More Extensive Cleanup
    - 903 Lip Area Cleanup Options to Characterize and Consider for End-State Discussion
    - Additional Information Needed for Surface Contamination Discussion

General remarks were made regarding the 903 Pad. It was speculated that 50% of the cost would be used for removal purposes and 50% of the cost would be used for disposal purposes. Ecological impacts were questioned and discussed in a general way. The Focus Group questioned the net benefit of cleaning up the 903 area and ecological impacts that involve the B-1, B-2, and B-3 pond sediments removal and the impacts on native prairie.

It was noted that a strategy might need to be developed to address some of the uncertainties associated with cleanup and the variation in costs.

General Options with Varying Degrees of Likelihood

The Focus Group identified options that were not currently "in play" for the options development process and include:

- B ponds remediation,
- The 903 pad itself,
- Ground water,
- Current landfill (cap), and
- Solar ponds.

500 pCi/g

- An area between 5 to 15 acres would be cleaned up;
- Risks to the wildlife refuge worker is 10^{-4} (1 in 10,000);
- More information is needed for surface water protection; and
- Stewardship may require future ecological cleanup at minimum levels.

50 pCi/g

- An area of approximately 50 acres would be cleaned up;
- Risks to the wildlife refuge worker is 10^{-5} (1 in 100,000);
- There is uncertainty about how this will affect surface water protection;
- Stewardship may require future ecological cleanup at minimum levels; and
- Questions about the ecology concern the timing, cost, and risk of future cleanup.

5 pCi/g

- An area of approximately 1,500 acres would be cleaned up;
- Risks to the wildlife refuge worker is 10^{-6} (1 in 1,000,000);
- There is uncertainty about how this will affect surface water protection; and
- Stewardship may require future ecological cleanup at low levels, with the potential that engineered controls will not be needed. Environmental monitoring will still be required.

Other general comments made about the cleanup of the 903 Lip area included the regulatory impact of the various levels of cleanup and storing the waste below certain levels on site or offsite waste disposal.

Additional Information Needed for Surface Contamination Discussion

The RFCA Focus Group requested information on the cost of onsite disposal.

ADJOURN

The meeting adjourned at 6:30 p.m

Participation List for RFCA Focus Group Meeting of 01/09/02

First	Last	Company Organization
David	Abelson	RFCLOG
Sean	Bell	DOE/RFFO/OCC
Christine	Bennett	AlphaTRAC, Inc.
Kent	Brakken	U.S. DOE - RFFO
Lane	Butler	Kaiser-Hill Company, LLC
Kimberly	Chleboun	RFCLOG
John	Corsi	Kaiser-Hill Company, LLC
Carol	Deck	Kaiser-Hill Co, LLC
Rick	DiSalvo	US DOE - RFFO
Sam	Dixion	
Shirley	Garcia	City of Broomfield
Steve	Gunderson	CDPHE
Jerry	Henderson	RFCAB
Reed	Hodgin	AlphaTRAC, Inc.
Victor	Holm	RFCAB
Clark	Johnson	City of Arvada
Ken	Korkia	RFCAB
Michelle	Kump	RFCAB
Ann	Lockhart	CDPHE
LeRoy	Moore	RMPJC
Albert	Nelson	City of Westminster
Bob	Nininger	Kaiser-Hill Company, LLC
John	Rampe	U.S. DOE - RFFO
Tim	Rehder	US EPA
Kathleen	Rutherford	CDPHE/HMWMD
Mark	Sattelberg	US Fish and Wildlife Service
Joel	Selbin	
Dave	Shelton	Kaiser-Hill Company, LLC

RFCA Stakeholder Focus Group
February 6, 2002
Meeting Minutes

INTRODUCTION AND ADMINISTRATIVE

A participants list for the February 6, 2002 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 and the meeting rules. Introductions were made.

AGENDA

Reed reviewed the agenda:

- Agency Report on Approach and Progress in Addressing RSALs Task 3 Comments and Revising Report;
- Focus Group Discussion and Feedback on RSALs Task 3 Information and Approach;
- Discussion on the Future of the RFCA Stakeholder Focus Group.

The first two items of the agenda were combined in a discussion.

AGENCY REPORT ON APPROACH AND PROGRESS IN ADDRESSING RSALS TASK 3 COMMENTS AND REVISING REPORT

FOCUS GROUP DISCUSSION AND FEEDBACK ON RSALS TASK 3 INFORMATION AND APPROACH

The U.S. Department of Energy (DOE) discussed the document titled *Windtunnel Review Comments.* DOE noted that this 55-page document compiled comments the agencies received from both the Wind Tunnel peer reviewers and the Radiological Soil Action Levels (RSALs) Task 3 peer reviewers.

The report was organized into the following sections:

1. Wind Tunnel Reviewer #1, with 12 general comments;
2. Wind Tunnel Reviewer #2, with 23 general comments;
3. Wind Tunnel Reviewer #3, with 21 specific comments;
4. Task 3 Peer Reviewer #1, with 11 general comments;
5. Task 3 Peer Reviewer #2, with 44 general comments;

6. Task 3 Reviewer Melissa Anderson, with 12 specific comments;
7. Task 3 Reviewer Robert Underwood, with 10 specific comments;
8. Task 3 Reviewer Jerry Henderson, with 30 specific comments;
9. Task 3 Reviewer Rocky Flats Citizens Advisory Board, with 12 comments;
10. Task 3 Reviewer W. Alexander Williams, with 64 general and specific comments; and
11. Task 3 Reviewer Le Roy Moore, with 14 specific comments.

According to the Colorado Department of Public Health and Environment (CDPHE), the RSAL Working Group is reviewing each comment and identifying who among the technical staff can respond.

Kaiser Hill, Ltd. noted that the comments received on the wind tunnel study were not organized in the order they were received, but rather in order of category.

DOE further noted that this document was a draft and was intended to show the interim product, and that agency responses to the comments were four to six weeks away from being completed.

Kaiser Hill described the steps the agencies would take:

1. Incorporate changes to the draft Task 3 report;
2. Release the next revision;
3. Agencies confer with the principals on Task 1 through 5;
4. 60-day public comment period;
5. Recommendation of final RSAL.

The Focus Group entered a discussion on the timing of the final RSAL and end-state discussions. The U.S. Environmental Protection Agency (EPA) felt that since there had been substantial work completed on the surface RSAL and some good data generated on subsurface cleanup levels as well as an understanding of the issues related to the 903 pad, that some preliminary end-state discussions could occur in the interim.

The CDPHE thought that the scope of end-state discussions was still not clearly identified. Some discussion could occur in parallel of the final RSAL, while others would have to wait for other processes, such as the discussions on the solar ponds and the landfill.

The Focus Group continued its discussion on the draft Task 3 Report. The CDPHE observed that there were three categories of comments:

1. Comments requiring further discussion among the agencies;
2. Comments requiring additional reflection;
3. Comments that were oriented towards "housekeeping."

One Focus Group member asked if the Task 3 Peer Reviewer #3 would be submitting comments. Reed Hodgin said that the contract for the work had expired, so it was unlikely Task 3 Peer Reviewer #3 would submit comments without remuneration.

Reed suggested that the agencies allow the Focus Group to review comments and responses by topic, so that as each topic is completed, the results could be released to the Focus Group. This approach could encourage the Focus Group rather than overwhelm it with a summary of responses at the end of the six week period.

The CDPHE said it would try and form a strategy based on the facilitator's suggestion.

DISCUSSION ON THE FUTURE OF THE RFCA STAKEHOLDER FOCUS GROUP

The U.S. Department of Energy (DOE) pointed out that there were two other forums discussing end-state issues. The message DOE wanted to send was that it was not feasible to have two end-state discussions going on at the same time, and yet the DOE is trying to support the public process.

The CDPHE commended the Focus Group for being so successful in educating all involved in the process of calculating dose and risk-based numbers to establish an RSAL. With respect to end-state discussions, CDPHE felt that most of the agency people were being spread "too thin," and that there were conflicts in schedules. CDPHE preferred the end-state discussions to be combined.

The EPA concurred with CDPHE, and added that EPA would like to attend end-state discussions, but would be unable to continue attending these Focus Group meetings due to workload.

A Focus Group member stated that the Focus Group needed to complete the RSAL discussion.

Another Focus Group member added that there existed a great deal of overlap and that different forums attracted different people.

CDPHE pointed out that the Focus Group still had several weeks before Task 3 was completed and that a final review of Task 3 needed to occur.

Reed Hodgin, Facilitator, added that work still needed to be done on establishing an RSAL for Uranium and also a final number for the subsurface RSAL.

CDPHE agreed to bring some of the RSAL issues back to the Focus Group. The subsurface RSAL would best be addressed with the Rocky Flats Coalition of Local Governments (RFCLOG) and the Rocky Flats Citizens Advisory Board (RFCAB) because of the pathway and policy issues that were above and beyond the Focus Group.

The Focus Group agreed to place the Uranium RSAL on the next meeting agenda.

Reed summarized decisions made by the Focus Group:

1. End-state discussions were going to occur in the RFCLOG and the RFCAB;
2. The Focus Group will focus on the RSALs discussion and evaluation to successful closure.

CDPHE noted that surface water protection discussions ought to be placed on the end-state discussion agenda.

Reed established the meeting agenda for the next meeting:

- Uranium RSAL;
- Draft Task 3 Report: Agency Responses - Topic One

ADJOURN

The meeting adjourned at 5:05 p.m

Participation List for RFCA Focus Group Meeting of 02/06/02

First	Last	Company Organization
Melissa	Anderson	RFCLOG
Sean	Bell	DOE/RFFO/OCC
Christine	Bennett	AlphaTRAC, Inc.
Kent	Brakken	U.S. DOE - RFFO
John	Corsi	Kaiser-Hill Company, LLC
Carol	Deck	Kaiser-Hill Co, LLC
Rick	DiSalvo	US DOE - RFFO
Sam	Dixion	
Shirley	Garcia	City of Broomfield
Steve	Gunderson	CDPHE
Jerry	Henderson	RFCAB
Reed	Hodgin	AlphaTRAC, Inc.
Victor	Holm	RFCAB
Clark	Johnson	City of Arvada
Ken	Korkia	RFCAB
Michelle	Kump	RFCAB
Tom	Marshall	Rocky Mountain Peace and Justice Center
LeRoy	Moore	RMPJC
Bob	Nininger	Kaiser-Hill Company, LLC
John	Rampe	U.S. DOE - RFFO
Tim	Rehder	US EPA
Mark	Sattelberg	US Fish and Wildlife Service
Kathy	Schnoor	City of Broomfield
Joel	Selbin	
Dave	Shelton	Kaiser-Hill Company, LLC
Honorable Hank	Stovall	City of Broomfield

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RFCA Stakeholder Focus Group
February 20, 2002
Meeting Minutes

INTRODUCTION AND ADMINISTRATIVE

A participants list for the February 20, 2002 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 and the meeting rules. Introductions were made.

AGENDA

Reed reviewed the agenda:

- Agency Responses to the Wind Tunnel Studies Peer Reviews;
- Uranium Surface RSAL Calculation and Draft Modeling Results.

URANIUM SURFACE RSAL CALCULATION AND DRAFT MODELING RESULTS

The U.S. Environmental Protection Agency (EPA) provided a brief summary on the status of the Uranium surface Radiological Soil Action Level (RSAL) calculation and draft modeling results. EPA stated that preliminary calculations had been completed. These calculations showed that the toxicological risk, rather than the radiological risk, would dominate for Uranium and thus determine the value for the Uranium RSAL. This was due to the fact that the toxic effects from Uranium manifest at doses equal to or lower than the carcinogenic effect. There is still some controversy regarding background Uranium levels; e.g., whether Uranium in the soil is naturally occurring and whether it is contamination from Rocky Flats.

A Focus Group member cautioned that Uranium is more soluble in water compared to plutonium in water, and that water infiltration and transport of Uranium should be carefully evaluated.

Reed Hodgin, facilitator, asked a clarification question regarding the type of Uranium being modeled: "Was it natural, enriched, or depleted Uranium?"

Kaiser Hill, Ltd. said that both forms of Uranium were being modeled separately.

AGENCY RESPONSES TO THE WIND TUNNEL STUDIES PEER REVIEWS

Kaiser Hill, Ltd. presented *Response to Peer Review Comments Wind Tunnel Analysis* on behalf of the RSAL Working Group.

The Focus Group agreed to study the presentation and document and hold questions until the next Focus Group meeting.

Kaiser Hill reviewed the history of the wind tunnel studies. Two studies were conducted during 2000 by Midwest Research Institute and URS Corporation. The studies were originally designed to develop an annual mass loading multiplier for use in estimating RSALs. The studies quantified site-specific conditions pertaining to the soil-wind erosion potential following a fire on the Buffer Zone soils. Three peer-level scientists reviewed the two wind tunnel reports and commented on the methodology and approach to data interpretation used to determine the mass loading multiplier. The agencies addressed 56 relevant review comments, which were grouped by categories for this presentation, including questions posed by Focus Group members.

Comments were grouped into four categories:

1. Equipment adequacy;
2. Ability of wind tunnel to replicate representative meteorological conditions;
3. Sampling / data representativeness; and
4. Data interpretation.

Equipment Adequacy

The Focus Group asked the peer-level scientists to evaluate the ability of the equipment and staffing to perform erosion potential measurements. For this presentation, three major comments were included:

1. Recognized expertise and wind tunnel methodology - "equipment is in good standing with scientific community..."; "pitot tube is essential..."; "...scientists and equipment have a long history of quality work..."
2. Noted limitations and their effect on the tunnel's ability to generate useable results—"...pitot tube is adequate since fast-response anemometry is not needed."
3. "...I think that no portable wind tunnel would exactly duplicate all possible fetch effects, but that some wind tunnel had to be used and that this wind tunnel is probably as good as most would be relative to the fetch effect."

Ability of wind tunnel to replicate representative meteorological conditions

Comments relating to meteorologically-induced effects had three general themes:

1. Wind tunnels do not simulate large scale turbulence and vertical wind components;
2. Small working section limits surface roughness variations and their effect; and
3. Saltation effect is limited in the wind tunnel.

1. Small-scale wind tunnels do not simulate large scale turbulence (wind speed variations), and vertical wind components

- "The test wind tunnels are probably too small in cross-section and too short in length to accurately simulate atmospheric boundary layer over a significant portion of the test section on the rough test surfaces at Rocky Flats."
- "The ratio of test section to length is greater than 100:1, which is a good indicator of boundary layer development. The main reason for assuring boundary layer development and stability is to characterize and control the shearing stress on the surface...The wind tunnel does that adequately."
- "Yet the erosion potentials so obtained have use in establishing RSALs, providing that we expect that the extreme erosion potentials observed are unlikely to ever exist in nature."
- "Turbulent variations on a small scale are abnormal in this wind tunnel...The result is that...flow variations are high-frequency, causing particles on the surface to oscillate, something that would not be as important in nature. ...In my opinion, the larger values of PM-10, TSP, and erosion potential reported may be construed as upper bounds, and thus provide a factor of conservatism to protect against unusual inhalation exposure."
- "In wind tunnels, the flux of momentum is carried by smaller-scale fluctuations than in outdoor work. However, one gets the same results by comparing resuspension for the same friction velocity in a wind tunnel or outdoors experimentation. That is, for the same friction velocity (momentum flux) you get the same resuspension, even though the turbulent spectrum is different for outdoor and wind-tunnel winds [This comment also goes to the representativeness of the data, discussed next.]
- The rapid fluctuations in wind speed are taken into account through the friction velocity in the wind tunnel.... I can accept this scale difference because I believe that it leads to an overestimate of suspended dust..."

- On vertical velocity:
  - "The average vertical velocity at the ground surface is zero, both in the wind tunnel and outside the tunnel."
  - Vertical wind variations are modeled well with the wind tunnel."

2. The layout and size of the small working section limits surface roughness variations and their effect

- "This wind tunnel adequately accounts for small-scale variations in surface cover and surface roughness. It does not account for large-scale or middle-scale variations, however."
- "In order to characterize differences in surface cover and surface roughness, the tunnel has to be moved several times... and the tests replicated. That gives satisfactory statistics between replicate results."

It was noted that, in the study, the wind tunnel was moved repeatedly on each plot. And plots were chosen to be representative of the burned area.

3. Saltation effect is limited to the wind tunnel

- "The implicit assumption in the wind tunnel test protocol was that... only wind would affect the test surface during a windstorm."
- "For the resuspension of PM-10, the dominant mechanism is the sand-blasting of the surface by particles larger than 100 micrometers."
- "In the wind tunnel, the onset of avalanching may be a product of the peculiar small scale of turbulence, and more soil might be available than under natural winds."
- "More recent observations show that there is an emission of small particles at speeds below the observed thresholds for saltation, and while this fact amounts to a relatively small emission loss, it affects the surface condition."

Sampling / data representativeness

Comments relating to data representativeness focused on three issues:

1. Ability of wind tunnel to obtain representative data,
2. Representativeness of particle resuspension mechanisms; and
3. Sampling artifacts.

1. Ability of wind tunnel to obtain representative data

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"This reviewer will make an attempt to show that the observations made by the wind tunnel method provide a set of data that are sufficient to proceed with the determination of RSALs."

2. Representativeness of particle resuspension mechanisms

The reviewers commented regarding wind tunnel ability to erode particles, compared to nature:

- "The wind tunnel provides sufficient shearing stress at the surface to suspend particle aggregates in the size ranges far greater than the respirable-size particles... Redeposition is negligible."
- "It is the opinion of this reviewer that the results are likely to be an overestimate of suspended dust and erosion potential compared to the worst that would ever be observed in nature."
- "Roughness can act to dam or retard rather than release particles. This happens in nature too. Consequently, I think that this phenomenon is adequately modeled in a wind tunnel."

3. Sampling artifacts

One reviewer questioned calibration of the DustTRAK instrument, but concluded, "The main function of the DustTRAK was to provide real-time particle concentration data and this function was not seriously compromised by the data adjustments."

We (the agencies) agree and comment further: The DustTRAK calibration depends on the size distribution of the test aerosol; the instrument employs optical scattering. It was used for purposes of establishing depletion, and did not need absolute calibration.

"To increase the accuracy of tunnel estimates, it would have been useful to have a cyclone preseparator on the ambient PM-10 filter."

We agree (the agencies) with this comment. It is likely that the uncertainty in the multiplication factor introduced by the empirical correction is around 10%, based on the PM-10:TSP ratio observed near the wildfire site. The multiplication factor is conservative with the empirical correction used.

Data interpretation

A number of significant comments relate to interpretation of the results for RSAL purposes and were as follows:

- Soils at Rocky Flats are a "limited source" - "The 'limited source' concept means that ...the present wind tunnel results would tend to overestimate the PM-10 available for resuspension."
- "The post-fire erosion potentials for the fall fire is estimated without a clear basis." – Vegetative regrowth is predictable, and regrows with a similar pattern whether the regrowth starts in the spring or fall. As a first approximation, the shape of the 'recovery curve' would be expected to be similar in form.
- Regarding the shape of the 'recovery curve,' the resuspension factor used in risk assessments is recommended (NCRP 129, 1999) to decrease as t^{-1}, and this is in agreement with the wind tunnel observations at Rocky Flats.
- One reviewer inferred correctly that the fall fire consequences are truncated after the first year. While this is true, it is also true that fires in consecutive years on the same area are not excluded in the manner the data are used probabilistically, even though their consequences would be negligible. The second year of the fall fire recovery would have a multiplier that is smaller than for the spring fire.
- The "appropriateness" of the sampling periods relates to data interpretation. "The soil material measured at the tunnel exhaust is the integration of all the observed peaks and the data are summed"... to estimate the erosion potential.
- Regarding use of observed site-specific mass loading data... "I am in complete agreement with the choice take by the Task 3 RSALs Working Group authors to use the observed mass loading distributions."

SUMMARY RESPONSE

- The peer reviews provided very valuable insight into the viability of the wind tunnel for studies of this type.
- Comments reinforce the RSALs Working Group's use and interpretation of the data, without change.
- One highlight of the reviews is the sense that the resulting erosion potentials are likely to be overestimated. The effect this has on the mass-loading multiplication factor is likely to be less influential.
- One reviewer's comments caused us to determine that the PM-10 correction to the erosion potential calculation resulted in a higher-than-anticipated bias in the mass-

Participation List for RFCA Focus Group Meeting of 02/20/02

First	Last	Company Organization
Melissa	Anderson	RFCLOG
Christine	Bennett	AlphaTRAC, Inc.
Rick	DiSalvo	US DOE - RFFO
Sam	Dixion	City of Westminster RFCLOG
Shirley	Garcia	City of Broomfield
Patrick	Haines	URS Group (RFETS Air Quality)
Jerry	Henderson	RFCAB
Reed	Hodgin	AlphaTRAC, Inc.
Ken	Korkia	RFCAB
Michelle	Kump	RFCAB
LeRoy	Moore	RMPJC
Albert	Nelson	City of Westminster
Bob	Nininger	Kaiser-Hill Company, LLC
Tim	Rehder	US EPA
Mark	Sattelberg	US Fish and Wildlife Service
Joel	Selbin	
Carl	Spreng	CDPHE
Honorable Hank	Stovall	City of Broomfield

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RFCA Stakeholder Focus Group
Meeting Minutes
March 20, 2002

INTRODUCTION AND ADMINISTRATIVE

A participants list for the March 20, 2002 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 and the meeting rules. Introductions were made.

AGENDA

Reed reviewed the agenda:

- Agency Responses to Wind Tunnel Studies Peer Reviews;
- Agency Responses to RSALs Task 3 Report Peer Reviews;
- Uranium Surface RSAL Calculation and Draft Modeling Results.

URANIUM SURFACE RSAL CALCULATION AND DRAFT MODELING RESULTS

The U.S. Environmental Protection Agency (EPA) informed the Focus Group that the Uranium surface Radiological Soil Action Level (RSAL) had been recalculated based on comments received by the agency. These recalculations will be documented and presented to the Focus Group at the next meeting.

AGENCY REPONSES TO RSALS TASK 3 REPORT PEER REVIEWS

The EPA presented *Agency Response Presentation to RSALs Task 3 Report Peer Reviews.* According to EPA, comments from the peer review process centered on the following topics:

- Cancer slope factors;
- Addition of point estimates;
- Probabilistic assessments;
- Adult soil intake rates;
- Childhood soil intake rates;
- Spreadsheet analysis;
- Backward calculation method; and
- Uncertainty and variability analysis.

Cancer Slope Factors

Comment: Cancer slope factors are for mixed age populations and should not be used for adult only scenarios.

Agency response: For this process, the mixed-aged population parameter was the averaged age of the child and adult age. EPA Headquarters provided EPA Region 8 with adult-specific cancer slope factors.

EPA will rerun the adult calculations for scenarios (i.e., wildlife refuge worker and office worker) using adult-specific cancer slope factors.

The Focus Group requested a report back on the new adult calculations and the impact the calculations had on the RSAL. EPA stated that the rural resident scenario and open space scenario children were still being run and that the cancer slope factors for the these scenarios would not change.

Addition of Point Estimates

Comment: Point estimates should be provided to allow a perspective on probabilistic estimates.

Agency response: Point estimates should be provided for residential and wildlife refuge workers (the open space and office worker scenarios are already point estimates).

Probabilistic Assessments

Comment: Probabilistic assessment should also be done for the open space and office worker scenarios.

Agency response: Development of probabilistic inputs is time- and resource-intensive. An RSAL Working Group decision was made to focus on the scenarios, pathways, and parameters which would most impact the risk and decision making process.

Adult Soil Intake Rates

Comment: The adult soil intake rate does not seem reasonable because it is a single value and it is high. The use of point estimates for variables with sparse data, instead of assigning distribution deliberately, interjects bias.

Agency response: The report will be revised to use a distribution for the adult soil intake rate. A point estimate calculation, using the 100 milligrams per day (mg/day) EPA default value for agricultural workers, will be provided for comparison.

Childhood Soil Intake Rates

Comment: The values chosen for children seem to be reasonable. The reviewer is skeptical how long the maximum value (1000mg/day) can actually be sustained by a child. A value that high seems questionable.

Comment: The RSAL calculation does not take into account extreme soil ingestion behavior that has been observed in a small percentage of children.

Agency Response: The intent of the RSALs is to provide a level in soil that is protective of continuous, long-term exposures. The data suggest that day-to-day variability occurs with children, resulting in occasional days of high soil intake; however, the annual or long-term average is much lower. The Calabrese and Stanek (1997; 2000); Stanek et al. (2001); and the Anaconda, Montana studies determined to be the most representative of the Denver Front Range population. The decision to increase the maximum value was an RSALs Working Group decision based on other suitable studies. The hot spot methodology in sampling and analysis plans would address risk from acute or short-term exposures.

Spreadsheet Analysis

Comment: Robert Underwood, reviewer, provided a number of suggestions on improving and correcting spreadsheets used in calculating RSALs.

One example provided by the reviewer is implementing security features in the spreadsheets so that it would be difficult to make errors.

Agency response: The comments were very good and the agencies will revise spreadsheets to address R. Underwood's comments where they pertain.

Backward Calculation Method

Comment: The backward calculating method is inappropriate for deriving RSALs.

Agency response: There are limitations to this method. It should not be used when the variable that is back calculated (i.e., the risk term) is represented by a distribution; however, if you set a single target risk level (i.e., risk = 10^{-6}), and then algebraically reverse the risk equation, you produce a distribution of RSALs that represents the same

source of variability as a forward calculation of risk. Each percentile of the RSAL distribution (e.g., the "x" percentile) corresponds to the 1-x percentile for the distribution of risk estimates.

Uncertainty and Variability Analysis

In response to many questions and comments, *Section VI Uncertainty and Variability Analysis* will be revised to the extent possible to:

- Better separate uncertainty from variability;
- Make clear that the input distributions (PDFs) to the RSAL calculations represent variability in the available data, not uncertainty;
- Clarify the text or those table entries that confused people, such as the area correction factors in the RESRAD model and risk equations;
- Correct errors;
- Include any additional sources of uncertainty in the tables;
- Expand discussions, where needed, to increase the clarity of the document, such as adding the exposure unit calculations for the wildlife refuge worker;
- Clearly describe the cumulative impact for each receptor of the choices made for all parameters and assumptions.

In response to disagreements between the Working Group and the reviewers, below are areas where plans exist to retain the original approach or apply an alternative:

- Qualitative assessment of the impacts of all sources of uncertainty on the final RSAL calculation:
  - Confidence in data supporting "driver" parameters will be ranked as high, medium, or low.
  - More consistent qualitative method for evaluating impact of all assumptions on the final RSALs.
  - Goal of uncertainty assessment: Does the 95th percentile of the probabilistic risk distribution (the 5th percentile of the probabilistic RSAL distribution) adequately represent the Reasonable Maximum Exposed (RME) individual or not?
  - Two-dimensional maximum credible accident (2D MCA) may have been informative, but complex analysis was beyond the scope of what was needed in this case and quantitative assessment of uncertainty is too subjective.
- A more complete discussion of sources of uncertainty in the dose and risk coefficients, but not quantification:
  - Even ICRP has not made a quantitative estimate of uncertainty regarding dose and risk coefficients.

  - EPA's ORIA is currently tasked with making estimates of uncertainty for the FGR 13 risk coefficients.

- Dose Conversion Factors (DCFs) from ICRP 60-72 rather than ICRP 26-30 (issue of no regulatory precedent for use of the dose factors from ICRP 60-72 rather than ICRP 30):
  - ICRP 26-30 methodology will continue to be used for all site compliance calculations as required by U.S. Department of Energy (DOE) orders; however, ICRP 60-72 provided a more precise biokinetic model of the respiratory system, provided more accurate apportionment of dose to the gastrointestinal tract, and reduced uncertainty.
  - ICRP 72 dose factors specifically applicable to members of the public as opposed to the workers.
  - Models used to develop ICRP 60-72 dose factors are the same as those used to develop the Cancer Slope Factors from FGR 13.
- Special dose or risk coefficients pertinent to the RME individual will not be developed.
- Validity of point estimates.

Reed opened up the floor for technical and policy issues. After a short discussion, the Focus Group decided to set the agenda for the next meeting. Meeting topics would include:

- Rerun uranium RSAL calculations and provide results;
- Revised RSAL Task 3 report;
- Revised surface Americium and Plutonium RSAL for Task 3, Table 4; and
- Action level framework.

AGENCY RESPONSES TO WIND TUNNEL STUDIES PEER REVIEWS

There were no additional comments or questions regarding the wind tunnel studies peer reviews.

ADJOURN

The meeting adjourned at 5:05 p.m

Participation List for RFCA Focus Group Meeting of 03/20/02

First	Last	Company Organization
Melissa	Anderson	RFCLOG
Christine	Bennett	AlphaTRAC, Inc.
Kent	Brakken	U.S. DOE - RFFO
John	Ciolek	AlphaTRAC, Inc.
Rick	DiSalvo	US DOE - RFFO
Sam	Dixion	City of Westminster RFCLOG
Shirley	Garcia	City of Broomfield
Susan	Griffin	EPA
Patrick	Haines	URS Group (RFETS Air Quality)
Jerry	Henderson	RFCAB
Reed	Hodgin	AlphaTRAC, Inc.
Victor	Holm	RFCAB
Ken	Korkia	RFCAB
Joe	Legare	DOE
LeRoy	Moore	RMPJC
Albert	Nelson	City of Westminster
Diane	Niedzwiecki	CDPHE
Bob	Nininger	Kaiser-Hill Company, LLC
Tim	Rehder	US EPA
Mark	Sattelberg	US Fish and Wildlife Service
Joel	Selbin	
Carl	Spreng	CDPHE

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RFCA Stakeholder Focus Group
April 17, 2002
Meeting Minutes

INTRODUCTION AND ADMINISTRATIVE

A participants list for the April 17, 2002 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 and the meeting rules. Introductions were made.

AGENDA

Reed reviewed the agenda:

- Agency Responses to RSALs Task 3 Report Peer Reviews;
- RESRAD and Risk Recalculations; and
- Uranium Surface RSAL Calculation and Draft Modeling Results.

AGENCY RESPONSES TO RSALs TASK 3 REPORT PEER REVIEWS

Reed asked if there were further comments or requests regarding the latest version of Task 3 before the document is finalized.

The Focus Group had no further questions or comments. Reed asked that in the event questions or comments arose, please forward them to Christine Bennett of AlphaTRAC and Christine would ensure that the agencies received them.

RESRAD AND RISK RECALCULATIONS

The Environmental Protection Agency (EPA) made two presentations:

1. Recalculated RSALs for Plutonium and Americium; and
2. Risk Recalculations Discussion.

Recalculated RSALs for Plutonium and Americium

This presentation was organized in two sections:

- Differences in Parameters; and
- Results: New / Previous Sum of Ratios in picoCuries per gram (pCi/g).

Differences in Parameters

Changes in parameters resulted from comments from peer reviewers.

Basically, all of the parameters that were used in all of the different scenarios were identical with one exception—a different parameter for the adult soil ingestion. This new calculation used a uniform distribution ranging from 0 to 130 milligrams per day (mg/day). The old point estimate used was 100mg/day.

Also corrected was an inconsistency. It was discovered that the soil ingestion needed different apportioning for the open space user and office worker scenarios. For example, an adult open space worker may ingest up to 50mg of soil each day that they are on the site. If they are only on the site for 2 hours, then the RESRAD inputs were adjusted to 50mg/day for a 2-hour visit for 100 days a year. This adjustment resulted in a different answer.

One reviewer commented that the risk equations did not have a provision for calculating full ingrowth of Americium. As a result, the maximum value of Amerinum, which is 18.2%, was used instead of the measured value of 15.3%. This added a level of conservatism.

Results: New / Previous Sum of Ratios in pCi/g

These dose-based calculations have been adjusted for the sum of ratios and are the recalculated results for each scenario. The recalculated result appears on the left-hand side **in bold**. The earlier result appears on the right-hand side.

Sum of Ratios - pCi/g

Scenario	Pu RSAL	Am RSAL
Wildlife Refuge Worker	**780**/862	**142**/132
Rural Resident - Adult	**232**/209	**42**/32
Rural Resident - Child	**251**/244	**46**/37
Open Space - Adult	**3617**/11797	**658**/1801
Open space - Child	**1205**/4842	**219**/739
Office Worker	**1598**/2289	**290**/350

A general trend was the relationship between Americium to Plutonium and the recalculations resulting in a higher RSAL, with the exception of the wildlife refuge worker. This was due to the fact that the distribution was multiplied by a factor of

three in order to assign the 130 mg/day of soil ingestion for 8 hours. The RESRAD model would not convert certain data, so this was a forced input.

Summary

- Americium RSALs go up relative to Plutonium because of the higher equilibrium ratio.
- The decrease in RSALs for open space user and office worker are consistent with the risk approach used previously; and
- The changes to the refuge worker and the rural resident values were not considered significant.

Risk Recalculations Discussion

The EPA reviewed some of the changes to the risk calculations. As previously noted at the March 20, 2002 RFCA Focus Group meeting, the cancer slope factors were not representative of adult-only soil ingestion rates, as it was previously calculated using an averaged adult / child number. Revisions to the spreadsheets have been completed using the new adult-specific cancer slope factor provided by EPA Headquarters. A Focus Group member asked if the adult cancer slope factor was designed to represent an entire lifetime. EPA said that it represented 18 to 65 years of age.

A Focus Group member asked about stewardship and questioned why the Focus Group was not using the most conservative scenario. The Colorado Department of Public Health and Environment (CDPHE) stated that the end state was being viewed with an eye on what would happen over time. With this in mind, areas that were subject to erosion had a role in making decisions about remediation. CDPHE also mentioned that these types of discussions were being held in the Rocky Flats Citizens Advisory Board and the Rocky Flats Coalition of Local Governments.

EPA added that additional calculations were not done on the resident rancher scenario. The RAC group conducted an evaluation, but their methods of calculating mass loading were very different, and the results were considered very, very high by this Focus Group. A similar and representative scenario (rural resident) was recalculated and the differences between the RAC resident rancher and rural resident were considered. The RAC resident rancher was higher than the rural resident by a factor of 5 due to the fact that the RAC used 8,000mg/m^3 for an annual mass loading average, and the rural resident scenario was modeled using a 24-hour mass loading of 660mg/m^3.

RESRAD V6.0 URANIUM RSAL RESULTS FOR ROCKY FLATS

This presentation was organized in thirteen sections:

1. Aspects of the Uranium Problem
2. General Approach;
3. Parameter Sensitivity Investigation
4. Pathway Sensitivity
5. Addressing Uncertainty in Area and Depth of Contamination
6. Addressing Uncertainty in Isotopic Ratios for Uranium
7. Addressing Toxicity
8. Depleted Uranium
9. 20% Enriched Uranium
10. Dose Coefficients
11. Plant Uptake Fraction
12. Results Before Toxicity Adjustments
13. Results Adjusted for Toxicity
14. Summary

Aspects of the Uranium Problem

- Small "hot spots" of uncertain area;
- Primarily subsurface;
- Site has worked with both depleted (DU) and enriched (EU) forms of Uranium;
- Possible wide range of ratios of three isotopes: U238, U235, U234; and
- Toxicity to human kidney must also be considered.

There are small "hot spots" of a wide variety of Uranium mixtures, which are widely dispersed and are not currently well characterized. So far, there exists enriched Uranium, which is processed to create U235 isotope used for weapons and depleted Uranium, which is the residual amount after the Uranium is processed. Uranium contamination is primarily subsurface as it has been buried.

Due to the wide variety of Uranium mixtures, a wide range of ratios are needed for three isotopes: U238, U235, and U234. This made assessing (calculating) human health affects a complex problem. Uranium is a toxic metal and toxicity to the human kidney

must be considered as well. It is possible to have radiological criteria that are protective, but still not be protected from toxicity.

General Approach

- Model wildlife refuge worker and rural resident (adult / child) scenarios;
- Use same parameter values and distributions as for Plutonium RSALs if possible;
- Investigate selected additional parameters for sensitivity (area and depth);
- Address uncertainty conservatively.

Currently, three scenarios were modeled: wildlife refuge worker and the rural resident (adult and child). Similar inputs were used in terms of site description and meteorology as used for Plutonium. Since Uranium has many more gamma rays than Plutonium, exposure is still a great concern even though Uranium is buried. Uncertainties were being addressed in a conservative way.

Parameter Sensitivity Investigation

- Area of contamination—very sensitive for small hot spots;
- Depth of contamination—sensitive up to about 40 centimeters for Uranium;
- Plant root uptake fraction for Uranium—a wide range of variability observed.

A full-scale sensitivity analysis was not conducted due to the work already completed for Plutonium. Areas of contamination were reviewed, and it was concluded that areas smaller than 100/m^2 needed to be considered a sensitive parameter, as they generally were characterized as hot spots. Research shows that at the depth of contamination beyond 40 centimeters, the surface soil shielded the gamma rays effectively. In terms of the plant root uptake fraction, it was discovered that for Uranium, the uptake was orders of magnitude higher than Plutonium due to Uranium's behavior while in the soil.

Pathway Sensitivity

- Plant ingestion—dominant for U234;
- External exposure—dominant for U238 and U235;
- Inhalation—always less than 1% of dose.

The pathways will remain the same for all three scenarios: soil ingestion, inhalation, external exposure and the rural resident all included plant ingestion. The scenarios

were modeled using the different isotopes: U234, U235, and U238. Plant ingestion is affected primarily by U234. U234 does not contribute to the external exposure. External exposure is primarily from U235 and U238. Soil ingestion contamination from the three isotopes showed very little contribution. For the inhalation pathway, the modeling results have always demonstrated less than 1% of dose, indicating trace amounts of Uranium.

Addressing Uncertainty in Area and Depth of Contamination

- Model a hypothetical large area (5 acres);
- Model hypothetical surface contamination;
- Select 50 centimeters as hypothetical depth of contamination.

A lot of uncertainty exists, so a decision was made to model a hypothetical area of around five acres. This is consistent with the parameter used for the rural resident for Plutonium. To try and model surface contamination, assuming the Uranium was able to move from subsurface to surface, 50 centimeters was determined to be the depth of contamination for the purposes of calculation.

Addressing Uncertainty in Isotopic Ratios for Uranium

- Compute RSAL for each isotope (U238, U235, and U234);
- Compute sum-of-ratios RSALs for both DU and EU (bounding cases);
- Select the most restrictive RSAL as a single criterion;
- Express as total Uranium in mass units (mg/g).

A RSAL and sum-of-ratios were calculated for each isotope for two Uranium cases: depleted Uranium and 20% enriched Uranium. These calculations were based on areas of known Uranium contamination and do not represent areas where only background Uranium exists. Based on these calculations, the most restrictive case would be chosen to represent an RSAL for Uranium. Micrograms per gram (mg/g) was used instead of picoCuries per gram (pCi/g) as a convenient way to measure total uranium in terms of mass per unit of soil instead of in terms of activity. Micrograms per gram enabled a comparison between depleted Uranium and enriched Uranium. When measuring in pCi/g, the isotopic ratio was required and became too complicated for this analysis. In addition, measuring in mg/g was useful for analyzing and comparing toxicity.

Addressing Toxicity

For sum-of-ratios RSALs for depleted Uranium and enriched Uranium:

- Find percentage of dose due to ingestion (plant ingestion plus soil ingestion);
- Back calculate to annual intake, average daily intake;
- Compare with the reference dose for Uranium (RfD=3.0 ug/kg/day);
- Reduce soil action level so reference dose is not exceeded.

To assess toxicity, a formula was used to back calculate annual intake of DU and EU to an average daily intake of depleted and enriched Uranium. The percentage of dose via plant or soil ingestion was calculated first using a computer model. This dose corresponded to millirem radiological dose. Then the percentage of dose was divided by the ingestion dose coefficient (ICRP 72) expressed in millirems per pCi. This was converted to micrograms. This represents the annual intake, which is used to calculate average daily intake. This result was compared with safety standards and the reference dose. If the safety standard or reference dose for toxicity was exceeded, the soil action level was reduced because radiological criteria was not protective enough.

Reed noted that reference dose is not associated with radioactivity, it is associated with heavy metal toxicity.

Depleted Uranium

The following chart showed the difference in percentages of the different isotopes of EU and DU by mass.

Depleted Uranium
1 picoCurie = 2.5 micrograms

Isotope	% by Mass	% Activity
U238	99.75	70
U235	.25	1
U234	.0005	29

U234 makes up a very small amount of DU by mass (.0005), but represents 29% by activity. This is due to the very short half-life relative to U235 and U238.

20% Enriched Uranium

U234 is still a very small amount by mass, but now has 90% of the activity. The range of mass in terms of pCi was great for EU and DU.

20% Enriched Uranium
1 picoCurie = .111 micrograms

Isotope	% by Mass	% Activity
U238	79.95	4
U235	20	6
U234	.05	90

Dose Coefficients

- Taken from ICRP 72;
- Applicable to members of the public;
- Age specific—adults and 1-year old child;
- Only one choice for ingestion coefficient (conservative);
- Used default Type M for inhalation.

The dose coefficients from ICRP 72 are age-specific. For these calculations, the data that are represented are an adult and a 1-year old child. A level of uncertainty was factored into the dose coefficient to help keep the coefficient conservative. The variables that were considered for uncertainty were solubility and form. Uranium tends to be reasonably insoluble, but the dose coefficient uses moderate solubility. Also, if the Rocky Flats Site was not sure what the chemical form of Uranium was at the time of exposure, then using type moderate (Type M) for the inhalation parameter was suggested. It was emphasized that inhalation only represents 1% of the dose according to sensitivity studies.

Plant Uptake Fraction

- Represents fraction of Uranium in soil taken up through plant roots;
- Wide variability observed in studies;
- Influenced by many factors;
- Used a broad distribution in the RESRAD model;
- Modeled more conservatively than the RESRAD default.

Plant uptake fraction represents a fraction of Uranium if the soil is taken up through a plant's roots. After reviewing several studies, the Working Group identified a wide variability in the amount of Uranium that could be taken up through a plant's roots. Since there was such a complicated relationship with plant uptake, the Working Group made a decision to use a broad distribution for that parameter in RESRAD. This was more conservative than the default value in RESRAD. It was observed that these results were three times higher than the RESRAD default at the 95th percentile. These results were reviewed by Dr. Ward Wicker, and he confirmed that they were conservative.

Results before Toxicity Adjustments

The next two charts, titled *Results (micrograms/grams) Before Toxicity Adjustments* and *Results (micrograms/grams) Adjusted for Toxicity* were calculated using total Uranium. It was found that total Uranium was easier to measure and less expensive to study than isotopic Uranium. For three scenarios, RSALs were calculated. For EU, the RSAL is greater than the two resident scenarios. The RSALs are calculated and expressed in micrograms/grams. It was discovered that scaling of the RSALs was necessary in order to meet toxicity criteria.

Results (micrograms/grams)
Before Toxicity Adjustments

Scenario	DU RSAL	EU RSAL
Rural Resident - Adult	619	31
Rural Resident - Child	692	35
Wildlife Refuge Worker	3268	225

Results Adjusted for Toxicity

Based on the adjusted toxicity results, it was decided that RSAL for the rural resident would be 31mg/g for EU, and for the wildlife refuge worker, the RSAL would be 225mg/g for EU. Both criteria are based on a radiological annual dose of 25 millirem because of the Uranium being enriched.

Results (micrograms/grams)
Adjusted for Toxicity

Scenario	DU RSAL	EU RSAL
Rural Resident - Adult	225	31
Rural Resident - Child	124	35
Wildlife Refuge Worker	3163	225

Summary

- The most restrictive criterion for rural resident scenario is 31 mg/g;
- The most restrictive criterion for wildlife refuge worker is 225 mg/g;
- Both criteria are radiologically based on a 25-millirem annual dose for 20% enriched Uranium; and
- The input parameters were based on many conservative assumptions.

General Discussion

A member of the Focus Group asked for a description of the different forms of Uranium at Rocky Flats and how they were represented in the model. The Focus Group was informed that this information was not easy to extract from the datasets, but consulting with different studies on the subject, the RSALs for Uranium at Rocky Flats reasonably represent the wide range of variability found in the studies. The description of the different forms of Uranium at Rocky Flats would be published in a pathway summary.

One Focus Group member pointed out that the RSAL for EU would result in very high clean up costs because of the potential for cleaning up areas where natural background levels exceed this RSAL.

The RSALs Working Group has been tasked with finalizing the Task 3 Report. The final report will address the Focus Group discussions and the responses to the peer reviews.

The Focus Group was informed that end state discussions and policy discussions concerned with RSALs would be answered in a different forum.

The CDPHE acknowledged all the participants for their hard work. CDPHE stated that Rocky Flats has accelerated its current cleanup schedule and the focus will be on surface contamination cleanup in the risk range of 10^{-5} for the refuge worker.

Participation List for RFCA Focus Group Meeting of 04/17/02

First	Last	Company Organization
Melissa	Anderson	RFCLOG
Christine	Bennett	AlphaTRAC, Inc.
Kent	Brakken	U.S. DOE - RFFO
Carol	Deck	Kaiser-Hill Co, LLC
Glenn	Doyle	DOE-RFFO
Shirley	Garcia	City of Broomfield
Susan	Griffin	EPA
Steve	Gunderson	CDPHE
Jerry	Henderson	RFCAB
Reed	Hodgin	AlphaTRAC, Inc.
Victor	Holm	RFCAB
Ken	Korkia	RFCAB
Tom	Marshall	Rocky Mountain Peace and Justice Center
Albert	Nelson	City of Westminster
Diane	Niedzwiecki	CDPHE
John	Rampe	U.S. DOE - RFFO
Tim	Rehder	US EPA
Kathleen	Rutherford	CDPHE/HMWMD
Joel	Selbin	
Dave	Shelton	Kaiser-Hill Company, LLC
Carl	Spreng	CDPHE

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