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Department of Energy
ROCKY FLATS FIELD OFFICE
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GOLDEN, COLORADO 80403-8200

03-DOE-00433

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DIST.	LTR	ENC
BERARDINI, J. H.	X	
BOGNAR, E. S.	X	
CROCKETT, G. A.		
DECK, C. A.	X	
DEGENHART, K. R.		
DIETER, T. J.		
DIETERLE, S. E.		
FERRERA, D. W.		
FERRI, M. S.		
GERMAIN, A. L.		
GIACOMINI, J. J.		
ISOM, J. H.		
LINDSAY, D. C.	X	
LONG, J. W.		
LYLE, J. L.		
MARTINEZ, L. A.	X	
NAGEL, R. E.	X	
NORTH, K.		
PARKER, A. M.	X	
POWERS, K. P.		
RODGERS, A. D.		
SHELTON, D. C.	X	X
SPEARS, M. S.		
TRICE, K. D.		
TUOR, N. R.	X	
WILLIAMS, J. L.		
BUTLER, L.	X	X
BROOKS, L.	X	

COR. CONTROL	X	X
ADMN. RECORD	X	X
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Reviewed for Addressee
Corres. Control RFP

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DOE ORDER #
NONE

1/378

Mr. Steve Gunderson
RFCA Project Coordinator
Colorado Department of Public Health and Environment
4300 Cherry Creek Drive South
Denver, Colorado 80246-1530

Mr. Timothy Rehder
Rocky Flats Project Manager
United States Environmental Protection Agency
999 18th Street, Suite 500
Denver, Colorado 80202-2466

Dear Mr. Gunderson and Mr. Rehder:

This is to transmit the following enclosed final modifications to Rocky Flats Cleanup Agreement (RFCA) Attachments dated May 28, 2003 for approval.

- RFCA Attachment 5, *Action Levels and Standards Framework for Surface Water, Ground Water and Soils*;
- RFCA Attachment 10, *RCRA Closure for Interim Status Units*; and
- a new RFCA Attachment 14, *Original Process Waste Lines (OPWL) Subsurface Soil Approach*.

Proposed modifications to these RFCA Attachments were released by the RFCA Parties on November 12, 2002 for public review and comment. Also enclosed is a *Memorandum Describing Final Approved Modifications to Rocky Flats Cleanup Agreement Attachments* regarding the changes from the proposed modifications resulting from consideration of public comments received and the *Response to Comments* document.

Reaching agreement on these modifications demonstrates the continuing effectiveness of the RFCA consultative process approach. We recognize that some outstanding issues remain, including the post-closure regulatory approach for Rocky Flats. We look forward to further consultation and discussion with you to resolve these issues.

If you have any questions concerning this transmittal, please contact me at (303) 966-5918 or Glenn Doyle at (303) 966-3087.

Sincerely,

Richard J. DiSalvo
Acting Assistant Manager
for Environment and Stewardship

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Enclosures

DOCUMENT CLASSIFICATION REVIEW WAIVER PER CLASSIFICATION OFFICE

SW-A-004808

RFCA Modifications Package

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Memorandum Describing Final Approved Modifications to Rocky Flats Cleanup Agreement Attachments

1.0 Introduction - Proposed modifications to certain Rocky Flats Cleanup Agreement (RFCA) Attachments were released for public review and comment by the RFCA Parties, the Department of Energy (DOE), the Environmental Protection Agency (EPA) and the Colorado Department of Pubic Health and Environment (CDPHE), on November 12, 2002 (hereinafter, the "proposal"). A *Technical Basis Document for the Proposed Modifications* was released at the same time to explain the rationale and basis for the proposal to facilitate public review. Ninety-five sets of individual or organization comments were received. After consideration of public comments received and incorporation of changes deemed necessary for approval, EPA and CDPHE have approved final modifications as described herein.

The proposal incorporated new surface Radionuclide Soil Action Levels (RSALs) for plutonium, americium and uranium that are more conservative than the RSALs established in 1996. New soil action levels for other contaminants of concern at the Site, most of which are more conservative than the 1996 action levels, and new action levels for ecological receptors were also proposed. The proposal recognized that a wildlife refuge is the reasonably foreseeable future land use of the Site. The new RSALs and action levels for other soil contaminants of concern were proposed based on contamination levels that are calculated to pose a lifetime excess cancer risk of $1x10^{-5}$ to a wildlife refuge worker. This is the midpoint of the acceptable lifetime excess cancer risk range promulgated pursuant to the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and complies with the anticipated relevant and appropriate requirements for radiation dose limits for a refuge worker as well as for a hypothetical rural resident.

The new RSALs in the proposal and the soil action level changes for other contaminants were predicated upon the adoption of an integrated risk-based approach for surface and subsurface contamination. This approach requires removal of soils contaminated above the RSALs or non-radionuclide contaminant action levels to specified depths and the application of a risk screen methodology to contaminated soils below that depth. The risk screen considers pathways of exposure that may pose a lifetime excess cancer risk of $1x10^{-5}$ or greater to a wildlife refuge worker. In response to the strong community priority for removal of soils with plutonium-239/240 and americium-241, which are subject to wind and water erosion and present a direct exposure path, the RFCA Parties proposed that soils above the RSALs for plutonium and americium be removed down to 3 feet below the surface. Removal of soils between 3 and 6 feet below the surface was also proposed for plutonium-239/240 concentrations above 3 nCi/g, depending upon the areal extent and volume of contamination that would pose an unacceptable risk if it were brought to the surface by burrowing animals. A new Attachment 14 specifying targeted soil sampling between 3 and 6 feet associated with Original Process Waste Line reported

or suspected leak locations was also proposed. The proposal specified removal of soils with other contaminants of concern above their respective action levels down to 6 inches below the surface. Below these removal depths the risk screen is applied.

The proposal included a change to the ground water action level for tritium and a change to the averaging period for measurement of plutonium and americium in surface water at the three onsite Points of Compliance (POCs) at the outfalls of the terminal ponds A-4, B-5 and C-2.

2.0 Purpose and Format - The purpose of this memorandum is to describe the changes incorporated in the final approved modifications.

Section 3.0 of this Memorandum discusses the final approved modifications and changes made from the proposal in the following Documents:

- RFCA Attachment 5, *Action Levels and Standards Framework for Surface Water, Ground Water and Soils*;
- RFCA Attachment 10, *RCRA Closure for Interim Status Units*; and
- new RFCA Attachment 14, *Original Process Waste Lines (OPWL) Subsurface Soil Approach.*

A *Response to Comments* has been prepared to document the RFCA Parties' consideration of the comments received regarding the proposal. While Section 3.0 briefly discusses the comments in relation to changes made in the final modifications, please refer to the *Response to Comments* for specific comments and responses.

3.0 Final Approved Modifications and Changes from Proposed Modifications Released November 12, 2002

3.1 Attachment 5, *The Action Levels and Standards Framework for Surface Water, Ground Water and Soils* - The following is a section-by-section guide to the major changes.

3.1.1 Section 1.0, General Background – After consideration of comments related to the future land use scenario, soil put back levels, institutional controls and long-term stewardship the proposal was adopted without change. In Section 1.1 one reasonably anticipated future land use - a wildlife refuge – replaces the former five conceptual land uses for various portions of the Site. Proposed changes related to "put-back levels" were retained because this may facilitate decisions to remove small volumes of soil with higher concentrations of contamination that are overlain by large volumes of less contaminated soil that otherwise would not trigger removal under the requirements of Attachment 5.

Section 1.2 modifications recognizing that appropriate institutional controls and long-term stewardship activities will be employed at the Site are also retained essentially as proposed. Numerous comments were received related to the post-closure regulatory approach for enforcement and the funding aspects of long-term stewardship. While the

RFCA Parties understand that these issues will require further consultation and discussion, including consultation with the community, they do not need to be resolved as part of these modifications. DOE will continue to consult with the community on the development of its Long Term Stewardship plan and these issues will also be addressed as appropriate in the development of the RCRA Facility Investigation/Remedial Investigation - Feasibility Study/ Corrective Measures Study (RFI/RI-CMS/FS), the Proposed Plan and the final Corrective Action Decision/Record of Decision (CAD/ROD).

Comments also were received related to adoption of a degree of cleanup that would eliminate the need for institutional controls and certain long-term stewardship activities. The RFCA Parties do not believe that it is feasible to achieve such a degree of cleanup for a variety of reasons, including cost and limitations of current technology.

Figure 1, *Conceptual Land Uses at RFETS* indicates areas of the Rocky Flats Environmental Technology Site (RFETS or the Site) within which it is anticipated that institutional controls will be used to prevent unacceptable exposure from residual contamination to the wildlife refuge worker. In addition it is presumed that there will be no residential development at the Site. Figure 1 also shows areas of the Site where landslide or increased erosion potential exists. Although no comments were received related to these aspects of the proposal Figure 1, minor changes to clarify certain mapped features and the legend were made in the final modification.

3.1.2 Section 2.0, Surface Water – Section 2.1 is unchanged from the proposal. The new Figure 2, Sketch of Stream Segments 4a/4b and 5, which accompanies the narrative description in Section 2.1, is also adopted, but minor changes were made to Figure 2's key in the final modification to more clearly indicate the segments. No comments related to the proposal were received.

Several comments were received regarding the proposed elimination of the point of compliance monitoring for tritium in section 2.2.C.1. The final modification adopts the proposed change. The proposed Section 2.2.C.2 modification adding a description of the Point of Evaluation (POE) at the outfall of the sewage treatment plant, as agreed in relation to the renewal of the discharge permit is also unchanged.

CDPHE has notified the Water Quality Control Commission of the proposal to change to an annual averaging period for plutonium and americium for the on-Site POCs in Sections 2.2.C.4 and 2.3, but the change is contingent upon adoption by the Commission, which is expected to occur in 2004. A number of comments were received regarding this proposed change, and the majority of these suggested that various reporting, notification and record keeping requirements be imposed. Many of these suggestions may ultimately be adopted in consultation with the community, but they do not affect the averaging period to be used for regulatory compliance determinations. A number of comments were received questioning why only plutonium and americium are specified as contaminants for monitoring. This specificity does not preclude monitoring for other contaminants of concern, but rather is intended to incorporate an annual averaging period for plutonium and americium. Therefore the proposal is adopted.

A number of comments were received regarding Section 2.2.C.5 and Section 2.3 in the proposal to clarify that specific surface water performance monitoring points may be implemented in addition to identified POEs or POCs. The comments suggested various requirements be added to expand the number of POCs and other monitoring points and the contaminants to be monitored. The proposal did not preclude consideration of these suggested requirements in decision documents or the Integrated Monitoring Plan (IMP) as appropriate. Since this was intended as a clarification related to performance monitoring points the proposal is adopted.

While not included in the proposal, the RFCA Parties have agreed that Table 1, *Surface Water Action Levels and Standards* should be updated to reflect the classifications and standards approved by the Water Quality Control Commission effective October 20, 2001. The WQCC consideration and promulgation of these changes is conducted pursuant to a formal public participation process. An annotated Table 1 showing the specific changes is enclosed with this memorandum.

3.1.3 Section 3.0, Ground Water – In the proposal Section 3.2.B.4 eliminated Table 3, *Tier II Ground Water Wells*. This Table is no longer needed since these well locations are identified in the IMP. The IMP is reviewed and updated as needed on an annual basis. (In the final modifications, Table 3 is now titled, *Soil Action Levels*.)

Table 2, *Ground Water Action Levels* changed the Tier II action level for tritium from 666 to 20,000 pCi/l and the Tier I action level (100 times the Tier II action level) from 66,600 to 2,000,000 pCi/l in the proposal. This change makes the Tier II action level consistent with the promulgated Maximum Concentration Limit (MCL) for tritium in drinking water. Measurable tritium is found in groundwater samples very infrequently, but at low levels compared to the Tier II action level. No comments were received regarding this action level change and it is adopted.

3.1.4 Section 4.0, Soils Contaminated with Non-Radioactive Materials – The title was changed from the proposal, Non-Radionuclide Contaminated Soils, for clarity.

The proposal was a complete rewrite of the original Section 4.0, Subsurface Soils, because the basis for accelerated action determinations in soil is based on risk posed by contamination rather than on a definition of surface and subsurface soils.

The majority of comments received focused on concerns about the underlying policy aspects of the proposed new integrated risk based approach. Although these concerns were directed towards the approach for plutonium, americium and uranium contamination, which is governed by Section 5.0, Soils Contaminated with Radioactive Material, the RFCA Parties assumed the issues raised were intended to apply to Section 4.0, as well. Many questioned the RFCA Parties policy decision to "fund" the additional soil removal triggered by the lower RSAL with closure project contract baseline savings projected to result from the application of the risk screen methodology. (Lower baseline costs for subsurface soil removal are projected, because there are insignificant or

incomplete pathways of exposure to a wildlife refuge worker or to ecological resources from subsurface contamination. Thus, the risk posed by subsurface contamination at many Individual Hazardous Substance Sites is expected to be less than $1x10^{-5}$ and an accelerated action to remove the soil would not be triggered.)

Some questioned adopting soil action levels based upon a $1x10^{-5}$ risk rather than a $1x10^{-6}$ risk or some lower value. Some commenters thought the integrated risk based approach should not be constrained by current projected closure project funding levels, and also expressed concern that comparison of cost projections for the current baseline and the integrated risk based approach were not well documented.

Many commenters expressed concerns about the institutional controls and long-term stewardship implications resulting from subsurface contamination that would not be removed under the risk screen approach. Some commenters had concerns about various technical details and aspects of the approach that were based on information in the *Technical Basis Document* and not the implementing language in Sections 4.0 and 5.0. In particular, there were a number of questions and suggestions regarding the prairie dog model used to estimate possible intrusion into and mobilization of subsurface contamination. While these were primarily focused on radionuclide contamination, they also related to non-radioactive contaminants.

The RFCA Parties considered the comments related to all of these issues. The final modifications in Section 4.0, Table 3 and Figure 3 retain the key elements of the integrated risk based approach that were in the proposal. However, the final modification contains a number of editorial and other changes to provide additional clarity.

Figure 3 has been renamed the *Subsurface Soil Risk Screen* rather than the *Soil Risk Screen* since the screen is only applied after any soil removals triggered by contamination above the action levels will be done. The decision gates have also been revised for clarity. The proposed Screen 6 related to soils that may cause surface water standards to be exceeded at an existing Point of Compliance has been eliminated. Screen 4 has been changed to incorporate evaluation of impacts to surface water, without the limitation in the proposed Screen 6. A conforming change was made to Section 4.2D to reference the entire Section 2.0 in Attachment 5, rather than just Section 2.4 for evaluations related to surface water impacts.

Section 4.2.I now also specifies that if the Subsurface Soil Risk Screen evaluation results in the determination that no accelerated action is triggered, the evaluation and results will be documented and approved by the Lead Regulatory Agency as a No Further Accelerated Action.

Table 3 has been changed from the proposal to eliminate the separation of site wide contaminants of concern as a separate part and a notation now indicates these contaminants within the table. The proposal listed ecological receptor action levels in Table 3 for analytes where the ecological receptor action level was lower than the wildlife refuge worker action level. All ecological receptor action levels that have been

calculated to date are listed in the final Table 3. Twelve new analytes have been added to the final Table 3 from EPA's list of Persistent, Bioaccumulative and Toxic (PBT) pollutants. The RFCA Parties are reviewing these analytes to determine if they were or could have been used at RFETS and whether the analyte is an ecological potential contaminant of concern. These analytes do not include action levels at this time; however, in the location of a value are the letters "TBD." If it is determined that any new analyte that was used or could have been used at RFETS is a potential contaminant of concern, then an action level will be determined in the same manner used to calculate the action levels in Table 3. (Note: This would include a calculation of wildlife refuge worker action levels as well as ecological receptor action levels.) Table 3 will be modified, if needed, based upon the outcome of this evaluation and after public review and comment.

Footnote b has been changed in the final Table 3 to clarify that all other analytes without calculated ecological receptor action levels will be evaluated to determine whether any are ecological potential contaminants of concern. These will be considered in any Action Determination, including pursuant to the Subsurface Soil Risk Screen, Screen 5 for an IHSS where these contaminants are located. An ecological receptor action level will be determined in the same manner used to calculate the other ecological receptor action levels in the table. Table 3 will be modified, if needed, based upon the outcome of this evaluation and after public review and comment.

3.1.5 Section 5.0, Soils Contaminated with Radioactive Material – As with Section 4.0, in the proposal this was a complete rewrite. The provisions of this section essentially parallel those in Section 4.0 regarding the application of the soil risk screen methodology for subsurface soils.

The majority of public comments were related to concerns about aspects of plutonium and americium accelerated action determinations and cleanup of soil once an action is triggered. While commenters expressed agreement with lowering the RSAL and the removal of soils above the plutonium and americium RSAL to 3 feet below the surface, many requested that the plutonium-239/240 RSAL be lowered to account for the possibility of a future subsistence farmer land use scenario. Some questioned adopting soil action levels based upon a $1x10^{-5}$ risk rather than a $1x10^{-6}$ risk or some lower value. Many objected to limiting the proposed approach to constraints of projected closure project funding and requested that DOE work to obtain additional funding to remove more plutonium contaminated soil. Others objected to the 10 nCi/g and 3 nCi/g limits for removal of soils in the 3-6 foot depth and requested removal of plutonium-239/240 contamination to 1 nCi/g or lower and to deeper levels regardless of depth or cost. Some requested more specificity about consultation with the community if extensive contamination between 1 and 3 nCi/g is encountered. Other concerns included the subsurface soil depths at which the risk screen will be applied for plutonium, americium or uranium, and the removal of soil above the RSAL down to 3 feet only if the contamination originated at the surface.

Many commenters expressed concerns about the institutional controls and long-term stewardship implications resulting from subsurface radionuclide contamination that would not be removed under the risk screen approach. Again, the questions and suggestions regarding the prairie dog model in the *Technical Basis Document* were primarily focused on radionuclide contamination.

While the RFCA Parties have determined that most attributes of the proposal will be retained in the final modification, the community preference for removal of plutonium-239/240 contamination to below 1 nCi/g is adopted for accelerated actions triggered in the 3 to 6 foot depth interval. The concentrations that will trigger accelerated actions to remove contaminated soils in the 3-6 foot depth interval have been changed as outlined in the following table:

Contamination Level (nCi/g)	Areal Extent Limit (m^2)	Volume Extent Limit (m^3)
7	0	0
6	40	25
5	50	31
4	60	37
3	80	50

In addition, the proposal requirement that plutonium or americium contamination in the 0-3 foot depth interval must originate on the surface to trigger an accelerated action has been removed.

EPA and CDPHE agree that based upon the application of the risk screen methodology, no accelerated action is required for subsurface contamination in T-7, the Ash pits and the soils wrapped in geotextile that were returned to T-4 as part of the T-3/T-4 accelerated action. Thus, the budget resources for these three IHSSs will allow for additional characterization and soil removal.

In response to comments, the RFCA Parties will add new OPWL characterization targeted sampling points and the depth of targeted samples will increase to 8 feet. This is in conjunction with completed or planned sampling for Under Building Contamination (UBC) and information gathered from the planned removal of valve vaults and OPWL. The limited amount of OPWL removed to date, including from the 700 Area, has not been highly contaminated or contributed to soil contamination. UBC characterization data collected to date indicates a lack of contamination from OPWL under deeper buildings. This sampling will provide additional confidence regarding the adequacy of characterization for areas of reported or suspected OPWL leaks.

In addition, the change to remove soils to below 1 nCi/g between 3 and 6 feet below the surface once an accelerated action is triggered eliminates the need for a community consultative process when an accelerated action is under way. This should streamline the

RFCA Party field consultation and allow the conduct and completion of these actions based on real time evaluations of remaining contamination without delays that might result from a community consultation process. The RFCA Parties believe that this change will result more contaminated soil removal at the ongoing 903 Pad soil removal action. If contamination between 1 and 3 nCi/g is found at multiple sampling points for any IHSS or group of IHSSs in close proximity, the DOE and LRA will evaluate the potential for risk of exposure and consult with the community regarding the need for further action.

Section 5.3.K now also specifies that if the Subsurface Soil Risk Screen evaluation results in the determination that no accelerated action is triggered, the evaluation and results will be documented and approved by the Lead Regulatory Agency as a No Further Accelerated Action.

3.2 Attachment 10, RCRA Closure for Interim Status Units – The proposal contained a new Part IV to allow for risk-based closure of certain RCRA/CHWA units in accordance with the integrated risk-based approach. This incorporated a regulatory change that was promulgated subsequent to the development of this Attachment in 1996. Part III recognizes the CDPHE determination that OPWLs are not interim status units.

Several comments were received regarding certain implementation aspects of the approach and the status of OPWLs and other units subject to this Attachment. New language was added to the final modification to clarify the basis for the determination for OPWLs. A few minor edits were also made. Since the implementation aspects will be the subject to subsequent decision documents and the regulatory change is applicable to the Site, the Attachment was otherwise finalized as proposed.

3.3 New Attachment 14, Original Process Waste Lines Subsurface Soil Approach - It is expected that the most likely source of possible plutonium-239/240 contamination originating in the 3 to 6 foot depth interval is from reported or suspected OPWL leaks.

Comments received were similar to those related to Attachment 5, Section 5.0. In summary, most commenters asked that contaminated soil below three feet be removed to 1 nCi/g or less when an accelerated action is triggered. They also asked that characterization should not stop at six feet and that more OPWL sampling locations be considered. Some commenters expressed concern about the sampling methodology, including how the proposal's "upper limit" of 10nCi/g would be implemented. In considering these comments along with those related to Attachment 5, Section 5.0, the RFCA Parties have made a number of changes to this Attachment consistent with the final changes made to Section 5.0.

First, the sample depth for targeted sample locations has been changed from six to eight feet to provide information about the vertical extent of contamination that may originate from an OPWL leak in the three to six foot depth interval. This characterization information will be used in the risk screen evaluation to make accelerated action

determinations for soil removal below six feet that may have originated from OPWL leaks in the 3-6 foot depth interval.

Second, the following table of the step out sampling points based upon the plutonium-239/240 concentration found at the initial targeted sample location has been added.

Contamination Level (nCi/g)	Areal Extent Limit (m^2)	Volume Extent Limit (m^3)	Step-out Sample Locations
7	0	0	None
6	40	25	2m x 5m
5	50	31	2m x 6m
4	60	37	2m x 7.5m
3	80	50	2m x 10m

The table shows that the spacing of the step out sample points is a function of the initial sample concentration. As the initial sample concentration increases the area circumscribed by the step out points decreases in increments. The sampled area and volume of soil based on the proposal's accelerated action trigger of 3 nCi/g, at 80 m^2. This represents an approximate sampled volume of 50 m^2 because each soil sample is the column of soil between three and eight feet below the surface divided into approximately 2-foot increments for laboratory analysis.

Third, as shown in the table, if the initial targeted sample is 7nCi/g or greater, an accelerated action is triggered. This was lowered from 10nCi/g in the proposal.

Fourth, as discussed in Section 3.1.5 related to ALF Section 5.0, the RFCA Parties evaluated the completed and planned sampling and analysis points for UBC and OPWL associated IHSSs. Based on this evaluation, additional OPWL targeted sampling locations will be included, which will result in thorough characterization of the OPWL. The proposal's targeted location descriptions were included as appendices to this Attachment. These appendices have been removed from the final Attachment 14. Instead, these locations will be specified in the modification of the Industrial Area Sampling and Analysis Plan necessitated by a number of provisions in the final modifications.

ENCLOSURE

ANNOTATED RFCA ATTACHMENT 5 TABLE 1, SURFACE WATER ACTION LEVELS AND STANDARDS

Best Available Copy

Table1 - Surface Water Action Levels & Standards

Bold Denotes the Value of the change made in the table.

Analyte	CAS Reference Number	Standards and Action Levels [a] (mg/L)	Basis [b]	Temporary Modifications [c] (mg/L)	PQLs [d] (mg/L)	2001 Comment	New Standard (mg/L)	Notes
Acenaphthene	83-32-9	4.20E-01	W+F, WS		1.00E-02	Revised W+F, WS value	4.20E-01	
Acenaphthylene	208-96-8	2.80E-06	W+F		1.00E-02			
Acetone	67-64-1	3.65E+00	PPRG					
Acrolein	107-02-8	2.10E-02	AL		1.00E-02			
Acrylonitrile	107-13-1	5.90E-05	W+F		5.00E-03	Revised W+F value	5.90E-05	
Alachlor	15972-60-8	1.20E-03	W+F		2.00E-03	Revised W+F value	1.20E-03	
Aldicarb	116-06-3	7.00E-03	WS		1.00E-02	Revised WS value	7.00E-03	
Aldicarb sulfone	1646-88-4	7.00E-03	WS		3.00E-03	Revised WS value	7.00E-03	
Aldicarb sulfoxide	1646-87-3	7.00E-03	WS		3.00E-03	Revised WS value	7.00E-03	
Aldrin	309-00-2	1.30E-07	W+F		1.00E-04			
Aluminum, dissolved	7429-90-5	8.70E-02	AL					
Ammonia, un-ionized	7664-41-7	[e]	[e]					
Anthracene	120-12-7	2.10E+00	W+F, WS		1.00E-02	Revised W+F, WS value	2.10E+00	
Antimony, total recoverable	7440-36-0	6.00E-03	W+F, WS		1.00E-02			
Arsenic, total recoverable	7440-38-2	1.80E-05	W+F			Revised W+F value	1.80E-05	
Atrazine	1912-24-9	3.00E-03	WS		1.00E-03			
Barium, total recoverable	7440-39-3	4.60E-01	WS			30 day value for WS is	4.60E-01	
Benzene	71-43-2	1.20E-03	W+F, WS	5.00E-03	1.00E-03	Revised W+F, WS value	1.20E-03	
Benzidine	92-87-5	1.20E-07	W+F		1.00E-02			
alpha-BHC	319-84-6	3.90E-06	W+F		5.00E-05			
beta-BHC	319-85-7	1.40E-05	W+F		5.00E-05			
gamma-BHC [Lindane]	58-89-9	8.00E-05	AL		5.00E-05	Revised AL value	8.00E-05	See hexachlorocyclohexane
Benzo(a)anthracene	56-55-3	4.40E-06	W+F		1.00E-02			
Benzo(a)pyrene	50-32-8	4.40E-06	W+F		2.00E-04	**Delete WS**		
Benzo(b)fluoranthene	205-99-2	4.40E-06	W+F		1.00E-02			
Benzo(g,h,i)perylene	191-24-2	4.40E-06	W+F		1.00E-02			
Benzo(k)fluoranthene	207-08-9	4.40E-06	W+F		1.00E-02			
Beryllium	7440-41-7	4.00E-03	SS, WS		5.00E-03			
Boron, total	7440-42-8	7.50E-01	AG, SS			**Add Ag**		
Bromodichloromethane	75-27-4	5.60E-04	W+F		1.00E-03	Revised THM Std	8.00E-02	Revised W+F = **5.60E-04**
Bromoform [Tribromomethane]	75-25-2	4.30E-03	W+F		1.00E-03	Revised THM Std	8.00E-02	Revised W+F = **4.30E-03**
Bromomethane [Methyl Bromide]	74-83-9	4.80E-02	W+F		1.00E-03			
2-Butanone [Methylethyl Ketone]	78-93-3	2.19E+01	PPRG					
Butylbenzylphthalate	85-68-7	1.40E+00	W+F, WS		1.00E-02	Revised W+F, WS value	1.40E+00	
Cadmium, dissolved	7440-43-9	1.50E-03	TVS [h]		5.00E-03			
Carbofuran	1563-66-2	4.00E-02	WS		7.00E-03	Revised WS value	4.00E-02	
Carbon disulfide	75-15-0	3.65E+00	PPRG					
Carbon tetrachloride	56-23-5	2.50E-04	W+F	5.00E-03	1.00E-03			
Chlordane	5103-71-9	2.10E-06	W+F		1.00E-03	Revised W+F value	2.10E-06	
Chlorobenzene	108-90-7	1.00E-01	W+F, WS		5.00E-03			
Chloroethane	75-00-3	2.94E-02	PPRG					
bis(2-Chloroethyl)ether	111-44-4	3.10E-05	W+F		1.00E-02	Delete WS, W+F =	3.10E-05	
Chloroform [Trichloromethane]	67-66-3	5.70E-03	W+F		1.00E-03	Revised THM Std	8.00E-02	Revised W+F = **5.70E-03**
bis(2-Chloroisopropyl)ether	39638-32-9	2.80E-01	W+F, WS		1.00E-02	Revised W+F, WS value	2.80E-01	
Chloromethane [Methyl Chloride]	74-87-3	5.70E-03	W+F		1.00E-03			See WQS for methly chloride
4-Chloro-3-methylphenol	59-50-7	3.00E-02	AL		5.00E-02			
2-Chloronaphthalene	91-58-7	5.60E-01	W+F, WS			Revised W+F, WS value	5.60E-01	
2-Chlorophenol	95-57-8	3.50E-02	W+F, WS		5.00E-02	Revised W+F, WS value	3.50E-02	
Chloropyrifos	2921-88-2	4.10E-05	AL		1.00E-04			
Chromium III, Total Recoverable	16065-83-1	5.00E-02	SS, WS					
Chromium VI, dissolved	18540-29-9	1.10E-02	TVS [h]					
Chrysene	218-01-9	4.40E-06	W+F		1.00E-02			
Copper, dissolved	7440-50-8	1.60E-02	TVS [h]					

Table1 - Surface Water Action Levels & Standards

Bold Denotes the Value of the change made in the table.

Analyte	CAS Reference Number	Standards and Action Levels [a] (mg/L)	Basis [b]	Temporary Modifications [c] (mg/L)	PQLs [d] (mg/L)	2001 Comment	New Standard (mg/L)	Notes
Cyanide	57-12-5	5.00E-03	SS					
4,4-DDD	72-54-8	8.30E-07	W+F		1.00E-04			
4,4-DDE	72-55-9	5.90E-07	W+F		1.00E-04			
4,4-DDT	50-29-3	5.90E-07	W+F		1.00E-04			
Dalapon	75-99-0	2.00E-01	WS		1.30E-02			
Demeton	8065-48-3	1.00E-04	AL		1.00E-03			
Dibenzo(a,h)anthracene	53-70-3	4.40E-06	W+F		1.00E-02			
Dibromochloromethane	124-48-1	8.00E-02	WS		1.00E-03	Revised THM Std	**8.00E-02**	Revised W+F = **1.40E-01** WQS Listed as Chlorodibromomethane
1,2-Dibromo-3-chloropropane	96-12-8	2.00E-04	WS		1.00E-03			
Di-n-butylphthalate	84-74-2	3.65E+00	PPRG		1.00E-02			
1,2-Dichlorobenzene	95-50-1	6.00E-01	W+F, WS		1.00E-02	Revised W+F,WS value	**6.00E-01**	
1,3-Dichlorobenzene	541-73-1	4.00E-01	W+F		1.00E-02			
1,4-Dichlorobenzene	106-46-7	7.50E-02	W+F, WS		1.00E-02			
3,3-Dichlorobenzidine	91-94-1	3.90E-05	W+F		1.00E-02			
1,1-Dichloroethane	75-34-3	3.65E+00	PPRG		1.00E-03			
1,2-Dichloroethane	107-06-2	3.80E-04	W+F, WS	5.00E-03	1.00E-03	Revised W+F, WS value	**3.80E-04**	
1,1-Dichloroethene	75-35-4	7.00E-03	W+F, WS	7.00E-03	1.00E-03	Revised W+F, WS value	**7.00E-03**	
1,2-Dichloroethene (cis)	156-59-2	7.00E-02	WS		5.00E-03			
1,2-Dichloroethene (trans)	156-60-5	1.00E-01	W+F, WS		5.00E-03			
2,4-Dichlorophenol	120-83-2	2.10E-02	W+F, WS		5.00E-02			
Dichlorophenoxyacetic acid [2,4-D]	94-75-7	7.00E-02	WS		1.00E-03			
1,2-Dichloropropane	78-87-5	5.20E-04	W+F, WS		1.00E-03	Revised W+F, WS value	**5.20E-04**	
1,3-Dichloropropylene	542-75-6	1.00E-02	W+F		1.00E-03			
Dieldrin	60-57-1	1.40E-07	W+F		1.00E-04			
Di(2-ethylhexyl)adipate	103-23-1	4.00E-01	WS		6.00E-03			
Diethylphthalate	84-66-2	5.60E+00	W+F, WS		1.00E-02	Revised W+F, WS value	**5.60E+00**	
Diisopropyl methyl phosphonate	1445-75-6	8.00E-03	WS		1.00E-03			
2,4-Dimethylphenol	105-67-9	1.40E-01	W+F, WS		5.00E-02	Revised W+F, WS value	**1.40E-01**	
Dimethylphthalate	131-11-3	3.13E+02	W+F		1.00E-02			
4,6-Dinitro-2-methylphenol	534-52-1	2.70E-03	W+F, WS		5.00E-02	Revised W+F, WS value	**2.70E-03**	Same as 4,6 Dinitro-o-cresol
2,4-Dinitrophenol	51-28-5	1.40E-02	W+F, WS		5.00E-02			
2,4-Dinitrotoluene	121-14-2	1.10E-04	W+F, WS		1.00E-02	Add WS		
2,6-Dinitrotoluene	606-20-2	2.30E-01	AL		1.00E-02	Revised AL value	**2.30E-01**	
Dinoseb	88-85-7	7.00E-03	WS		2.00E-03			
Dioxin (2,3,7,8 TCDD)	1746-01-6	1.30E-11	W+F					
1,2-Diphenylhydrazine	122-66-7	4.00E-05	W+F			Revised W+F value	**4.00E-05**	
Diquat	65-00-7	2.00E-02	WS		4.00E-03			
Endosulfan	115-29-7	5.60E-05	AL		1.00E-04			
Endosulfan, alpha	95-99-88	5.60E-05	AL		1.00E-04			
Endosulfan, beta	3321-36-59	5.60E-05	AL		1.00E-04			
Endosulfan sulfate	1031-07-8	5.60E-05	AL		1.00E-04	Revised AL value	**5.60E-05**	
Endothall	145-73-3	1.00E-01	WS		9.00E-02			
Endrin (technical)	72-20-8	3.60E-05	AL		1.00E-04	Revised AL value	**3.60E-05**	
Endrin aldehyde	7421-93-4	7.60E-04	W+F		1.00E-04	Revised W+F value	**7.60E-04**	
Ethylbenzene	100-41-4	7.00E-01	W+F,WS		1.00E-02	Revised W+F, WS value	**7.00E-01**	
Ethylene dibromide [1,2-Dibromom	106-93-4	5.00E-05	WS					
bis(2-Ethylhexyl)phthalate	117-81-7	1.80E-03	W+F		1.00E-02			
Fluoranthene	206-44-0	2.80E-01	W+F, WS		1.00E-02	Revised W+F, WS value	**2.80E-01**	
Fluorene	86-73-7	2.80E-01	WS		1.00E-02	Revised WS value	**2.80E-01**	
Fluoride	7782-41-4	2.00E+00	WS					
Glyphosate	1071-83-6	7.00E-01	WS		6.00E-02			
Guthion	86-50-0	1.00E-05	AL		1.50E-03			
Heptachlor	76-44-8	2.10E-07	W+F		5.00E-05			
Heptachlor epoxide	1024-57-3	1.00E-07	W+F		5.00E-05			

Table1 - Surface Water Action Levels & Standards

Bold Denotes the Value of the change made in the table.

Analyte	CAS Reference Number	Standards and Action Levels [a] (mg/L)	Basis [b]	Temporary Modifications [c] (mg/L)	PQLs [d] (mg/L)	2001 Comment	New Standard (mg/L)	Notes
Hexachlorobenzene	118-74-1	7.50E-07	W+F		1.00E-02			
Hexachlorobutadiene	87-68-3	9.30E-03	AL		1.00E-02	Revised AL value	9.30E-03	
Hexachlorocyclohexane, Technical	608-73-1	1.20E-05	W+F		2.00E-04			
Hexachlorocyclopentadiene	77-47-4	5.00E-03	AL		1.00E-02			
Hexachloroethane	67-72-1	7.00E-03	W+F, WS		1.00E-02	Revised W+F, WS value	7.00E-03	
Indeno(1,2,3-cd)pyrene	193-39-5	4.40E-06	W+F		1.00E-02			
Isophorone	78-59-1	3.60E-02	W+F		1.00E-02			
Lead, dissolved	7439-92-1	6.50E-03	TVS [h]		1.00E-02			
Malathion	121-75-4	1.00E-04	AL		2.00E-04			
Mercury, total	7439-97-6	1.00E-05	SS		1.00E-03			
Methoxychlor	72-43-5	3.00E-05	AL		5.00E-04			
Methylene chloride [Dichloromethai	75-09-2	4.70E-03	W+F, WS		1.00E-03	Revised W+F, WS value	4.70E-03	
4-Methyl-2-pentanone [Isopropoac	108-10-1	2.92E+00	PPRG					
2-Methylphenol [o-Cresol]	95-48-7	1.83E+00	PPRG					
Mirex	2385-85-5	1.00E-06	AL		1.00E-04			
Naphthalene	91-20-3	2.80E-02	W+F, WS		1.00E-02	Revised W+F, WS value	2.80E-02	
Nickel, dissolved	7440-02-0	1.23E-01	TVS [h]					
Nitrate	14797-55-8	1.00E+01	AG	100 [j]				
Nitrite	14797-65-0	5.00E-01	AL [i]	4.5 [j]				
Nitrobenzene	98-95-3	3.50E-03	W+F, WS		1.00E-02			
Nitrophenol 4	100-02-7	5.60E-02	WS, W+F					
Nitrosodibutylamine N	924-16-3	6.40E-06	W+F		1.00E-02			
Nitrosodiethylamine N	55-18-5	8.00E-07	W+F		1.00E-02			
Nitrosodimethylamine N	62-75-9	6.90E-07	W+F		1.00E-02			
n-Nitrosodiphenylamine	86-30-6	5.00E-03	W+F		1.00E-02			
n-Nitrosodipropylamine	621-64-7	5.00E-06	W+F		1.00E-02			
Nitrosopyrrolidine N	930-55-2	1.60E-05	W+F		1.00E-02			
Oxamyl(vydate)	23135-22-0	2.00E-01	WS		2.00E-02			
PCBs	1336-36-3	1.70E-04	W+F		1.00E-02			
Parathion	56-38-2	1.30E-05	AL					
Pentachlorobenzene	608-93-5	3.50E-03	W+F		1.00E-02			
Pentachlorophenol	87-86-5	2.80E-04	W+F		5.00E-02			
Phenanthrene	85-01-8	2.80E-06	W+F		1.00E-02			
Phenol	108-95-2	2.56E+00	AL		5.00E-02			
Picloram	1918-02-1	5.00E-01	WS		1.00E-03			
Pyrene	129-00-0	2.10E-01	W+F, WS		1.00E-02	Revised W+F, WS value	2.10E-01	
Selenium	7782-49-2	4.60E-03	AL		1.00E-02	Revised AL Value	4.60E-03	
Silver, dissolved	7440-22-4	6.00E-04	TVS [h]		5.00E-03			
Simazine	122-34-9	4.00E-03	WS		7.00E-04			
Sulfide	18496-25-8	2.00E-03	SS					
Styrene	100-42-5	1.00E-01	WS		5.00E-03			
1,2,4,5-Tetrachlorobenzene	95-94-3	2.10E-03	WS		1.00E-02	Revised WS value	2.10E-03	
1,1,2,2-Tetrachloroethane	79-34-5	1.70E-04	W+F		1.00E-03			
Tetrachloroethene	127-18-4	8.00E-04	W+F	5.00E-03	1.00E-03			
Thallium	7440-28-0	5.00E-04	W+F, WS		1.20E-02			
Toluene	108-88-3	1.00E+00	W+F, WS		5.00E-03			
Toxaphene	8001-35-2	2.00E-07	AL		3.00E-03			
1,2,4-Trichlorobenzene	120-82-1	5.00E-02	AL		1.00E-02			
1,1,1-Trichloroethane	71-55-6	2.00E-01	W+F, WS		5.00E-03			
1,1,2-Trichloroethane	79-00-5	3.00E-03	W+F, WS		1.00E-03	Revised W+F, WS value	3.00E-03	
Trichloroethene	79-01-6	2.70E-03	W+F	5.00E-03	1.00E-03			
2,4,6-Trichlorophenol	88-06-2	2.10E-03	W+F		5.00E-02	Revised W+F value	2.10E-03	
Trichlorophenoxyproprionic acid	93-72-1	1.00E-02	W+F		5.00E-03	Revised W+F value	1.00E-02	
Vinyl chloride	75-01-4	2.00E-03	W+F, WS		2.00E-03			

Table1 - Surface Water Action Levels & Standards

Bold Denotes the Value of the change made in the table.

Analyte	CAS Reference Number	Standards and Action Levels [a] (mg/L)	Basis [b]	Temporary Modifications [c] (mg/L)	PQLs [d] (mg/L)	2001 Comment	New Standard (mg/L)	Notes
Xylene (total)	1330-20-7	1.00E+01	WS		5.00E-03			
Zinc, dissolved	7440-66-6	1.41E-01	TVS [h]					
PHYSICAL PARAMETERS:								
Dissolved oxygen (minimum)		5.0 mg/L	SS					
pH		6.5-9.0	SS					

NOTES:

[a] The values in this table reflect the classifications and standards approved by the Colorado WQCC effective October 30, 2001. Values apply as standards in Segments 4a and 4b and as action levels in Segment 5. Values based on PPRGs are applied only as action levels and are not enforceable standards. Standards for chloride, dissolved iron, dissolved manganese, and sulfate are Secondary Drinking Water Standards which are based on aesthetic considerations. They have been removed as site-specific standards since Segments 4a, 4b, and 5 waters will not be used for drinking water supply.

[b] Acronyms: AG = Agriculture; AL = Aquatic Life; BS = Basic Standard; PPRG = Programmatic Preliminary Remediation Goal for residential groundwater ingestion; SS = Site Specific Standard; WS = Water Supply; W+F = Water plus Fish

[c] Temporary modifications affect Segment 5 only and apply until December 31, 2009.

[d] Whenever the practical quantitation level (PQL) for a pollutant is higher (less stringent) than a standard/action level or temporary modification, "less than" the PQL will be used as the compliance threshold. These less stringent PQLs are shaded.

[e] There is no un-ionized ammonia standard for Segment 5 or Segment 4b. A standard of 0.1 mg/L applies to Segment 4a which begins in Walnut Creek downstream of Indiana Street.

[f] The total PCB standard in the Basic Standards is based on the sum of the Aroclor analytes.

[g] Per the Basic Standards, the Total Trihalomethane (TTHM) standard applies to the sum of the four TTHM compounds.

[h] Table value standards for metals are based on a toxicity equation which uses a hardness value of 143 mg/L.

[i] The listed nitrite value is the chronic aquatic life standard based on chloride levels in excess of 22 mg/L in Segment 4.

[j] The temporary modifications for nitrate and nitrite apply to the Walnut Creek drainage only.

The scientific notation used in this table indicates the power of ten by which the two-decimal-place number is multiplied (e.g., 2.52E-02 = 2.52 X 10^{-2} = .0252).

Proposed Additions

Endosulfan, alpha	95-99-88	5.60E-05	AL		1.00E-04	Added
Endosulfan, beta	3321-36-59	5.60E-05	AL		1.00E-04	Added
Nitrophenol 4	100-02-7	5.60E-02	WS, W+F			Added
Parathion	56-38-2	1.30E-05	AL			Added
PCBs	1336-36-3	1.70E-07	W+F			Added

Index of Commenters
November 12, 2002 – January 31, 2003

Comment No.	Who Sent the Comment(s)	When were the comments received?	In what form were the comments received	Title of Written Comments	Section(s) in Responsiveness Summary that Addresses Comments
1	Rocky Flats Coalition of Local Governments (RFCLOG)	September 9, 2002	Letter, dated September 9, 2002	No title	E, F, H, I, J, K, M, N
2	Rocky Mountain Peace and Justice Center (RMPJC)	December 18, 2002	Oral and written comments at Public Meeting	Comments, Questions, & Recommendations on Proposed Changes to RFCA (Rocky Flats Cleanup Agreement), December 17, 2002	F, H, O
3	Kimberly Mander (No affiliation)	January 7, 2003	Letter, dated 12/31/2002	No title	D, H, O
4	Rocky Flats Coalition of Local Governments (RFCLOG)	January 6, 2003	Letter, dated January 6, 2003	No title	A, E, F, I, N
5	Various commenters numbered 5.A, 5.B, 5.C, etc, below.	January 13, 2003	12/17/2002 Public Meeting Transcripts	Public Meeting in re: Proposed Modifications to the Rocky Flats Cleanup Agreement, Transcript of Proceedings, December 17, 2002	
5.A	Rocky Flats Citizens Advisory Board (CAB)	December 17, 2002	Oral comments at Public Meeting	Transcript of Proceedings	D, E, F, G, H, I, K, N, O
5.B	Rocky Mountain Peace and Justice Center (RMPJC). Moore/T.Marshall	December 17, 2002	Oral and written comments at Public Meeting	Transcript of Proceedings and handout material	A, D, F, H, I, K, L, O
5.C	Rocky Flats Coalition of Local Governments	December 17, 2002	Oral comments	Transcript of Proceedings	A, E, F, M

Comment No.	Who Sent the Comment(s)	When were the comments received?	In what form were the comments received	Title of Written Comments	Section(s) in Responsiveness Summary that Addresses Comments
8	Marty Kleva (No affiliation)	January 15, 2003	Email, January 15, 2003	No title	O
9	Dr. Aime Fournier (No affiliation)	January 15, 2003	Postcard, dated January 10, 2003	No title	O
10	Suzanne and Nicholas Helburn (No affilation)	January 15, 2003	Email, dated January 15, 2003	No title	O
11	Bob Kinsey, Peace and Justice Task force, Rocky Mountain Conference, United Church of Christ	January 15, 2003	Email, dated January 15, 2003	No title	O
12	Mike Turner (No affiliation)	January 15, 2003	Email, dated January 15, 2003	No title	H, O
13	Judith Blitz (No affiliation)	January 16, 2003	Email, dated January 16, 2003	No title	G
14	Keith & Joyce Langley (No affiliation)	January 17, 2003	Email, dated January 17, 2003	No title	O
15	Julie Porter (No affiliation)	January 20, 2003	Email, dated January 20, 2003	No title	C, D, F, H, K, O
16	Larry Bingham (No affiliation)	January 20, 2003	Email, dated January 20, 2003	No title	D, H, K, O
17	Macon Cowles (No affiliation)	January 20, 2003	Email, dated January 20, 2003	No title	K, O
18	Kenneth Nova (No affiliation)	January 20, 2003	Email, dated January 20, 2003	No title	C,H, O
19	Christa Ray (No affiliation)	January 20, 2003	Email, dated January 20, 2003	No title	O
20	Michael Hoenig (No affiliation)	January 20, 2003	Email, dated January 20, 2003	No title	O
21	Sopan Greene (No affiliation, but agrees with RMPJC position)	January 20, 2003	Email, dated January 20, 2003	No title	B, C, D, G, H, K, O
22	Judith Ansara Gass (No	January 20, 2003	Email, dated January	No title	O

Comment No.	Who Sent the Comment(s)	When were the comments received?	In what form were the comments received	Title of Written Comments	Section(s) in Responsiveness Summary that Addresses Comments
			Hakonson	Contamination and Closure of Selected Interim Status Units.	
34	Mark Sattelberg (U.S. Fish and Wildlife Service)	January 30, 2003	Letter, dated January 30, 2003	Proposed Modifications and Additions to Attachments to the Rocky Flats Cleanup Agreement	D, E, F, I, K, M, N
35	Nancy Kessel	January 29, 2003	Email, dated January 30, 2003	No title	A, O
36	Alliyah Mirza	January 29, 2003	Email, dated January 30, 2003	No title	D, F, H, O
37	Naomi Rachel	January 29, 2003	Email, dated January 29, 2003	No title	A, O
38	Doris Neusse & John Grill	January 24, 2003	Email, dated January 24, 2003	No title	A
39	Jim Morris	Fax, January 31, 2003	Faxed letter, dated January 31, 2003	No title	A, D, E, K, N
40	Erin E. Hanby	January 31, 2003	Email, dated January 31, 2003	No title	A, C, E, H
41	Morgan Oberhaus	January 29, 2003	Email, dated January 29,2003	No title	F, O
42	Lindy Lyman/Terry Teis	January 29, 2003	Email, dated January 29, 2003	No title	A, C, D, F, H, K, O
43	Mike Turner	January 29, 2003	2 Emails, one dated January 15, 2003 & one dated January 29, 2003	No title	A, H, O
44	Bruce McNaughton	January 29, 2003	Email, dated January 29, 2003	No title	A
45	John Richardson	January 29, 2003	Email, dated January 29, 2003	No title	D, H, K, O

Comment No.	Who Sent the Comment(s)	When were the comments received?	In what form were the comments received	Title of Written Comments	Section(s) in Responsiveness Summary that Addresses Comments
	Jews of the Earth)		2003		
58	Michael Linck	January 31, 2003	Letter, undated	No title	D, H, O
59	Bonnie Soileau	January 30, 2003	Letter, dated January 29, 2003	No title	D, O
60	Dr. Kathleen Sullivan (Nuclear Weapons Education and Action Educators for Social Responsibility, Metropolitan Area)	January 31, 2003	Letter, undated	Rocky Flats' Forgotten Plutonium: the contamination continues	A, F, H, O
61	Rocky Mountain Peace and Justice Center	January 31, 2003	Letter, dated January 31, 2003	Comments on Proposed Revisions to the Rocky Flats Cleanup Agreement + attachments	B, C, E, G, H, I, O, Q
62	City of Arvada (Ken Fellman & Lorraine Anderson)	February 10, 2003	Letter, dated January 24, 2003	Comments on Modifications to the Rocky Flats Cleanup Agreement	C, E, F
63	Laura McKenzie	February 5, 2003	Letter, dated January 29, 2003	No title	O
64	Kristen McDermott	February 4, 2003	Letter, dated January 29, 2003	No title	O
65	Brian Peterson	February 5, 2003	Letter, undated	No title	O
66	Dick Cole	February 5, 2003	Letter, dated January 30, 2003	No title	H, O
67	Alliance for Nuclear Accountability	February 4, 2003	Letter, dated January 29, 2003	No title	A, D, F, H, M, O, Q
68	Alexander Clayden	January 31, 2003	Email, dated January 31, 2003	No title	A, H, O
69	Annia Engel	January 31, 2003	Email, dated January 31, 2003	No title	C
70	Anthony, Sharon & Heather	January 24, 2003	Email, dated January	No title	O

Comment No.	Who Sent the Comment(s)	When were the comments received?	In what form were the comments received	Title of Written Comments	Section(s) in Responsiveness Summary that Addresses Comments
86	Rick Warner	January 31, 2003	Email, dated January 31, 2003	No title	C, D, F, H, I, K, O
87	Dr. Beth Krensky	January 27, 2003	Email, dated January 27, 2003	No title	O
88	Scott Hatfield	January 31, 2003	Email, dated January 31, 2003	No title	O
89	Snake River Alliance (Beatrice Brailsford, on behalf of)	January 31, 2003	Email, dated January 31, 2003	No title	B, H
90	Stirling & Brian Cousins	January 28, 2003	Email, dated January 28, 2003	No title	B, C, F, H, K
91	City and County of Broomfield	February 6, 2003	Email, dated February 12, 2003	Modifications to Rocky Flats Cleanup Agreement, dated November 12, 2002	C, E, F, I, K, N, Q
92	Susan Marie Frontczak	February 1, 2003	Email, dated February 1 ,2003	No title	O
93	Terri Barrie	January 31, 2003	Email, dated January 31, 2003	No title	H
94	Todd Phillips	January 31, 2003	Email, dated January 31, 2003	No title	O
95	Julie Bennett	January 31, 2003	Postcard, postmarked January 17, 2003	No title	O

General Response
The Parties to RFCA have received many comments stating that soils at Rocky Flats should be cleaned up to a level of either background levels of plutonium or 5 picocures/gram (pCi/g) regardless of depth, cost or schedule. The RFCA Parties have decided to set the soil action level at 50 pCi/g for plutonium within the top three feet and set an action level of 3,000 pCi/g (based upon concentration and area/volume) for the depth interval of three to six feet. Once an action has been triggered in the three to six foot depths, cleanup will continue until contamination greater than 1,000 pCi/g has been removed.

The Federal Regulation that governs the cleanup of hazardous substance and hazardous waste sites specifies that two threshold criteria that must be met in making cleanup decisions: 1) protection of human health and the environment, and 2) compliance with Applicable or Relevant and Appropriate Requirements.

Overall Protection of Human Health and the Environment: For carcinogenic contaminants, EPA defines protective of human health as a level of residual contamination that would result in an excess lifetime cancer risk with the range of one in ten thousand ($1x10^{-4}$) to one in a million ($1x10^{-6}$). The action levels in the modified cleanup agreement fall within this range of acceptable risk. The soil action level of 50 pCi/g plutonium equates to an excess lifetime cancer risk of less than one in one hundred thousand for a wildlife refuge worker. A member of the public visiting the refuge would be subject to a much lower risk. In fact, a rural resident living atop soil contaminated at 50 pCi/g would be subject to a lifetime excess cancer risk within the acceptable range at approximately 3 in one hundred thousand.

Research on the effects of radionuclides such as plutonium on wildlife indicates that humans are the most sensitive species and that by protecting human health the health of other species on the site are protected. The reason humans are the most sensitive species has to do with the fact that humans have much longer life spans and therefore are more likely to experience the latent effects of low-dose radiation exposure.

Compliance with Applicable or Relevant and Appropriate Requirements. The modifications to the cleanup agreement fully comply with applicable or relevant and appropriate State and Federal environmental laws.

Other Criteria to be Considered
Of the other criteria to be used in choosing a remedy, three rate primary consideration at Rocky Flats:

Long-term effectiveness
Cost
Community Acceptance

Long-term effectiveness: The DOE, EPA and CDPHE believe that the modifications to RFCA will result in a remedy that is effective for the long-term. Since hazardous substances will be left on site at concentrations that will not allow for unrestricted use,

the Federal government will need to control access to the site as well as monitor and maintain the site for the foreseeable future. However, even if the decision were made to attempt cleanup to a plutonium concentration of 5 pCi/g, the site might still require long-term monitoring and maintenance for residual radionuclide contamination to assure the continued protectiveness of the remedy. We cannot guarantee that all radionuclide contamination will be removed from the site. The technical limitations of equipment used for measuring contaminants wouldn't allow us to make such a guarantee. In addition, the presence of landfills and groundwater treatment systems will require long-term maintenance.

Cost: The regulations are very clear that cost is an important factor to be considered in choosing a remedy. The resources in the Federal budget for environmental cleanup are not unlimited, far from it. The RFCA Parties have been told by members of Congress to be mindful of these fiscal constraints that are placed on a cleanup of this magnitude and complexity. The RFCA Parties believe that a fully compliant cleanup can be achieved within the projected funding.

Community Acceptance: While it is obvious that the modifications to the RFCA will not be acceptable to everyone in the community, DOE, EPA and CDPHE have worked extensively with local governments and members of the public to craft a plan for cleanup that meets a majority of the concerns we've heard. The modifications to RFCA are very much a reflection of community interests.

Other factors, though not mentioned specifically in regulation that weighed heavily in the modifications to the cleanup agreement were:

Future Land Use
Preservation of habitat

Future Land Use: When assessing the risks that may be posed by residual contamination, a critical question is always, "What will the land be used for in the future?" EPA has a long-standing policy of basing risk assessments on the anticipated future use, and not on worst-case scenarios. The use of the wildlife refuge worker as the reasonably, maximally exposed individual is consistent with that policy. While no one at DOE, EPA or CDPHE can absolutely guarantee that Rocky Flats will never be used for subsistence farming, we believe that scenario to be highly unlikely.

Preservation of Habitat: Attempts to cleanup up soil to a concentration of 5 pCi/g plutonium or to background concentrations would require the destruction of hundreds of acres of xeric prairie. This is a habitat that is becoming extremely rare along the Front Range, and a habitat that once destroyed is very difficult to restore.

RFCA Attachment Proposed Modifications

Response to Comments

Category: A. Public Participation Process

Commenter No.	Comment(s)	Response
4	The Coalition recognizes the extent to which the draft RFCA language tracks the position stated in our September 9th letter. It is clear that the RFCA parties worked hard to address and include in the draft RFCA the myriad of interests and needs the Coalition expressed. We believe the draft RFCA language serves to improve the level of cleanup at Rocky Flats by better aligning cleanup priorities with community interests and goals.	Comment noted.
5.B.1	To get assured funding from Congress for clean-up and closure of Rocky Flats, the Department of Energy and the contractor, Kaiser-Hill, agreed to meet three conditions: Close the site by the arbitrary date of 2006; complete all closure activities for the fixed sum of seven billion dollars; curtail conflict in the community. The first two items here in this list of decisions -- the first two items put all parties involved in a -- all parties, the government people as well as the public -- put all parties involved in a time and money trap in which public health and environmental integrity are sacrificed to a partial clean-up and closure by an arbitrary date.	The Federal Government is responsible for the clean up of Rocky Flats to meet regulatory requirements to protect human health and the environment and for the necessary funding to meet those obligations. The RFCA Parties believe that the funding anticipated to be provided by Congress to close this site will fulfill those requirements. The RFCA Parties have determined that the modifications to RFCA Attachments will result in a cleanup that is protective of human health and the environment and will result in a level of residual risk that is lower than that achieved at other major Superfund sites. The closure date is based upon careful consideration of the scope of work and a balance of project risks and potential rewards for successful performance, including consideration of opportunities for development of faster, better, more cost-effective ways to conduct work safely and turn the Site over to public use as a Wildlife Refuge.
5.B.2	Community conflict has been dealt with by involving the engaged public heavily in rearranging details of a plan	The RFCA Parties have fully implemented the consultation requirements of paragraph 53 of RFCA with the communities. Over

	devised without their input.	the past several years there has been extensive community input in developing the final modifications to the Attachments to RFCA. Forums for these discussions have occurred in the Citizens Advisory Board, the Rocky Flats Coalition of Local Governments, the Rocky Flats Stakeholder Focus Group and with specific individuals and city staffs. There have been far more opportunities for community input concerning the cleanup of Rocky Flats than is required under CERCLA. A Public Involvement Summary of meetings and comments received from community members in the preparation of the proposed modifications to RFCA is found in Appendix A of the Technical Basis Document.
5.B.3	Two other key decisions were made without consulting the affected public. The first one: Clean Rocky Flats to protect a wildlife refuge worker, though the law making the site a refuge says the refuge designation shall not define clean-up. The focus group spent much time on the clean-up scenario issue because several participants believed the refuge-worker scenario was not sufficiently protective. Finally, in June 2001, we finally were told that the decision to use the refuge-worker scenario had already been made. We'd been wasting our time. I asked: "Who made the decision. Was it done locally or in Washington?" I thought the public was entitled to know so we could address our concerns to the real decision-makers. Getting no answer, I sought the truth via a Freedom of Information Act request. Months later I received some irrelevant documents already in our possession. The question remains unanswered. The other decision made without public input was to not change the funding at all, but the budget clean-up costs at the old 651 level that had been rejected by the public, even though the Department of Energy itself was funding a technical review, expected to produce a lower number. This fact illumines the trade-off the public is asked to	Under CERCLA guidance, the reasonably anticipated future land use should be considered in developing remedial actions. The decision to analyze the wildlife refuge worker scenario, as well as the rural resident scenario, was made at the Project Coordinator level, at the suggestion of the RFCA Parties' Radionuclide Soil Action Level Working Group. The new, lower RSAL for plutonium-239/-240 is within the CERCLA risk range for both the wildlife refuge worker and the rural resident scenarios. With respect to the trade-off of more contaminated surface soil removal and possibly less subsurface removal, the RFCA Parties have always stipulated that they would have to make some difficult cleanup decisions. The extensive community public process that occurred was an effort to solicit community input in these decisions and resulted in the RFCA Parties proposing to remove contaminated surface soil to substantially lower levels.

	accept of getting better surface clean-up in exchange for less subsurface clean-up. Given a fixed sum, spending more on surface clean-up means less for the subsurface. A lot could be said about that trade-off. The subsurface, of course, had to do with the process waste lands to which Victor Holm referred a while ago, the plan not to characterize all those process waste lands [lines], much less remove them, so that's part of the trade-off.	
5.B.4	As is, public participation in the -- and I've sure spent a lot of time on it -- public participation in the present plan has been reduced to tinkering.	The RFCA Parties disagree that public participation was reduced to "tinkering". For example, the proposed changes to RFCA include a 13-fold reduction in the RSAL for plutonium, which the RFCA Parties consider a substantial change to the current RFCA, and which was based on public participation and input.
5.C.1	When I sat down to think about speaking tonight, one of the things that struck me is I really wanted to talk about our guiding end-state principles, and there are seven, and if they sound like the ones that LeRoy mentioned and Victor mentioned, it shows that commonality. First of all is reducing risk to a future user, something that is extremely important. The second one is protecting water quality and two communities in the coalition of governments are downstream and downwind of Rocky Flats, and so protecting water quality is a very important consideration. The third one is addressing uncertainty, and that is one that is much harder to capture, how you go about addressing uncertainty, but that is a key principle when we look at establishing final clean-up parameters and numbers for the site. The fourth one is developing and implementing a strong and comprehensive post-closure monitoring regime. We've heard that referred to tonight by all three speakers, or, actually, all four speakers, as long-term stewardship. The	The RFCA Parties have taken these principles into consideration in developing and finalizing the modifications. While the extent of post closure activities and the amount of funding needed cannot be fully determined at this time, the RFCA Parties believe that the modifications reflect a good understanding of these aspects of final closure of the Site.

	fifth principle is ensuring adequate funding both to get us to closure and, as importantly, for post-closure, for long-term stewardship. The sixth principle is ensuring a role, a regulatory enforcement role, for the EPA and the Colorado Health Department. One of the things that is absolutely instrumental to the way that the current clean-up documents is implemented is that the two regulatory RFCA Parties -- they have substantive seats at the table. They actually have enforcement authority, and having that check and balance within the three RFCA Parties is something that is not only important now, but something we need to maintain for the long-term, and that, again, is another one of our guiding end-state principles, and the seventh one is developing redundancies and mechanisms to become aware of and address problems as they arise, so it's not just that clean-up is done and documents are signed. It really is an ongoing process, because, sure, I'm sure I'm not the first to say it, but you know contamination does not end when a regulatory period has ended, and so we need to make sure there's that continuation post-closure.	
5.C.2	One of the things I just wanted to mention before concluding is that the coalition -- and I think tonight is a good example of it -- is cognizant of the fact that there is no unanimity of thought of the community as to what the final clean-up levels for Rocky Flats should be like. That means decisions are going to have we believe -- and this is really where we're coming from -- that there are real limitations as to how far the federal government's going to go as a matter of national policy and in cleaning up this site. No. 1, Congress is not going to spend unlimited amounts of money on the clean-up. to be made and, as a community, one of the things we need to do is prioritize our interests.	Comment noted.

5.C.3	The second thing is that the regulations -- and LeRoy talked about this -- provide quite a broad latitude for final clean-up levels, and, yes, what is being done is safe. We believe it's also compliant and, in many cases -- I hope this gets stressed tonight -- in many cases, it actually goes well beyond the regulatory minimum. If we're not getting a regulatory minimum clean-up here, I don't think anybody in this room would support that, certainly not the coalition of governments, but one of the things is that clean-up background is not mandated, so local governments are really looking at realistic parameters and seeing, within those parameters, a fiscal constraint and the broad latitude within what is acceptable regulatorily. What is the best clean-up we can get? What are our interests that we have to get? And that's where we're coming from, and, really, as I listen to LeRoy, that's really where our paths start to diverge, is that we understand those limitations, and our recommendations recognize those limitations, and try to identify the best clean-up within those parameters.	Comment noted.
5.C.4	What is the best clean-up for Rocky Flats? And what does the long-term stewardship regime look like? I've mentioned -- let me just mention one final thing: I've mentioned that the coalition does have a position. We made copies. The board actually issued a letter on September 9th of 2002 that really outlines where the board is coming from and what our priorities are, what are our interests.	Comment noted.
5.H.1	Thank you for allowing me to speak tonight and this issue is extremely important, and your decision is a lasting one, with impact to the citizens and to the water supply of Westminster. As you are aware, we are the key partner in redefining the end-state for Rocky Flats, as a community downwind and downstream of the site, and we are acutely aware of the impact of these decisions.	Given the strong community concern over the uncertainties surrounding the original process waste lines, the RFCA Parties have decided to do additional work in characterizing the original process waste lines and if necessary, removal of more contamination associated with these lines than what was in the Proposed Modifications and Additions to Attachments to the RFCA, dated November 2002. This additional work will be done in lieu of

	Let me begin by thanking the DOE, EPA, and CDPHE for your efforts to work with the community. You have always been available to city officials and city staff to explain the signs, answer our questions, address and meet our interests. I might add your efforts have not focused exclusively on local governments but have included a broad cross-section of the community, including the Rocky Mountain Peace and Justice Center and others. Because of this effort, I'm pleased to say the City of Westminster is in agreement with many of the provisions included in the proposed modifications for significant increase to plutonium protection of water quality. Water leaving the site will be available for any and all uses, removal of all process waste lines at the top three feet of soil and below three feet, where there's a risk of contaminant pathway. The ash pits, Trench 7, and No. 3 Burrito will be remediated, and CDPHE and EPA will have a significant role in enforcing the long-term stewardship provisions.	conducting accelerated actions to remove the contents of four Ash Pits and Trench 7 and the Trench 4 "burrito". While not made an explicit part of the proposed modifications, the RFCA Parties did discuss with the community that conducting accelerated actions at these Individual Hazardous Substance Sites (IHSSs) would potentially reduce the area where institutional controls and monitoring are needed. However, it was anticipated that the application of the proposed risk screen methodology to these IHSSs would not result in a determination that an accelerated action must be taken. In considering comments, we believe that the strong community preference for more targeted characterization of the OPWL and for removing plutonium contamination to below the action level is more important than addressing these 3 IHSSs through accelerated actions. The Ash Pits, Trench 7 and the Trench 4 are within the anticipated extent of areas at Rocky Flats with institutional controls and monitoring because of expected residual contamination at other IHSSs. The reduction of institutional controls and monitoring that would result from removing the contents of four Ash Pits and Trench 7 and the Trench 4 "burrito", if any, is expected to be small.
5.H.2	Some final thoughts: Do we believe that what is being proposed is perfect? No. Do we believe that what is being proposed is safe? Yes. Do we believe Congress will devote unlimited funds to this project? No. Do we believe that what is being proposed complies with environmental laws? Yes. There is a great deal of work ahead of us, and tonight I reaffirm our commitment for working with you and to ensure the clean-up is productive -- or protective of human health and the environment. We trust and expect you will continue to consult with the City of Westminster, and I thank you.	The RFCA Parties will continue to consult with all the local communities as the closure project moves forward.
5.K	I'm concerned about numerous things, so, in terms of one of your conditions for getting the assured funding for clean-up at Rocky Flats and curtailing conflict in the community, I want to assure you that you have not done	The RFCA Parties have determined that the modifications to RFCA Attachments will result in a cleanup that is protective of human health and the environment. While we understand that there is not full agreement within the community of all aspects of the risk-based

	that. There is conflict in the community. There is severe conflict in the community, and there would be very many more people here tonight if it weren't final exam time at the University of Colorado, because we have numerous students who come into the Rocky Mountain Peace and Justice Center or that I meet on the street or that I meet in other situations who are just flabbergasted, number one, that it's being designated as a wildlife refuge and that the clean-up level -- that the agency people, DOE and our Congress, are willing to settle, willing to settle for less than a real clean-up at Rocky Flats. What a disservice we are doing to our present generation and to all the generations in the future, being willing to settle. This is on our shoulders. Now is the time. We have the opportunity and what are the future generations going to inherit and what are they going to think of this generation if we don't take the responsibility and seize the opportunity?	approach that will be implemented pursuant to the modifications, the RFCA Parties believe that there is strong community preference for lowering of the RSAL and removing more surface plutonium contamination. A CERCLA compliant cleanup of Rocky Flats does not require removal of all contamination, but rather a consideration of the risks posed by the contamination. Like many other Sites that have been or are being cleaned up pursuant to CERCLA, institutional controls and monitoring and other long-term stewardship activities will be part of the final remedy, as appropriate, to ensure the continued protectiveness of the final remedy.
35	Please do not do a partial job of cleaning up at RF. DOE and the US government owes it to the people of Colorado to cleanup the mess there so that it isn't adversely impacting not only this generation, but the ones that follow.	Please see response to 5.K, Category A.
37	I am strongly opposed to the lesser clean up. The site needs to be cleaned up- regardless of time or cost. The DOE has said that water won't be drinking water, but if the site is to be a wildlife refuge... don't animals drink? And graze? Someday humans will hunt animals that eat off the land and drink the water. The clean up needs to envision the future and instead it is very short term... very narrow minded. If only we had some of the money used to bomb Iraq for cleaning up the bomb materials in this country..... I hope you will ensure the long term and complete clean up of this site, but I am in the majority... I am very	The RFCA Parties determined that the modifications to the Attachments to RFCA are protective of human health and the environment. Based on studies to date, there's no evidence that these radionuclides accumulate in significant quantities in either plants or animals. Therefore, if any animals were hunted and consumed, the risks to human health are considered negligible. RFCA Attachment 5 surface water standards and action levels are consistent with standards promulgated by the Colorado Water Quality Control Commission (CWQCC). Further, RFCA Attachment 5 requires that final remedies must be designed to protect surface water for any use.

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	doubtful that the job will be done well.	
38	We urge you to clean up Rocky Flats so that others after us can safely use the entire site. If that means that the entire $7 billion must be spent on this effort-so be it.	The modifications to the Attachments to RFCA are based on the anticipated land use and are protective of the wildlife refuge worker. The proposed surface soil cleanup also falls within the CERCLA risk range for a rural resident. The approximate $7 billion cleanup cost covers the entire cleanup effort from 1995 though closure, so much of this $7 billion has already been spent. Most of those costs cover nuclear operations, removal of radioactive materials and wastes from site buildings, as well as the decontamination and demolition of those buildings.
39.a	Please don't give yourself (DOE) and the contractor, K-H bonuses for a quick and dirty cleanup.	DOE is obligated to clean up Rocky Flats to meet regulatory requirements. All nuclear materials will be removed, all buildings will be demolished and all waste shipped offsite. Cleanup must be conducted in accordance with RFCA. Fee to the contractor is governed by the closure project contract and depends on safely completing the scope of work, the schedule and the cost.
39.b	Please use an independent contractor to look for waste.	All areas at Rocky Flats that are known or suspected of being contaminated by releases of hazardous substances are identified in the Historical Release Report, which is updated annually. New sources of information are also considered for possible investigation. For example, CDPHE and EPA have extensively reviewed aerial photographs of the site in an effort to identify additional disturbed areas where activities might have occurred that could result in residual contamination. All of these sites must be addressed before the site is closed.
39.c	Roads, trails, animal burrows, wind erosion, water erosion, construction of buildings, roads, trails moving of the stream beds, tornados, floods, and other unimaginable things can and will uncover buried waste. Dig it up, pack it in drums, and store it somewhere where it can be monitored.	The final modifications to RFCA Attachments provide the framework for the conduct of accelerated actions that are protective of human health and the environment, notwithstanding the fact that all contamination may not be removed by these actions. DOE recognizes that since decisions regarding long-term stewardship activities have yet to be made there will continue to be some concerns in the community related to contamination that is not removed based upon the risk-based approach. However, DOE is committed to maintain post-cleanup controls. There will be requirements for periodic review of the remedy to ensure that it is

		working. Rocky Flats is not unique in having this requirement. There are hundreds of sites in the United States, including other DOE and other government owned sites as well as privately owned sites, where there all contamination is not removed after remedial activities have been completed. Some sites will also have waste disposal cells, unlike Rocky Flats.
39.d	We need citizen ability to sue to force the DOE to cleanup.	CERCLA has provisions for citizen suits after a Record of Decision has been issued.
39.e	Please remove building foundations and pond sludge	Contaminated pond sludge has been removed from the Solar Evaporation Ponds and is being treated for offsite disposal. If the commenter is referring to pond sediments, these are subject to the soil action levels in RFCA Attachment 5, Table 3. Sediment that exceeds soil action levels must be evaluated to determine whether an accelerated action is warranted to remove the sludge. All building foundations must be removed to 3 feet below the surface grade. Contamination on building foundations must be cleaned up in accordance with the RFCA decision documents applicable to the decontamination and decommissioning of the particular building. Foundations will be managed so as to protect the environment and the future use as a wildlife refuge.
40.a	I would like to submit that I am NOT satisfied with the proposed clean-up level for Rocky Flats. I am a citizen of Colorado and a student of biology at the University of Colorado- Boulder.	The RFCA Parties have determined that the modifications to the Attachments to RFCA are protective of human health and the environment.
40.b	Let it be known and reflected in public record, for this and future generations, that Rocky Flats will be left harmfully contaminated if the current Rocky Flats Clean-up Agreement is passed.	The RFCA Parties disagree that Rocky Flats will be left "harmfully contaminated". Rather, the modifications will result in a cleanup that is protective of human health and the environment, notwithstanding the fact that all contamination may not be removed at Rocky Flats. We understand that there is not full agreement within the community of all aspects of the risk based approach that will be implemented pursuant to the modifications. A CERCLA compliant cleanup of Rocky Flats does not require removal of all contamination, but rather a consideration of the risks posed by the contamination. Like many other Sites that have been or are being cleaned up pursuant to CERCLA, institutional controls and

		monitoring and other long-term stewardship activities will be part of the final remedy as appropriate to ensure the continued protectiveness of the final remedy.
42.a	In the cleanup process, allow yourselves enough time to accomplish the formidable task as well as humanly possible. December 2006 may be too soon a deadline for the extent of deep cleaning needed.	DOE is required to fulfill the requirements of RFCA, no matter how long it takes.
42.b	In closing, we ask that you do not compromise public health and environmental integrity to fulfill a set budget and an arbitrary deadline. The costs to our descendents will be too high. We also ask that you continue to ask for and pay close attention to input from the affected public, past, present, and future. Stop, look, and listen to our recommendations for a LONGSTANDING cleanup plan. Together we must do our very best to protect the safety of human, animal, and plant life at the Rocky Flats former nuclear weapons site - not just for the immediate future, but for the 240,000 years to come!	The RFCA Parties have determined that the modifications to the Attachments to RFCA are protective of human health and the environment. These modifications to the Attachments to RFCA were informed by several years of intensive dialog with the community through such forums as the Rocky Flats Coalition of Local Government, the Citizens Advisory Board, and the Stakeholder Focus Group.
43	There are so many contaminants in the soil, plants and groundwater in and around rocky flats that are totally toxic to every living thing on this planet; mutations occur and next disease or death occurs. Sure some will live to a ripe old age, but with what hindrances to a normal life? These toxins last from many years to hundreds of thousands of years, silently doing their damage to our environment; damage that we have allowed to occur. There is never too much we can pay to keep our planet and all of its inhabitants safe. Are we willing to find out sometime in the future that all that we assumed was wrong and that the damage we wreaked is irreversible? Not in my name. Clean up rocky flats as though it is our backyard where our children play daily. Clean it up and then make the polluters pay, not the taxpayers who thought that they	The RFCA Parties have determined that the modifications to the Attachments to RFCA are protective of human health and the environment.

	were being taken care of by their government. "if they pay enough the consequences will far outweigh the profits"	
44	Considering the virtual eternity of the radioactive toxicity of the materials being dealt with in the cleanup at the former weapons facility at Rocky Flats, I am writing to urge the most stringent and thorough methods and materials be used in the cleanup work. We owe the unborn generations our best efforts at leaving a clean, healthful environment, though that doesn't seem to enter into the thinking of the greedheads who are bent only on maximum profits and 'externalizing' costs. I trust you will consider your children and their children in your work to make that blighted site as unthreatening to life as possible.	The RFCA Parties have determined that the modifications to the Attachments to RFCA are protective of human health and the environment.
60	I do not agree with the process or the intended outcome of this inquiry. I believe that many intelligent people I the US Department of Energy are turning a blind eye to the plutonium contamination at Rocky Flats. But it is invisible after all. So maybe it is easy to ignore. Easy, that is until it manifests as cancer or a mutagenic effect in some person, plant or animal. We must democratize the radioactive waste decision making process. Rocky Flats "clean-up" as it is, currently manifest flies in the face of dialogue. One way to do this is to follow the well thought [out] and workable principles of Nuclear Guardianship.	The RFCA Parties have determined that the modifications to the Attachments to RFCA are protective of human health and the environment. Additionally, the RFCA Parties have fully implemented the consultation requirements of paragraph 53 of RFCA with the communities. Over the past several years there has been extensive community input in developing the final modifications to the Attachments to RFCA. Forums for these discussions have occurred in the Citizens Advisory Board, the Rocky Flats Coalition of Local Governments, the Rocky Flats Stakeholder Focus Group and with specific individuals and city staffs. There have been far more opportunities for community input concerning the cleanup of Rocky Flats than is required under CERCLA. A Public Involvement Summary of meetings and comments received from community members in the preparation of the proposed modifications to RFCA is found in Appendix A of the Technical Basis Document.
68	In addition to a more reasonable level of clean-up, I ask that you make every effort possible to inform the public of this site's toxicity when it becomes a wildlife refuge. I	Signage, if appropriate, for Rocky Flats post-closure will be determined as part of the CAD/ROD. The final modifications to RFCA Attachments provide the framework for the conduct and

	ask for highly visible warnings of radioactivity at every entrance to this future refuge.	completion of accelerated actions that are protective of human health and the environment, notwithstanding the fact that all contamination may not be removed by these actions. The RFCA Parties believe that upon completion of cleanup the land will be safe for use as a wildlife refuge. The RFCA Parties do not believe that signs such as the ones proposed in this comment will need to be in place
67	We were pleased to learn that DOE extended the original 60-day public comment period an additional 18 days from January 13 until January 31, 2003. We note, however, that DOE held only one public meeting for the purpose of receiving verbal comments. This meeting occurred on December 17, 2002, in the midst of the busiest holiday period of the year, during school vacations, university final exams and recesses, family visits, holiday activity, religious festivities, travel - clearly a time when many people are too occupied with other matters to attend a public meeting to comment on a very controversial technical topic. Had the Department decided to try to exclude as much of the public as possible by deliberately choosing an inappropriate date for a public comment meeting, it could hardly have done better than in fact it did by selecting this date for its sole meeting. We know that DOE was asked to schedule at least one, preferably two additional public comment meetings in January, and that it declined to do so. We regret this decision, since it forces people who might have commented verbally to use the mail rather than the more straightforward method of oral testimony in a setting where they also learn from the remarks of others, including spokespersons for the government RFCA Parties responsible for Rocky Flats cleanup. There is a close relation between DOE'S unwillingness to provide more opportunity for public comment and the public participation process for the Rocky Flats cleanup project	The RFCA Parties have fully implemented the consultation requirements of paragraph 53 of RFCA with the communities. Over the past several years there has been extensive community input in developing the proposed modifications to the Attachments to RFCA. Forums for these discussions have occurred in the Citizens Advisory Board, the Rocky Flats Coalition of Local Governments, the Rocky Flats Stakeholder Focus Group and with specific individuals and city staffs. There have been far more opportunities for community input concerning the cleanup of Rocky Flats than is required under CERCLA. A Public Involvement Summary of meetings and comments received from community members in the preparation of the proposed modifications to RFCA is found in Appendix A of the Technical Basis Document.

	to which we turn next.	

RFCA Attachment Proposed Modifications

Response to Comments

Category: B. Conservativeness of RSAL model

Commenter No.	Comment(s)	Response
5.J	It's often said that we have a high natural background radiation, solar effects, and natural occurring radium in the soil in Colorado, so it doesn't really matter if we have a little bit more radiation, and, on the contrary, as Ed Martell used to warn us, this is every reason for being extremely conservative, not adding to the burden that there is already in this area.	When the EPA sets standards for radiation protection, it takes into account that certain areas of the country have higher levels of naturally-occurring radiation. When the Site is cleaned in accordance with the modified RFCA Attachments, the additional radiation dose to a wildlife refuge worker will be less than 3 millirem/year. This amount of radiation is basically insignificant along the Front Range where the dose from background radiation is generally in the range of 350 to 450 millirem/year.
5.K	. . . and in terms of your setting it for the protection of the wildlife worker, I really agree with John Till and using the resident rancher scenario, that I think that's much more realistic and would be a much more adequate clean-up, because we're talking about wildlife who are going to be here. They're going to be on that site a whole lot more than the wildlife workers, so, in fairness to the wildlife that we're designating this site for, I think we owe it to them, as well as to the future generations of humans, up to a quarter of, you know, up to 240,000 years in the future . . .	Please see General Response.
61.a	Publications and recommendations of RMPJC's technical consultant, the Institute for Energy and Environmental Research (IEER) Attachment A is a technical report prepared for RMPJC by the Institute for Energy and Environmental Research (IEER) entitled "Setting Cleanup Standards to Protect	Please see General Response. IEER made six recommendations that are relevant to the closure project at Rocky Flats:

	Future - Generations: The Scientific Basis of the Subsistence Farmer Scenario and Its Application to the Estimation of Radionuclide Soil Action Levels for Rocky Flats" (December 2001). See page 44 of this report for recommendations IEER made at the time of the release of this report. Attached is a copy of the May 2002 issue of "Science for Democratic Action," newsletter of the IEER. This issue summarizes IEER's technical report and includes on page 16 a list of IEER recommendations. There is some overlap between the two sets of IEER recommendations, but the lists are not identical. Recommendation 4: We ask the RFCA Parties to consider carefully and to respond in full to the several IEER recommendations referenced in the previous paragraph.	1) DOE should use the subsistence farmer scenario rather than the wildlife refuge worker as the basis for setting RSALs. Please see General Response. Also, the RSALs are protective of a hypothetical rural resident. 2) Reiteration of recommendation 1). Please see General Response. 3) The designation of Rocky Flats as a wildlife refuge should not serve as a precedent for other major DOE sites. The designation was made by an Act of Congress, not by DOE. The designation as a National Wildlife Refuge was based on the attributes of the site. These attributes are specific to Rocky Flats and do not necessarily serve as a precedent for other major DOE sites. 4) Investigations of the effects of residual contamination on wildlife should be undertaken. Investigations of the potential for a wildlife refuge designation to enhance mobility of plutonium should be undertaken. Considerable research has been conducted on the effects of radiological contamination on wildlife. Those studies indicate that the level of cleanup proposed in the modifications to the cleanup agreement will not pose significant risk to wildlife at Rocky Flats. Considerable research has also been conducted on the mobility of plutonium in the environment at Rocky Flats. The parameters used to estimate risk for the wildlife refuge worker take into account the potential mobility of contaminants. Furthermore, estimates have been made as to the amount of radiological contamination that could be transported offsite by wildlife (e.g. a deer that eats contaminated

		foliage and then wanders off the site). The calculations show that this method of contaminant transport would result in negligible quantities leaving the site. 5) IEER evaluation shows that, if the ground water pathway is taken into account, an RSAL of 1 to 3 pCi/g would be compatible with the State surface water standard for plutonium and americium of 0.15 pCi/l. The IEER evaluation does not seem to take into account the ground water data gathered at more than 1,000 monitoring wells over 30 years at Rocky Flats. Those data show conclusively that the mobility of plutonium in ground water is extremely limited and give no indication whatsoever that ground water would transport radionuclides at concentrations that would affect the quality of surface water in the streams on Rocky Flats. 6) Any cleanup plan that does not achieve the ultimate goal of protecting a subsistence farmer should specify how that goal will be achieved via interim steps. Please see General Response.
61.b	REASONABLY MAXIMALLY EXPOSED INDIVIDUAL: p. 2: "The reasonably maximally exposed individual is the wildlife refuge worker." Can you guarantee that this will be the maximally exposed individual in 200 years? in *500* years? in 1000 years? in 2400 years (10% of the half-life of Pu-239)? The Congressional bill making Rocky Flats a national wildlife refuge stated that this designation should not be used to establish the cleanup level for the site. Yet this is exactly what is being done. Why?	Please see General Response. Subtitle F – Rocky Flats National Wildlife Refuge Act says "nothing in this subtitle shall reduce the level of cleanup and closure at Rocky Flats required under the RFCA or any Federal or State law." The modifications to the cleanup agreement call for RSALs that are more stringent than those previously in RFCA and meet the requirements of Federal and State law.
61.c	C. LAND USE ASSUMPTION: p. 9: What does it mean to say that "the RFCA Parties *believe* it is appropriate to incorporate a wildlife refuge land use assumption into the	The RFCA Parties have carefully considered the requirements of CERCLA and the Rocky Flats National Wildlife Refuge Act, and determined that it is appropriate to employ the wildlife refuge

	proposed RFCA modifications"? Clearly, what the RFCA Parties "believe" is not identical to what they are required by law to do.	worker scenario to determine the reasonably maximally exposed receptor.
89	The proposed future use of Rocky Flats as a wildlife refuge has also been used, contrary to congressional intent, to determine cleanup levels at the site. But Rocky Flats will not remain a wildlife refuge for the eons nuclear waste remains hazardous. Again, it is apparent that the decision to clean up only enough to protect a wildlife refuge worker was made despite serious public reservations. We are deeply concerned that the latest risk-based end states document will be used for a DOE attempt to shortchange long-term protection at INEEL, too.	Please see response to Comment 61.c, Category B.
21	• We recommend that Rocky Flats be cleaned to protect the family of a resident subsistence farmer (on this topic see IEER, Science for Democratic Action, vol. 10, no. 3, pp. 1-6, 8-9). • The resultant cleanup level for plutonium in surface and subsurface soil would be 5 or less picocuries per gram, with subsurface cleanup depth determined by the depth of contamination. Cleanup to this level will make the site safer for all other uses.	Please see General Response.
90	We recommend that Rocky Flats be cleaned to protect the family of a resident subsistence farmer (on this topic see IEER, Science for Democratic Action, vol. 10, no. 3, pp. 1-6, 8-9 -- this document is available on this website as a PDF document -- Acrobat Reader required). This would ensure the cleanup is safer for any future use at the site. The resultant cleanup level for plutonium in surface and subsurface soil would be 5 or less picocuries per gram, with subsurface cleanup depth determined by the depth of contamination. Cleanup to this level will make the site safer for all other uses.	Please see General Response.

RFCA Attachment Proposed Modifications

Response to Comments

Category: C. Protectiveness of 50 pCi/g RSAL

Commenter No.	Comment(s)	Response
15	2. The resultant cleanup level for plutonium in surface and subsurface soil would be 5 or less picocuries per gram, with subsurface cleanup depth determined by the depth of contamination. Cleanup to this level will make the site safer for all other uses.	Please see General Response.
18	I am a resident of Boulder, and would like to express my concern about the level of clean-up at Rocky Flats that the DOE is proposing. The Rocky Flats area is so close to a couple million people, one would think that the commitment to cleaning up the site to truly safe levels would be a #1 priority. While the expenses of such a clean-up are high, we should be allocating funds for things like that as opposed to military build-ups. The fact that many people are unaware of the dangers inherent in an incomplete clean-up should not be used as a justification for that inadequate clean-up. We live here, and we are American citizens. Part of "homeland security" is the knowledge that we are doing what we can as a society to assure a safe environment for a major metropolitan area. Therefore, put me on a record as a concerned citizen who wants the remaining plutonium levels (which we shall live with for tens of thousands of years) at the Rocky Flats site to be no more than 5 picocuries per gram, who wants you to not restrict clean-up efforts to an arbitrary ending time (but to go on as long as is required) or to a budgetary	Please see General Response.

	figure that may not be enough, and who wants you to thoroughly clean all remaining buildings, waste pipelines, and toxic soils--all of these considerations to bring about an adequate and safe clean-up of an area so close within metropolitan Denver.	
5.D	Our concern is making a refuge that will exclude, presumably, the present industrial area, and so people will have, to or another, presumably, some access to the rest, and I also understand, from things I learned 20 years ago in graduate school, that our hot-particle theory has some scientific validity, so that, if you have 50 picocuries per gram as your objective, how is that radiation distributed in those grams, and are those particles -- are they concentrated, diffuse, and are those particles rescuable, so, to me, when I made a comment along the refuge scoping, that was the point I emphasized from my perspective as an issue of safety for people from our organization who may eventually want to visit the site.	The limits of current technology will almost certainly mean that some "hot particles" will be found. However, any sampled soils containing "hot particles" that exceed the RSAL will be subject to the risk screen and /or an action determination. In the buffer zone, the majority of the plutonium contamination is derived from wind blown redistribution of materials spilled at the 903 Pad. Measurements of the size distributions of the airborne material show that the plutonium is distributed rather uniformly across a broad range of soil particle sizes ranging from submicron up to several tens of microns. Generally, the mechanism for this distribution is understood to be the attachment of very small actinide particles to larger soil granules. These various soil granules make up the aggregate soil particles. The activities of these contaminated soil particles are much less than would be the case for pure actinide particles of the same aerodynamic size.
5.J	I'm a professor of biology at CU, and in 1975 and '76, I was given a contract by the Department of Energy and, as a result of that, I happened to sample freshly fallen snow at the Rocky Flats site, and, looking back at those data now, I have made an extrapolation from the actual measurements. Some of you have heard these data before, but not all of you, and, in one snowfall, there were 14,000,000 radionuclide particles per acre in the upwind, quote, unquote, buffer zone, western buffer zone. By extrapolating that, for 36 years of routine plutonium emissions, I come up with a figure, not a precise figure, but over 90 billion radionuclide particles per acre, and, however conservative one is in estimating how much of that is left, there must be astronomical numbers left, even	DOE, EPA and CDPHE have reviewed the 1975-76 research. Certainly the commenter is aware that the methodology employed over a quarter century ago was imprecise. Furthermore, the methodology employed had no technique for subtracting the naturally-occurring radionuclides from the total. The methods employed now adjust for background effects. DOE, EPA and CDPHE are relying on much more accurate analytical methods for determining the amounts of plutonium and americium contamination in the soils at Rocky Flats. Regarding observations about the numbers of particles that have been deposited on the soils at the site over the course of its operation, those numbers are not at all surprising given the high levels of naturally-occurring radium, thorium and uranium along

	in the buffer zone that's proposed for the wildlife refuge. These figures are, in general, supported by Dr. John Till's study for the health department, which you're familiar with, which came from official data from the emissions of plutonium from the stacks at the site. I note that 50 picocuries per gram of soil is 833 times the background level around the site, or to the west of the site, 833 times, which seems to me still very high, and Dr. Arjun Makhijani has recommended, after studying the site, that something in the range of one to ten picocuries would be a safer level, and I certainly endorse that.	the Front Range, and the rudimentary method employed for measurement. If one considers an acre of contaminated soil at an average activity of 0.05 pCi/g, (an average value of plutonium in soil that one could expect to see anywhere along the Front Range as a result of atmospheric weapons testing), there would likely be greater than 500 million plutonium particles per acre in the top millimeter of soil. This would assume the particles are each 0.1 microns in diameter, likely a substantial overestimate of the actual average particle size.
5.G	Now, we're talking about whether it's a refuge worker or a rancher living there and, you know, frankly, we're talking about the most lethal substance known to mankind that has a half-life so long that it's essentially forever in our environment, and I want to reiterate the comments that we look at the mountains and they look solid right now, but, I mean, living here, we know what the winds on the Front Range are like. We know that we're in a drought period, that we're losing topsoil, and that we're losing soil adhering vegetation at a rapid rate, and I see winds and ongoing erosion of topsoil. We're also focused on topsoil, and the top soils clean-up alone is -- we're saying that about a thousand-times background-level radiation is now acceptable to us because it's what we can do. Therefore, it's acceptable, and I disagree with that argument.	Please see General Response.
5.T	I want to speak in support of the 50-picocurie clean-up level for surface soil. In the first place, from a scientific standpoint, I think it is protective of even the resident because our working group determined that the clean-up level for a resident should be about 200 picocuries, so we're at a quarter of that many. We're also very close to what the CAB study showed. There's no statistical difference between 35 and 50. The 50-picocurie level -- the other thing that has been brought out a lot tonight is the	Comment noted.

	half-life of the plutonium. While it's certainly true that the half-life of plutonium is 24,000 years, the half-life of the plutonium on Rocky Flats is about 150 to 200 years. It's decreased at about 1 percent per year. Nearly 30 percent of it is has already left the site, so that it won't be there for much longer anyway so that's one reason why I think the 50 is acceptable. The other point about the 50 is that it covers about 50 acres. 50 acres is an acceptable ecological damage, I think. If we were to go down to five or so, we would be looking at a thousand acres, and to destroy a thousand acres of that kind of life out there -- I just couldn't see that. That's like destroying a village to save it, so I'm not in favor of that.	
30	Recommendation 5: If during surface remediation it is found that contamination continues below six inches, DOE should remove all contamination in excess of 50 pCi/g in the top six feet of soil from the present grade, unless a different cleanup level is established for the three-to-six-foot layer below grade in formal consultation with the regulators and stakeholders. DOE should apply the ALARA principle and a risk analysis to areas where the contamination below six feet exceeds 50 pCi/g. This depth is based on the possibility that near-surface contamination may be exposed due to erosion, or contamination may be excavated at some point in the future, either by humans or by burrowing animals. As an example, it should be noted that environmental restoration work at Building 663 unexpectedly resulted in excavating a hot spot down to a depth of five feet.	Under the final Modifications to RFCA Attachments plutonium contamination in excess of 50 pCi/g will be removed to a depth of 3 feet. The RFCA Parties believe that contamination below 3 feet is unlikely to pose a significant surface contamination problem. Therefore, the action level for the depth interval between 3 and 6 feet has been set at 3,000 pCi/g (based upon concentration and area/volume) for both plutonium and americium (once an action is initiated, removal will be to lower than 1000 pCi/g). However, the action determination considers erosion potential (see Subsurface Soil Risk Screen, Figure 3 in Attachment 5).
40	I do not believe that the proposed levels of 50 pCi/g of soil is an adequate level of clean up. The surface soils should be cleaned to the level that would protect the most people. Two independ[e]nt studies have been conducted regarding the soil action levels. Both groups of scientists suggested clean-up levels below those proposed by the DOE. The	Please see General Response.

	DOE paid for the study conducted by RAC--John Till's group. The other was conducted by nationally respected scientists at the IEER. I believe that the surface soil should be cleaned to a level of 10 pCi/g of soil. This level would go far in assuring public safety, now and in the future.	
42	Decrease your criteria for remaining pico curies to be left in the soil from 50, to 5 pico curies or less per gram, w/cleanup depth determined by depth of contamination.	Please see General Response.
69	I would like to express my concern in regards to the amount of plutonium that will be remaining in the soil after clean-up. 50 pci per gram of soil is simply too much, especially if the site is to be opened to the public. There is no question that the clean-up level should be 1-10 pci maximum. Anything less is unacceptable and a hazard to the public's health, as well as the ecosystem itself. Thank you for considering these concerns.	Please see General Response.
71	I, along with many others close to me, am concerned about the health implications of allowing public access to the Rocky Flats Wildlife Refuge planned for 2006. The proposed level of 50 picocuries per gram of soil is not a safe enough level to strive for. Children playing in the dirt will have much to worry about if 50 picocuries remains the target contamination level. The soil needs to be reduced to a maximum of 1-10 picocuries, as Dr. Arjun Makhijani has proposed, if there is to be any hope of alleviating the worry in damaging our friends and children's health. More needs to be done to make Rocky Flats as safe as possible.	Please see General Response.
79	It is my opinion that the soil clean-up project for the planned National Wildlife Refuge should rid the levels of radioactive material to a degree that compromises between what the DOE and the IEER believe is safe. I understand that the DOE believes 50 picocurries of plutonium per gram of soil is safe, while 1-10 picocurries	Please see General Response.

	per gram of soil is what the IEER feels is safe. I suggest that the post-cleanup level be between 20 and 25 picocurries (though I truly feel that 1-10 would be more comforting to your family and friends and to mine). If the money, time, and other resources are available to clean up the site by just 25-30 pic[oc]uries more per gram than proposed, I believe that effort would satisfy more people than an effort made for one or the other of those proposed post-clean up levels. The stretch in resources used to rid the soil of only 25 more picocuries per gram of soil would not be significant, but well worth a greater piece of mind for many.	
82	Clean up to 5 or less picocuries is much more desirable than gov. proposal.	Please see General Response.
83	The proposed level of 50 picocuries per gram of soil is too high to insure the safety of the public and future workers on the National Wildlife Refuge scheduled to open by 2006. A more safe, reasonable (and realistic) level of clean-up would be 1-10 p[i]cocuries per gram of soil.	Please see General Response.
86.a	Of course the proposed modifications have moved toward protecting human health and safeguarding the natural environment, yet they do not yet offer sufficient, adequate, verifiable or substantial assurance. The contamination that is left unfound and/or unremediated is potentially dangerous at a single dose level. One particle of inhaled plutonium is enough to cause irreparable harm to an unprotected individual whether inhaled on-site or off-site (due to migration.) Averaged risk assumptions in such a situation are meaningless. No means has been considered to verify that no one is harmed in such a manner. The enormous amount of plutonium left above background levels that will be left unremediated or even unfound is contamination that was produced and then carelessly or even recklessly placed in the surrounding environment	Please see General Response.

	solely by the activities of the Rocky Flats Plant. Even the existing background levels are for the most part the result of the Federal Government's nuclear testing.	
86.b	Radionuclide action levels should be set to background (0.04 pCi/g) and no higher. Migration from this site is and always has been possible and it has caused a lot of harm. If it costs more to do this and it will take longer, than by all means advise the stakeholders that we need to go to Congress to make our case. However, we need to know the nature and extent of the contamination, and possible cleanup alternatives and what they cost. The Parties have to help in order to do this.	Please see General Response.
61.a	Recommendation 1: The RFCA parties should set the RSALs at a risk level of 10-6 for an on-site resident . To provide the maximum protection for possible intensive future use of the site, we recommend defining the resident as a subsistence farmer or resident rancher (see Attachments A and B). This would result in a cleanup level for plutonium (Pu) in the soil of 5 or less picocuries per gram of soil (pCi/g). Recommendation 2: If the RFCA Parties cannot achieve cleanup in accordance with Recommendation 1, they need to show why this is not possible and then to work closely with the community to set a level that is as protective as possible.	Please see General Response.
61.b	Question iii: While EPA guidance says to use reasonably anticipated future use in determining cleanup, would it not have been possible for the RFCA Parties to make very different assumptions and to use a scenario that corresponds more closely to the long-term danger of Pu, the contaminant of principal concern at Rocky Flats? Had the RFCA Parties "belief" encompassed the notion that they should take a truly long-term approach to protection for future users at the site, would they not have recognized	Please see General Response.

	that Rocky Flats is likely to cease being a wildlife refuge long before Pu left in the environment ceases being dangerous in minuscule amounts? The appropriate scenario for long-term protection is the subsistence farmer scenario.	

RFCA Attachment Proposed Modifications

Response to Comments

Category: D. Adequacy of Characterization

Commenter No.	Comment(s)	Response
3	I continue to support and recommend the following: • That the site be thoroughly characterized and cleaned to the maximum extent possible.	While much characterization data has been collected previously, additional Site characterization will occur in accordance with the Industrial Area Sampling and Analysis Plan (IA SAP) and the Buffer Zone Sampling and Analysis Plan (BZ SAP). These plans have been approved by CDPHE and EPA and contain the data quality objectives and the overall sampling approach consistent with the regulations and a sound statistical approach. The sampling approach includes a combination of biased sampling in areas where contamination is expected, statistical sampling grids, and geostatistical sampling. The sampling is designed to provide a high level of statistical confidence that contaminated areas have been identified and accelerated actions have been effective. In addition, the characterization plans have been designed to provide the necessary data to perform the Comprehensive Risk Assessment after all accelerated actions have been completed. Specific sampling location maps are developed and included in Sampling Plan Addenda which are prepared as work proceeds. These Addenda are consistent with the sampling methodology and protocols established in the IA and BZ SAPs. In addition to the approved sampling plans, DOE has agreed to enhance the approach to sampling the original process waste lines (OPWLs). This includes deeper sampling and more extensive sampling than originally proposed. The enhanced approach is included in the new Attachment 14 to RFCA.

		Accelerated action determinations will be based on the results of the characterization and in accordance with RFCA. The final modifications to RFCA Attachments provide the framework for the conduct and completion of accelerated actions that are protective of human health and the environment, notwithstanding the fact that all contamination may not be removed by these actions.
15	Recommend thorough characterization of the whole site and cleanup to the maximum extent now possible.	Since the subject matter of this comment is similar to that of Comment 3, Category D, please also see that response.
16	• The Rocky Flats site has not been adequately characterized. • The Buffer Zone has not been adequately characterized. • The land outside the Buffer Zone has not been adequately characterized.	Since the subject matter of this comment is similar to that of Comment 3, Category D, please also see that response. The offsite Operable Unit (OU-3) has been thoroughly characterized, including independent sampling and analysis by CDPHE, citizen's groups and communities, and has been approved as a No Action Corrective Action Decision/Record of Decision.
21	We also recommend thorough characterization of the whole site and cleanup to the maximum extent now possible. The government RFCA Parties responsible for cleanup of Rocky Flats have not thoroughly characterized" the Rocky Flats site to determine the full extent of contamination in the environment, and they have no plan to do so.	Please see response to Comment 3, Category D.
5.A.1	The other thing we're concerned about is that the surface area is adequately sampled using the best sampling practices. We want to see an independent evaluation called independent verification and validation be done. This would be by an independent company that would come in and make sure that the lab work and the sampling was done correctly.	Since the subject matter of this comment is similar to that of Comment 3, Category D, please also see that response. The sampling program at Rocky Flats is established consistent with EPA-approved procedures and controls to ensure data quality is not compromised. These include sample collection, packaging, shipping, and chain-of-custody. Sample analyses are performed in approved laboratories with approved methods that meet stringent

		EPA requirements. Sample results are verified and validated to ensure the data quality requirements have been met. Routine quality control samples are included in sample batches to the laboratory including field duplicates, field blanks, and laboratory QC samples. The sampling program is routinely audited to ensure compliance. In addition, on certain projects, CDPHE and EPA conduct independent sampling and analyses to verify results. These independent samples are processed at independent laboratories.
5.A.2	We also want DOE to thoroughly characterize the subsurface, especially the old process waste lines. We feel that this is necessary so that we, again, know what is being left behind.	The OPWL approach presented in the RFCA modification has been changed based on the comments received. The proposal provided sampling to 6 feet below the surface where leaks were reported and in the 700 area where leaks were suspected. The proposal was modified to include samples to 8 feet below the surface and also suspected leak areas across the entire site will be sampled. These changes have been made to the final Attachment 5 and Attachment 14.
5.B	[T]he site has not ever been thoroughly characterized and there is no plan to do that. First of all, perform a thorough characterization of the site to find out where the contamination is, how much there is.	Since the subject matter of this comment is similar to that of Comment 3, Category D, please see that response.
5.I	I would also like to ask that there should be verification of the status by independent atmospheric scientists, soil specialists and hydrologists. Since my membership on the board, I have not been able to see any soil samples, analysis of plant material, and characterization of the soil. Since there are no plans to clean the deepest surface -- and that has come up before too -- where the contaminated pipes are, I'm concerned about landslides, because the USGS maps show the whole area full of unstable soil and, as we've talked about – and before the occurrence of breaks after the site is open to the public – and the RFCA documents which I have state that there will be monitoring, maintenance, and information management; yet, DOE does not have a dedicated fund to do this.	All characterization results are available in the Rocky Flats Reading Rooms. The RFCA Parties have utilized independent experts to evaluate environmental conditions at Rocky Flats. Erosion-prone areas are evaluated in accordance with the Soil Risk Screen in Attachment 5 and monitoring, remedy maintenance and information management will be required post-closure.

5.O.1	I think that we should characterize the site and we should test all over because it's much cheaper to clean it up than it is to find some major problem later and have it spread all over into drinking water supplies or in the air we breathe.	Please see response to Comment 3, Category D.
5.O.2	It's more important that we pay attention to low levels and clean them up, or at least know where they are and where they're moving.	Please see response to Comment 3, Category D.
5.G.1	I'm also here to speak on behalf of Physicians for Social Responsibility, PSR of Colorado. I feel that I can say, for PSR, that we're essentially in agreement with the arguments delineated by Dr. Nichols, Dr. Moore, and Dr. Selbin.	Comment noted.
5.G.2	In terms of characterization, I understand you say that there has really not been the extent of characterization that you want to do and that more is planned. You know, as a physician, I look at Rocky Flats as a sick patient and I'm thinking that, in order to be able to fully diagnose and to provide a treatment plan for a sick patient, I want to have all of the information and data upfront in terms of diagnostic testing, and it's on that information that I would base a comprehensive plan, and so I have some concerns that we don't have the extent of characterization present to really know where all the hot spots are and be able to plan accordingly; additionally, that we're talking about this plan in a very static form in a snapshot of what Rocky Flats looks like.	Please see response to Comment 3, Category D.
5.S.1	[Y]ou said that future characterization was still needed to be done, and I was wondering what the plans were for that. Are there any concrete plans for what future characterization looks like, when it's going to be done, by whom, and what our public access will be? And, when that characterization is done, what are the plans for remediation, or are we just going to do the	Since the subject matter of this comment is similar to that of Comment 3, Category D, please see also that response. Characterization results are available in the Data Summary Reports or the Closeout Reports. Data Summary Reports provide the characterization data for sites that, after characterization, have been determined not to require accelerated action. Where results indicate

	characterization and say, "Hey, there it is," so that's one of my concerns.	accelerated action is required, no Data Summary Report is prepared. Rather, accelerated action is performed and confirmation samples are collected to confirm that the cleanup meets the objectives. These characterization and confirmation sample results are included in the Closeout Reports. Where accelerated action was taken and the contamination has been removed, previous characterization data are not included in the Closeout Report.
5.S.2	I didn't hear anything said tonight about what would be done for future remediation, and then one more quick thing was I was a little bit insulted by the risk assessment that was put up there at the first presentation. Plutonium has not been a choice that we've chosen to deal with. It's something that's been laid at our feet that we have to deal with. So I'm still a little confused as to what further characterization looks like.	Accelerated actions will be based on the characterization results and the requirements in the final modifications to the RFCA Attachments. The reference to the risks of various activities was not to suggest the value that should be placed on various risks, but only to provide a technical comparison of relative risks of contamination at Rocky Flats to everyday life activities in which we may engage. Since the subject matter of this comment is similar to that of Comment 3, Category D, please also see that response.
5.S.3	But no guarantees or estimates of how many samples will be taken per square yard of measurement, or whatever you're dealing with. And that will be random sampling, unless high amounts are found, and then the amount of sampling will increase?	The number of samples collected varies with the type of contaminant, release mechanism, exposure pathway, and exposure unit for the expected receptor. The methodology for making this determination is presented in the IA and BZ SAPs. The methodology includes the following: ▪ Statistical sampling based on standard grid ▪ Biased sampling ▪ Geostatistical sampling ▪ A combination of the above sampling approaches
29	The site has never been "characterized" to identify the full extent of the contamination. In fact, there is no plan for obtaining this basic information. This is a major unconscionable oversight.	Since the subject matter of this comment is similar to that of Comment 3, Category D, please also see that response above.
30.a	Data for Recom 37 - RFCAB understands an "institutional control zone" (RFCA Attachment 5, figure 1) – anticipated to be approximately 1,000 acres within which there will be institutional, physical, and engineered controls – will be established at the site.	The anticipated extent of areas with institutional controls at closure is shown in Figure 1. The anticipated boundary of areas that will be subject to institutional controls depicted in Figure 1 is subject to modification based upon characterization, future response actions, the results of the Comprehensive Risk Assessment, and the final remedial/corrective action decision in the final CAD/ROD. The

	Recommendation 37(*): RFCAB recognizes that the Rocky Flats site is a distinctly valuable site for research on how to remediate a plutonium-contaminated site. Lessons learned at Rocky Flats could be beneficial for cleanup of plutonium-contaminated sites elsewhere. With the understanding that wildlife and workers with the U.S. Fish and Wildlife Service will have access to the "institutional control zone" at Rocky Flats, RFCAB believes this area should remain in the primary jurisdiction of DOE and should serve as a test bed for research on future promising remediation technologies.	Parties additionally presume that there will be no residential development at Rocky Flats. The RFCA Parties' intent is to use Figure 1 to inform the accelerated action decision-making process. It is anticipated that U.S. Fish and Wildlife personnel will have access to areas subject to institutional controls. Nothing precludes the use of this area for additional study. However, DOE has no plans at this time to fund any remediation research or other technologies post-closure. If performance monitoring or the results of required periodic reviews indicate that additional remediation is necessary, then DOE is responsible in accordance with CERCLA and RCRA for implementing additional response actions that may be required. . Also, please see response to Comment 90 in Category F, Long-Term Stewardship.
30.b	Characterization Data for Recom 38 - It is imperative that future stewards at the site and the public know as precisely as possible the extent of contamination above background levels left behind after closure. Recommendation 38(*): The Board recommends DOE develop a detailed map of and information about residual contamination above background levels at the site post-closure	The final modifications to RFCA Attachments do not change the current reporting requirements for contamination that may remain. DOE documents the contaminants that remain in two types of documents. First, the Data Summary Reports provide characterization of sites requiring no accelerated action and therefore document residual contamination. Second, Closeout Reports document the accelerated actions and provide the confirmation samples and other samples to document residual contamination. Data is compared to background +2 standard deviations. The RCRA Facility Investigation/Remedial Investigation-Corrective Measures Study/Feasibility Study (RFI/RI-CMS/FS) report will also summarize the contamination left at the completion of accelerated actions. A map showing the remaining contamination is probably a good way to communicate the information and will be included as part of the long-term stewardship information.
39	Please search for Pu, physically, outside the industrial area, for old dump and burn sites, and verbally, by	This has been done with several previous studies and evaluations to identify all potential release sites. CDPHE independently performed

	interviewing former employees.	an evaluation to determine if any such sites were being overlooked. Any new information that becomes available will be evaluated and considered. In addition, characterization will be performed in accordance with the Buffer Zone Sampling and Analysis Plan.
42	Attend to characterizing and cleaning the whole site to the fullest extent possible. We understand that you have not yet determined the extent of the contamination. We need to hear of your plans to do so.	Please see response to Comment 3, Category D.
45	The site has not been thoroughly characterized. This is irresponsible and dangerous and ignores a history at Rocky Flats that includes 2 large fires, constantly changing wind patterns, and negligent dumping of VOC's.	Please see response to Comment 3, Category D.
51	1. Lack of adequate characterization The surface soil and subsoil of some of the most contaminated areas in the Rocky Flats site (under buildings and along 7 miles of buried process waste lines) have not been fully characterized to determine the actual extent of contamination. Therefore, there is insufficient data at present upon which to base a comprehensive cleanup plan- unmeasured hot spots are certain to have been missed. This situation is analogous to a "patient" (Rocky Flats) who has received an insufficient diagnostic work-up as to the extent of disease present. In this way, the ability upon which to base an accurate treatment plan is thereby pre-empted. A reliable, comprehensive cleanup plan requires a more accurate determination of the locations, depth, and levels of radioactive contamination on-site at Rocky Flats.	Please see response to Comment 3, Category D.
56	A thorough characterization of the whole site and cleanup to the maximum extent now possible needs to be done.	Please see response to Comment 3, Category D.
58.a	The most obvious problem is that Rocky Flats seems to be horribly polluted, and nobody seems to know the exact extent.	Please see response to Comment 3, Category D.

58.b	For that matter, the currently available budget should also be used to perform a thorough characterization of radiation levels on Rocky Flats, both above and below the surface, and to use those as an argument for additional funding. It appears to some, that such a characterization would reveal considerably higher radiation levels th[a]n are assumed to exist on Rocky Flats. This is because during the last assessment of radiation levels in the area readings were taken as far away as Greely and then calculated into the average to make it appear lower than it really is.	Please see response to Comment 3, Category D.
59	In 1996 the Department of Energy (D.O.E.) made an arbitrary decision to close Rocky Flats in ten years, without first determining requirements for a real cleanup. At this point, contamination levels in areas under buildings and along the buried process waste lines that carried toxic and radioactive waste have not been analyzed. In addition, the surface soil has yet to be fully examined to determine the actual pollution levels. The D.O.E. has no plan for full site examination, and regulators are not requiring it.	Please see response to Comment 3, Category D.
67	A. Closure date: A decision was made to clean and close the site by the arbitrary date of 2006. We, with others, applaud DOE's intent to expedite cleanup, but the decision to close Rocky Flats by the end of 2006 was made without having first determined what would be required for a real cleanup. The site, for example, had not been thoroughly characterized to determine the full extent of contamination. Indeed, to date there has been no comprehensive characterization of the site. There is no plan for such, and the regulators are not requiring it. The site should be thoroughly characterized to determine the full extent of contamination in the environment, and the characterization should be reviewed by a competent, neutral external party.	Please see response to Comment 3, Category D.

36	Secondly, RFETS will become a wildlife refuge. I am greatly concerned that allowing dogs, horses, women, men, and children, of all ages into a buffer zone that is not being characterized will present a significant health risk to the public. To presume that the "buffer zone" area is pristine is to ignore the infamous history of Rocky Flats. Some of the contamination spreading activities include: the burning of hazardous materials, such as plutonium, that was spewed into the air and spread for miles, the 2 fires that released amounts of contamination that can hardly be imagined, and the illegal dumping of VOCs and plutonium into unknown areas of the site. I urge the DOE to fully characterize the entire site before even considering handing the site over to Fish and Wildlife, which will trust the site is clean, and allow people and pets on the site. Leaving the health and safety of the citizens of this area to presumption is extremely unresponsible.	The Buffer Zone will be characterized in accordance with the BZ SAP. Since the subject matter of this comment is similar to that of Comment 3, Category D, please also see that response. The RFCA Parties are aware that the U.S. Fish and Wildlife Service is considering whether to allow domestic animals onto the refuge as part of the Comprehensive Conservation Plan.
34	Attachment 5, Page 5-22, 5.3.D. – The Service is aware that there is disagreement between the stakeholders as to the concentrations, depth, and area/volume of subsurface contamination that needs to be removed. The Service believes that this is an issue that needs to be looked at closely by the RFCA Parties' technical staff. What ever the resolution, there needs to be some characterization in the lower depths (proposed as greater than six feet), so that there is some knowledge of what is remaining.	The OPWL approach presented in the final Modifications to RFCA Attachments has been changed based on the comments received. The proposal provided sampling to 6 feet below the surface where leaks were reported and in the 700 area where leaks were suspected. The original proposal has been modified to include samples to 8 feet below the surface and also suspected leak areas, across the entire site, in addition to all reported leaks, will be sampled. These changes are being made in Attachment 5 and Attachment 14. For other potential release sites, characterization will be performed at necessary depths to determine what contamination is remaining and to provide adequate data to perform the comprehensive risk assessment.
86.a	Sadly the very nature of the RFCA allows for an arbitrary and capricious decision-making environment. While endeavoring to "To expedite remedial work and maximize early risk reduction at the Site, the Parties	Accelerated actions reduce risk and expedite the cleanup process. They are expected to contribute to the achievement and efficient performance of the anticipated final remedy for the Site. The accelerated actions under RFCA do not in any way short- circuit the

	intend to make extensive use of accelerated action..." (RFCA, para 79) a situation whereby the tail shakes the dog has been created. In this case making use of a global Interim Response Action (IRA) and granting total primacy to the poorly informed determinations by the U.S. Congress to complete cleanup by December 2006 for an amount less than or equal to $7 billion dollars. Add to this the concept of a so-called wildlife refuge and it becomes impossible to follow the appropriate and legally specified procedures outlined by environmental law and regulation. Where is the Remedial Investigation? Where is the Feasibility Study? What is the extent and nature of contamination to the air, surface water, groundwater, sediments, surface soils, subsurface soils? What is the extent and nature of contamination to wildlife and biota? Where is the Comprehensive Risk Assessment? Where is the Detailed Analysis of Alternatives? Where is the consideration of permanent solutions by reducing toxicity? Where is the consideration of alternative cleanup technologies? Where is a detailed analysis of costs for these unconsidered risks and alternatives? Where is meaningful public participation? Without these questions being answered neither the decisions made or the public's participation in those decision[s] can be meaningful. Of course these questions must be answered. The plan as it stands today is to not make these determinations prior to cleanup actions as should be the case at such a dangerous and complicated site. The plan is to make these determinations, as has already been done, concurrent with the actions or even after all the actions have occurred (See, "Final Work Plan for the Development of the Remedial Investigation and Feasibility Study Report", 3/11/2002.) Steps, data gathering and analysis get skipped or put on hold. But	CERCLA process and do not relieve DOE from the responsibility to ensure legal and proper cleanup. The accelerated action provides a benefit to the public by taking action quickly to remove any immediate risks and prevent contamination from spreading further into the environment. The IA and BZ SAPs have been approved by the regulatory RFCA Parties and outline a method to ensure thorough and proper characterization of the site. Each accelerated action has full and open public comment and participation as outlined in RFCA. RFCA also addresses how the accelerated actions are evaluated against the CERCLA criteria such as: protection of human health and the environment; compliance with applicable, relevant and appropriate requirements (ARARs); short term and long term effectiveness; reduction of toxicity, mobility, and volume; implementability; cost; etc. Analyses of alternatives, including alternative technologies, are addressed in the appropriate decision documents. Once these accelerated actions are completed, DOE will complete a full comprehensive risk assessment, RFI/RI-CMS/FS, and Proposed Plan with full public participation and comment. A Record of Decision will be prepared. DOE is responsible in accordance with CERCLA and RCRA for implementing additional response actions that may be required.

	no matter what, as has been stated repeatedly by DOE officials and members of Congress and the Senate, this cleanup will be done by December 2006 for a cost of less than or equal to $7,000,000,000.00. Without the above questions and processes being followed answered or followed, what is the basis for these cleanup mandates other than a basis that is arbitrary and capricious?	
86.b	It is uncertain where, how much, and the nature of the contamination in surface soils, subsurface soils, mineral deposits, biota, air, groundwater, surface water, sediments. Has an accurate mass balance for all contaminants been done since there has been very limited characterization? Particularly, how much plutonium remains in the soil and where (this should be mapped in millimeters)? What is the extent of contamination under buildings and structures, in and around underground process lines? There has been unfinished work on a study which showed that actinide migration occurs during times of elevated groundwater levels (increased rain periods) moving particles via colloidal pathways from below the surface level, if true doesn't this substantially change the way subsurface soils are considered? Fully characterize the entirety of Rocky Flats including, air, soils, subsurface soils (even beneath structures), all process lines, groundwater and its contamination pathways, surface water, sediments, and all biota. Do the RI/FS before cleanup levels are set and actions taken. Although Technical Memoranda (TM) are to be reviewed by the public; it is highly unlikely given the vast amount of work to do in the mandated time frame that the public can keep up.	Since the subject matter of this comment is similar to that of Comment 3, Category D, please also see that response. The final modifications to RFCA Attachments specifically address removing more of the contaminated soils at the surface which present greater potential risk due to greater exposure potential and migration through erosion and surface processes. This approach reduces the overall risk at Rocky Flats because while minimal subsurface movement via colloidal transport could occur, the exposure pathway and risk are orders of magnitude less than those from surface soils.
90	We also recommend thorough characterization of the whole site and cleanup to the maximum extent now possible.	Please see response to Comment 3, Category D.

91	Finally, Broomfield wants language added to the proposed RFCA language to include an independent validation and verification (IVV) process of the remediation activities. The plan will ensure the community that all remediation action objectives have been achieved and reviewed by an independent third party. We support and reiterate Westminster's request for an independent IVV.	The sampling program at Rocky Flats is established consistent with EPA-approved procedures and controls to ensure data quality is not compromised. These include sample collection, packaging, shipping, and chain-of-custody. Sample analyses are performed in approved laboratories with approved methods that meet stringent EPA requirements. Sample results are verified and validated to ensure the data quality requirements have been met. Routine quality control samples are included in sample batches to the laboratory including field duplicates, field blanks, and laboratory QC samples. The sampling program is routinely audited to ensure compliance. In addition, on certain projects, CDPHE and EPA conduct independent sampling and analysis on certain projects to verify results. These independent samples are sent to independent laboratories.

RFCA Attachment Proposed Modifications

Response to Comments

Category: E. Subsurface

Commenter No.	Comment(s)	Response
1	Despite our general support for remediating additional surface soil in lieu of subsurface soil, the Coalition remains apprehensive about leaving in place high concentrations of subsurface contamination. This concern stems from the high degree of uncertainty regarding subsurface contaminants, concentrations, exposure pathways, and plans and means to implement a comprehensive long-term stewardship plan after the Site is closed. Some of the uncertainty stems from the fact that the subsurface remains largely uncharacterized, especially in the Industrial Area. In many cases, the RFCA parties do not know what contaminants exist and at what concentrations and depths. For example, the Actinide Migration Evaluation group recently concluded in the "Actinide Migration Evaluation Pathway Analysis Report" (April 2002) that a significant data gap exists regarding subsurface actinide data in the Industrial Area, including potential actinide solubility in subsurface process waste lines. If plutonium and americium are found to be associated with acids in the subsurface, these compounds may be more mobile than currently thought. Another example of this uncertainty is that	The entire premise of the proposed modifications to RFCA Attachments was based on the concept of conducting a risk-based cleanup that results in a more aggressive surface soil cleanup beyond minimal regulatory requirements in return for leaving more subsurface contamination in place. The technical basis for this approach is extensive research indicating that plutonium moves in the environment by particulate transport as a result of surface soil erosion. Plutonium is extremely insoluble and does not easily move in the subsurface. Field data at Rocky Flats supports this conclusion. There is an extensive network of Industrial Area ground water monitoring wells and subsurface soil boreholes. Plutonium is not detected in ground water from these wells, nor has it been found in borehole cuttings. Although data on contamination associated with leaking original process waste lines (OPWLs) are limited, in the past 2 years, more subsurface soil contamination data have been collected beneath building slabs. Radionuclide contamination beneath these slabs has generally been less than expected. The RFCA Parties contend that extremely immobile plutonium and americium contamination in the deeper subsurface would not pose a risk to a wildlife refuge worker. The modification to RFCA Attachment 5, section 1.2 identifies institutional controls to prevent digging. A ground water monitoring network will be in place to detect the movement of contaminants. There will also be required periodic reviews of the remedy to determine whether it remains protective. If at some future date plutonium was

	Kaiser-Hill found process waste lines (PWL) under the northern portion of the Building 123 foundation that were shallower than anticipated. They expected all PWLs to be 4 - 6 feet below grade, but piping was found between 0.5 - 1 foot below grade. In addition, it is unclear whether or not the RFCA parties will incorporate a worst-case scenario of potential treatment unit/remedy or related stewardship control failure in their risk assessment calculations. The consequences of such a failure need to be fully understood in order to account for all possible exposure pathways. Lastly, there is uncertainty about surface soil erosion rates, especially in the drainages. Surface soil may erode more quickly in a drainage than on a plateau, thus exposing subsurface contamination more quickly than anticipated. The Coalition will accept leaving contamination in the subsurface if the pathway analysis shows with a 95% certainty that the 10^{-5} risk is not exceeded and that the following, including protection of water quality and development of a comprehensive stewardship program (discussed below), are met: 1.Completely remediate the ash pits, trench 7, and trenches 3 and 4 "burrito". The Coalition supports the RFCA parties' proposal to completely remove the ash pits, trench 7, and trenches 3 and 4 "burrito". Removal of these Individual Hazardous Substance Sites is warranted as these remedial actions will decrease risk to water quality and reduce overall risk should controls fail. 2. Establish a maximum allowable concentration of subsurface contamination. If exceeded,	discovered moving in the subsurface, the ground water monitoring network would detect this movement long before it became a surface water problem. More mobile subsurface contaminants, such as organics, have been detected in ground water in certain parts of the Site and will be managed if they pose a risk to surface water. Public comments received on the proposed modifications to RFCA Attachments indicate that there remains strong community concern over the uncertainty of contamination related to the OPWLs. Given this community concern, the RFCA Parties decided to conduct more extensive OPWL characterization than what was proposed in the draft modifications, dated November 2002. In addition, when an action is taken, DOE will commit to remove any plutonium/americium contamination found between 3 and 6 feet deep to concentrations less than 1 nCi/gm. Many of the major process waste lines in the 700 Area (where the older plutonium buildings are located) are either above ground or in a tunnel between production buildings. These lines are being removed as part of building demolition, or they are directly underneath the buildings and will be characterized as part of the under building sampling. To date, process waste lines that have been removed at Rocky Flats, both in the 700 Area and in areas outside of the 700 Area, have exhibited low levels of contamination and have been disposed of as low level waste. There was also very little contamination found associated with original process waste lines under Building 771, one of the site's oldest plutonium buildings. The RFCA Parties do not consider removal of process waste lines that are associated with little or no contamination to be a wise use of taxpayer dollars. Nonetheless, the RFCA Parties recognize that there is strong community concern over the uncertainties surrounding the process waste lines. In response to that concern, the final RFCA Attachment 14 requires an increase in the amount of characterization required for original process waste lines. When an

	remediation of the given area would be necessitated. Because there are ample instances of human intrusion into the subsurface at contaminated sites, even in the presence of institutional controls, we believe the possibility of human access to the subsurface must be considered when determining a cleanup level for the subsurface. Establishing a threshold concentration limit for the subsurface will help mitigate potential human and ecological risk resulting from exposure in the event of control failure. The most recent Radionuclide Soil Action Level (RSAL) review conducted by the RFCA parties concluded that a surface soil plutonium concentration of approximately 780 pCi/g would result in a 25 mrem dose to a wildlife refuge worker. We understand the probability of accessing subsurface soil is lower than that for surface soil. Therefore, we support setting a threshold level of 1 nCi/g in the subsurface between 3 - 6 feet below current grade. Below six feet, the Coalition supports using a graded approach. At this time, however, we are not prepared to offer a detailed recommendation, but expect the RFCA parties will continue to discuss such an approach with us. We recognize that the RFCA parties are considering establishing a threshold limit of 3 nCi/g for the 3 - 6 feet range. We also recognize there is a great deal of uncertainty as to the extent, if any, of contamination between 1 nCi/g and 3 nCi/g in the 3 - 6 feet below grade level. Consequently, we trust the RFCA parties will work with us on developing strategies to bridge this potential gap.	action is taken to remove plutonium contamination associated with original process waste lines at a depth of 3 to 6 feet, DOE will remove that contamination to concentrations that are less than 1 nCi/g.

4	The Coalition remains concerned about the RFCA parties' approach to remediating plutonium in the subsurface three to six feet below grade. The Coalition stands behind its commitment to work with the RFCA parties to bridge the gap between its position (1nCi/g) and the RFCA parties' proposal (3nCi/g). What the Coalition did not understand until the draft language was released for public comment was that 3nCi/g would be calculated across $80m^2$. As a result of this provision and another provision establishing a single point cleanup level for plutonium of 10nCi/g, concentrations as high as 9.9nCi/g could be left in the subsurface. The Coalition is troubled by the impact of the $80m^2$ provision and cannot, as a matter of public policy, support leaving almost 10nCi/g in the subsurface. We are aware, however, that we do not know the extent of contamination between 1nCi/g and 9.9nCi/g and thus any dispute may be more intellectual than factual. We therefore request that Section 5.3 be modified to clearly delineate the RFCA parties' obligations to the Coalition. Specifically, if contamination is found above 1nCi/g three to six feet below grade and the decision is made to not remediate it to 1nCi/g or less, the RFCA parties must inform the Coalition and provide, among other information, data detailing the areal extent and volume of contamination, concentration levels, basis for and results of the pathway analysis and risk assessment, the RFCA parties' recommended action and basis for action, and any other relevant information necessary to understand the basis for the decision. After completing the remedial action, the RFCA parties	Please see General Response and response to Comments 1 and 91.a, Category E.

	must then provide a written account of the action and basis for action, and any impacts of the action including, but not limited to, long-term stewardship requirements resulting from the action. Finally, below six feet the Coalition recommended using a graded approach for remediating plutonium and pledged to work with the RFCA parties in developing such an analytical method. We are therefore not prepared to accept the RFCA parties' proposal to remediate below six feet based simply on a risk screen and pathway analysis, and welcome the opportunity to discuss this matter with the three agencies.	
5.A	On the subsurface, we want to work with the regulators. We realize the subsurface can't be cleaned up to the same level as the surface, so basically the CAB does buy into the notion that the surface presents the more immediate risk, but our real concern is in that word "immediate," because any contamination left in the subsurface is going to be long-lived and, at some point, will reach the surface, so, therefore, we want a careful evaluation of how much contamination is left in the subsurface. We propose that a number of 1,000 picocuries per gram would be the maximum that would be permitted in the subsurface. We feel that this number is both achievable and it would also ensure that the subsurface does meet the minimum risk criteria to the wildlife refuge worker if that material was later brought to the surface.	Discussions have been on-going. These responses and the final modification to the RFCA Attachments conclude that discussion. The RFCA Parties recognize that there is strong community concern over the uncertainties surrounding the process waste lines. In response to that concern, the final RFCA Attachment 14 requires an increase in the amount of characterization required for original process waste lines. When an action is taken to remove plutonium contamination associated with original process waste lines at a depth of 3 to 6 feet, DOE will remove that contamination to levels that are less than 1 nCi/g.
5.C.1	The second issue that we are looking closely at is the differences between our organization and the modifications of final clean-up levels in certain areas	Comment noted.

	of the subsurface. The coalition has issued a recommendation well in advance of these modifications being put out for public comments. There is a difference in how you address the subsurface below three feet, and we're going to continue to examine that issue and dialogue as to how we can best meet our collective interests . . .	
5.C.2	[T]he third major area that we're going to be focusing on is the details of the pathway analysis. How does stuff move in the environment at Rocky Flats, and what does that tell us about clean-up and clean-up options for contamination at the site?	Comment noted.
5.G.1	It's my understanding that, for the surface contamination, plutonium, if it exceeds the 50 picocuries, will be chased to three feet but that other contaminants only go down to six inches. You only clean up to six inches. Is that correct, and, if so, why?	That is correct. Contaminants other than plutonium and americium will be removed in the top 6 inches. Below 6 inches, the Subsurface Soil Risk Screen will be used to determine if further accelerated action is warranted. Once the six inches has been removed and no further accelerated action is needed, the area will be backfilled so that there will be 6 inches of clean soil on top. The Subsurface Soil Risk Screen will determine if further accelerated actions are needed to reduce unacceptable risk or if a groundwater treatment system would effectively treat the contaminant. The rationale for applying the risk screen after removal of six inches of surface contamination (rather than 3 feet as in the case for plutonium) is due to the fact that most contaminants other than plutonium are soluble and therefore readily move in the subsurface. In fact, in many cases, contaminants like volatile organic compounds have moved significant distances in the subsurface and into ground water. In those cases, the only effective remedial approach is ground water treatment, not contaminated soil removal. The RFCA modifications do address soil removal in the event that soil contaminant concentrations approach free product levels, making soil removal a more effective alternative.
5.G.2	But it is true there's a difference between plutonium	Yes, there is a difference between plutonium and other

	and other contaminants?	contaminants.
5.H	As I believe you are aware, we are looking closely at your calculation for removal of plutonium in the subsurface. We knew that there would be a difference of opinion between local governments and the RFCA parties on how to address plutonium contamination below three feet. While I have some concerns, I've been assured by your staffs that the parties will continue to discuss this provision with Westminster and others. I think we should be looking more at the subsoil because that's what's going to be present in generations from now.	Discussions have been on-going. These responses and the final modification to the RFCA Attachments conclude that discussion.
5.O	<u>Institutional Controls Related to Groundwater</u> Attachment 5, Section 1.3, p. 5-4 lists examples of institutional controls that may be appropriate for use at Rocky Flats post-closure; among them: "prohibition on drilling wells for water use into contaminated groundwater and/or pumping groundwater that could adversely affect the remedy." <u>Recommendation 32(*)</u>: RFCAB recommends that the RFCA parties implement a site wide ban on groundwater use and/or drilling. This would reduce the possibility of accidental use and/or drilling into contaminated groundwater.	The RFCA Parties will use the RFCA consultative process to discuss the areas for which engineered and institutional controls must be implemented. The institutional controls listed in RFCA Attachment 5, Section 1.2 including the prohibition on the use of ground water will be used as appropriate to protect human health and the environment.
7	Due to the uncertainties associated with contamination in the subsurface area below three feet, the City recommends the following: 1. A threshold level of 1 nCi/g in the subsurface between three – six feet below current grade is presently supported. However, as the site characterization progresses, the City will consider	Please see General Response and response to Comment 1, Category E. The final modifications to RFCA Attachments clarify the step out sampling and lowers the maximum concentration that would trigger an accelerated action in the 3-6 foot depth interval to 7 nCi/g. The hot spot methodology does not apply to the initial sample. The following table of the step-out sampling points based upon the

a threshold limit of 1 - 3 nCi/g Pu based upon being consulted on the results of the characterization. The hot spot methodology shall not be applied per the Industrial Area Sampling and Analysis Plan (IASAP). This methodology allows up to three times the soil action level and is unacceptable.

2. Below six feet, Westminster recommends using a graded tiered approach and establishment of a maximum allowable concentration and volume of subsurface plutonium and other contaminates for each tier. DOE shall include Westminster in any determination as to what defines graded approach and the establishment of a maximum allowable concentration and volume of subsurface plutonium and other contaminates for each tier.
3. DOE shall commit to perform a risk analysis in order to provide a 95% confidence level that one in 100,000 (10^{-5}) exposure risk to humans is not exceeded.
4. DOE shall perform a pathway analysis to confirm that there are no contamination pathways to groundwater and the environment.
5. DOE shall perform the graded tiered approach, the risk analysis and the pathway analysis on an IHSS by IHSS basis.
6. DOE shall commit to maintain the current surface water standard (.15 pCi/L) at POCs post-closure.
7. DOE shall ensure that all Volatile Organic Contaminants (VOCs) or other contaminants are remediated through excavation or treatment. The source material shall be removed.
8. DOE shall commit to remove any buried material

plutonium-239/240 concentration found at the initial targeted sample location has been added to Attachments 5 and 14 for clarity. The table shows that the spacing of the four step-out sample points is a function of the initial sample concentration. As the initial sample concentration increases the area circumscribed by the step out points decreases in increments.

Contamination Level (nCi/g)	Areal Extent Limit (m^2)	Volume Extent Limit (m^3)	Step-out Sample Locations
7	0	0	None
6	40	25	2m x 5m
5	50	31	2m x 6m
4	60	37	2m x 7.5m
3	80	50	2m x 10m

The final modification bridges the gap between 1 and 3 nCi/g by now specifying that once an accelerated action is triggered in the 3-6 foot depth, soil contamination will be removed to less than 1 nCi/g. This change, therefore, also obviates the community consultative process for contamination between 1 and 3 nCi/g for these accelerated actions. If contamination between 1 and 3 nCi/g is found at multiple sampling points for any IHSS or group of IHSSs in close proximity, the DOE and LRA will evaluate the potential for risk of exposure and consult with the community regarding the need for further action.

Rather than specifying a particular consultative process, the RFCA Parties believe that the current practice of regularly scheduled information exchange meetings, such as the monthly Environmental

	from under B776 or any other facility or area. 9. DOE shall commit to a 95% confidence level that with a combination of geo-statistical and bias or target sampling methodology, the contaminated material associated with process waste lines will be identified and remediated to an agreed upon ceiling level. 10. For the Original Process Waste Lines (OPWLs) the City supports the following: • That DOE shall have the Actinide Migration study group complete its subsurface actinide and contamination data collection and analysis in the Industrial Area, to include subsurface process waste lines. • Sampling of all known leaks (26 leaks). • Sampling in the 700 area of all suspected areas of leaks (about 38 locations). • Sampling of all known questionable segments (about 57 locations). • The extensive pilot sampling of three known leaks to study actinide migration. One of the leaks should be in a line to or from Building 774. • All sampling to have a third party independent verification of analytical results and statistical sampling. • The removal of all OPWL's which are located within a groundwater flow path, erosion area, or exceed the ceiling. The OPWL's may be a pathway of potential to contaminate the	Restoration/Decontamination and Decommissioning meetings, Citizen's Advisory Board meetings, etc., will provide the opportunity to consult with the community and discuss planned and ongoing accelerated actions. The results of characterization will be provided to the community through these informal exchanges. The requested types of information will be provided, including whether additional soil removal was conducted pursuant to the ALARA approach applied in the field. Also, the sample depth for targeted sample locations has been changed from 6 to 8 feet to provide information about the vertical extent of contamination that may originate from an OPWL leak in the 3 to 6 foot depth interval. This characterization information will be used in the risk screen evaluation to make accelerated action determinations for soil removal below six feet that may have originated from OPWL leaks in the three to six foot depth interval. The Subsurface Soil Risk Screen will be applied to evaluate the need for an accelerated action to remove soils at depths greater than six feet. Institutional controls and monitoring and other long-term stewardship activities will be part of the final remedy as appropriate to ensure the continued protectiveness of the final remedy. In response to community concerns over the subsurface approach and the original process waste lines, the RFCA Parties have decided to conduct more OPWL characterization. When an action is triggered, plutonium contamination between 3 and 6 feet will be removed to levels below 1nCi/g. The RFCA Parties evaluated the completed and planned sampling and analysis points for UBC and OPWL associated IHSSs. Based on this evaluation, additional OPWL targeted sampling locations are required by the final modification, which will result in thorough characterization of the OPWL. DOE will substitute this scope for accelerated actions at the three IHSSs mentioned in this comment. EPA and CDPHE agree that based upon the application of the risk screen methodology, no

	environmental media. • The removal of all valve vaults. • The grouting/foaming of the entire length of the lines, to the extent possible, of all OPWL's that are not removed. 11. DOE shall remediate any Under Building Contamination to <50 pCi/g for depths of zero – three feet below slab and to <1 nCi/g for depths of three – six feet below slab. The above mentioned risk assessment and pathway analysis shall be used for depths greater than six feet. 12. DOE shall map all sub-surface contamination with a risk of greater than 10^{-6}, including plumes, that will be left at RFETS by GIS indicating contaminants of concern, level of contamination and estimated amounts of that contaminate. DOE shall provide a copy of current map to the City of Westminster and other local governments and it shall become a part of the final CAD/ROD documents. The map shall be revised as hydrological or geological conditions change. 13. DOE shall completely remediate the ash pits, trench 7, and the burrito between trenches 3 and 4.	accelerated action is required for subsurface contamination in T-7, the Ash pits and the soils wrapped in geotextile that were returned to T-4 as part of the T-3/T-4 accelerated action. Thus, the budget resources for these three IHSSs will allow for the additional characterization and soil removal resulting from the changes.
30	Recommendation 11: RFCAB finds the proposed subsurface cleanup levels are far too high and cleanup depth is too shallow. DOE should work with regulators and stakeholders to establish a limit on subsurface contamination that would apply regardless of depth or size of the contaminated area. Note: RFCAB understands the site has stated that a	See response to Comments 1 and 5.A, Category E.

	risk analysis would likely conclude there is no current pathway by which users of the site could become exposed to PU and americium at this depth. RFCAB has yet to have the components of the risk analysis identified. We also know circumstances may change in the future. The RFCA Parties' approach to subsurface contamination does not adequately address these uncertainties. RFCAB is requesting a ceiling on subsurface contamination that would apply regardless of depth.	
39	RF should be cleaned down to 5 picoCuries/Gram of pu. The goal should be to protect a resident subsistence farmer. A family may live there sometime with a parent gardening, growing food for their family, and children playing in the dirt.	Please see General Response. The RFCA Parties consider the final Modifications to RFCA Attachments to be protective of human health and the environment. The RFCA Parties are also cognizant that the resources available for the cleanup of Rocky Flats are not unlimited. There are hundreds of sites in the United States, including other DOE and other government-owned sites, as well as privately owned sites, where there will be residual contamination after remedial activities have been completed. Some sites will also have waste disposal cells. Many, possibly all of these sites, including Rocky Flats, will require a long-term stewardship component as part of the remedy, including monitoring of the remedy and appropriate institutional controls.
40	I also believe that it is wrong to "trade-off" better surface clean-up for less sub-surface clean-up. The contamination that is below ground poses a great risk too. The location of underground pipes is known. There is NO excuse for leaving these structures in place no matter what their depth. They are highly contaminated and pose a risk to the public.	See response to Comments 1 and 5.A, Category E.
47.a	Page 21, last paragraph. Westminster does not agree with the 3nCi/gm and 10 nCi/gm numbers. Change the first sentence to read, "If contamination above 1nCi/gm is located at the initial..." Change the fourth sentence to read, "If contamination above 3	See response to Comments 1 and 5.A, Category E.

	nCi/gm is located…" Following paragraphs in Section 3.6.3 should reflect these changes. However, as stated in our previous letter, "as site characterization progresses, the City will consider a threshold limit of 1 – 3 nCi/gm based upon being consulted on the results of the characterization."	
47.b	Page 22, second paragraph. The proposed 80 square meters trigger derived from Appendix B appears to have been "dry-labbed." In other words, it appears that the formulas had numbers assigned that would arrive at a desired outcome. Informal surveys of prairie dog burrows surrounding Rocky Flats show a population density much greater than 6.2 burrows per 1000 square meters. Page 23, second paragraph. Remove, we do not support the hot spot methodology as stated previously, "The hot spot methodology shall not be applied per the Industrial Area Sampling and Analysis Plan (IASAP). This methodology allows up to three times the soil action level and is unacceptable."	The RFCA Parties believe the calculations performed to arrive at the values of 80 square meters and 3 nanocuries per gram are valid. While uncertainty exists surrounding some of the parameters for the calculations, we believe we erred on the side of conservativeness. Please also see response to Comment 33, Category E.
47.c	Page 5-21, Section 5.3.D.1. Change 3nCi/gm to 1nCi/gm. And remove reference to 80 square meters.	The requested change has not been adopted. Also, please see responses to Comments 1, 5A and 7.b, Category E.
47.d	Page 5-21, Section 5.3.D.2. Change 3nCi/gm to 1nCi/gm.	The requested change has not been adopted. Also, please see responses to Comments 1, 5A and 7.b, Category E.
33.a	1. DOCUMENT 1-Appendix B- Subsurface Soil Conceptual Model RFETS has developed and proposes to use a model, based on the burrowing activities of prairie dogs, to evaluate the need for accelerated actions	Responses begin with comments starting with, "Problems Concerning Model Assumptions", below.

	for subsurface contamination resulting from buried structures (OPWL's) at RFETS. Their model essentially uses the surface soil contamination limit for a particular contaminant and some weighting factors that are specific to prairie dog burrowing, to estimate a subsurface soil concentration limit that is considered safe for a Refuge Worker exposure scenario. The application of this model to OPWL evaluation DOES NOT require the collection and analysis of surface soil samples. It also in no way involves present or future burrowing by prairie dogs at RFETS so that this methodology and its application are primarily theoretical. The methodology described in Appendix B is based on the following assumptions and data: a. An area of contaminated surface mound soil, or "hot spot"(A_{hs}) based on the average mound diameter *(burrow area of 0.28 m^2 based on mound diameter of 0.6 m as taken from White and Carlson, 1984),* b. An area surrounding the contaminated burrow mound (A_{pd}) based upon White and Carlson, 1984 *(160 m^2/ burrow system based on a burrow density of 6.2/1000 m^2),* c. An area below ground that is contaminated (A_{sc}) *(an unknown in the model),* *d.* An area below ground that is disturbed by prairie dog burrowing *(assumed to be the same as A_{pd}),* e. The concentration of contaminants in mound ($Conc_{surf}$, also C_{hs}) soil (based on the regulatory standard) that contributes less than 25 mrem/yr	

	over A_{pd} to a Refuge Worker, and f. A calculated subsurface soil concentration ($Cons_{subs}$) based on items 1-5 that when excavated to the soil surface by prairie dogs contributes less than 25 mrem/yr over A_{pd} to a Refuge Worker. Their model uses two weighting factors that were derived from variables described in a, b, and c above, 1. A Dilution Factor (DF) that is the ratio of A_{pd}/A_{sc}, and 2. An Area Factor (AF) that is a derived from A_{hs} and a value from a lookup table in DOE (2002, p. 30). The equation used to predict the subsurface soil concentration limit is: $Conc_{subs} = Conc_{surf} \times DF \times AF$ (equation 1) From items a and b above, DF = 160 m^2/A_{sc} and AF = 30. Equation 1 then reduces to $Conc_{subs} = 4800m^2 \times Conc_{surf}/A_{sc}$ (equation 2) Where 4800 is the product of 160 m^2 x 30. General Comments about the model and approach In the absence of clean closure of OPWL's, developing a defensible method for estimating risk/exposures resulting from leaking OPWL's	

	would be difficult at best. The risk assessor must rely on the use of "models" that are difficult to parameterize and verify. Consequently, any attempts to develop such models must be strongly based on published facts, where possible, to limit deficiencies arising from the need to make assumptions and from limited use of data. Given that acknowledgement, it is my opinion that the methodology presented in Appendix B is based on some invalid assumptions and fails to use enough published data to support the prairie dog component of the model. In addition, statements to the contrary, it appears to me that some of the assumptions that were made by RFETS in developing the model do NOT reflect a conservative approach. Additionally, all but one of the many research publications on prairie dog burrow systems were ignored. My specific concerns are as follows. Problems Concerning Model Assumptions 1. Assumption: Prairie Dogs are the best species to use as agents of subsurface transport of soil contaminants to the soil surface. Based on Appendix B as well as a 1995 wildlife survey at RFETS (RMRS, 1996), it is not certain that prairie dogs even exist at RFETS. For example, Appendix B does not specifically mention the existence of prairie dogs at RFETS. If they do exist, some indication of the species present, their numbers, and their location relative to the subsurface structures is needed that would justify using them in a model as agents for transporting subsurface contaminants to the soil	1. The black-tailed prairie dog was chosen for the model because a) they are prevalent along the Front Range, b) RFETS presents potential habitat for this species and, c) based on known behavior of prairie dog species, black-tailed prairie dogs reportedly represent the species capable of creating the highest amount of soil disturbance. Also, black-tailed prairie dogs were resident on RFETS until a die-off caused by the sylvatic plague epizootic (disease epidemic) in 1994. Over the last few years, they have been starting to move back onto RFETS on the north, east and south perimeters, and are establishing small colonies in those areas. Although prairie dogs are not typically associated with xeric tallgrass prairie, they are readily found in mesic mixed grass prairies around RFETS. It is entirely conceivable that previous occupation of the tallgrass prairie habitat by

	surface. The importance of selecting an appropriate burrowing animal stems from the use of species specific burrowing data in calculating AF and DF in the model. AF and DF are critical components of the model since they effectively increase the concentration of subsurface contaminants that can be "safely" left in the ground with no further action. Based on my understanding of the RFETS environs, I would have given serious consideration to pocket gophers (Geomys sp.) as a candidate agent for subsurface soil transport to the ground surface instead of using prairie dogs in the model. Pocket gophers are locally abundant at RFETS, excavate more soil over time (up to 20 metric tons/ha-yr and they do this every year) (Grinnell, 1923; Ingles, 1952; Ellison, 1946), and they exploit disturbed areas such as those that will result from cleanup in the Industrial Area at RFETS. Pocket gopher mound densities can be around 100/ha and mound sizes can be comparable to those for prairie dogs. I also would have considered ants, another fossorial animal that has prodigious burrowing capabilities, as agents of subsurface contaminant transport. Ant mound densities of up to 100/ha, burrow depths to 6 meters, and burrow mound size comparable to prairie dogs are typical of some ant species (Pemberton, 1992; Friese and Allen, 1993; Dubois, 1995; Cole, 1966; Cline et al., 1976; Hölldobler and Wilson, 1990;). Ant colonies are also an obvious feature of the RFETS environs. Concern about which species is chosen for the model would not matter except that estimates of	prairie dogs was made possible by the grazing that took place before the land was transferred to the U.S. Government. Typically, tallgrass prairie is not considered suitable habitat for prairie dogs, since they prefer short- and mid-grasses, flat slopes, sparse brush, and a history of disturbance. Optimal vegetation height for prairie dog habitat is between two to ten inches (Clippinger, N.W. 1989. Habitat suitability index models: black-tailed prairie dog. U.S. Fish and Wildlife Service Biological Report. 82(10.156): 21 p.). Depending on how the industrial area is restored, revegetated and managed, it is possible that prairie dogs may immigrate to the area. However, it is expected that the Industrial Area will be restored to tallgrass prairie habitat, which will discourage prairie dog colonization. The model was developed to estimate uncontrolled management of the former industrial area. Active management of the Industrial Area, to keep the prairie dogs out, will be necessary until the tallgrass habitat is established. As the commenter states, the habitat is also suitable for pocket gophers; however, the burrowing depths of pocket gophers are shallower (0.5 to 4.5 feet) than the prairie dog burrows. The depths for which OPWLs will be removed are 0 to 3 feet. The range of concern for this model is the OPWLs that are found in the range of 3 to 6 feet. Most soil excavated by pocket gophers is located in the first couple of feet of soil. Although the RFETS' habitat is also suitable for ants, these fossorial animals are not found at RFETS in sufficient density to be a major concern. For example, in a survey of soil mounds located on the pediments of RFETS, a density of 2 ant mounds per hectare was noted. (2001 Annual Vegetation Report for RFETS, written by KH, May 2002). Ants and gophers were also dismissed as insignificant factors with respect to maintenance of cap integrity for the engineered covers at the Rocky Mountain Arsenal (Draft Final Biota Barriers for Cap and Cover Systems written by the Rocky Mountain Arsenal Remediation Venture Office, September 1997). Lastly, as discussed in the next response, the

	burrow density and burrow size for the selected fossorial species serves as the basis for estimates of DF and AF in equation 1. As I mention before, DF and AF have an important effect on the concentrations of contaminants in OPWL leak areas that can be left in place. 2. Assumption: The values for burrow density and mound dimension for Black Tailed Prairie Dogs are representative of the literature. *I question the use of data from only one publication in developing the values used in calculating AF and DF. For example, White and Carlson (1984) give an average black tailed prairie dog mound density of 62 burrows/ha but densities of about twice that number have been reported by the same authors (White and Carlson, 1984) as well as others (Tileston and Lechleitner, 1966; Koford, 1968).* Likewise, the average mound diameter of 0.6 meter (from White and Carlson, 1984) contrasts to a range of values that have been observed by others of 1-~7m (King, 1955; Sheets et al., 1971; Koford, 1958; Carlson and White, 1987). Carlson and White (1987) found mounds to be somewhat conical and asymmetrical in shape. They tended to measure 6.5 to 6.8 meters (about 21.3 to 22.3 feet) horizontally, 0.35 meters (about 1.15 feet) tall, and be in a cone shape. Mound diameters of 1-7m would give mound areas of 0.8–34 m^2 or about 3-120 times the value of 0.28 m^2 calculated by RFETS in Appendix B. *RFETS states that the assumptions in Appendix B that were used in developing DF and AF were considered conservative. If the model was to be*	burrow density for the prairie dogs that was chosen for the model is conservative compared to on-site and nearby data, therefore accounting for additional fossorial animals. 2. Further examination of the burrow density and mound dimensions selected for the model indicates the former is on the high end of the range and the latter is on the low end of the range. A review of the summary done by Munn (1993) shows a range of burrow densities for black-tailed prairie dogs between 0.7 burrows/hectare to 128 burrows/hectare, with an arithmetic mean of 16.9 burrows/hectare (the reported 247 burrows/hectare maximum was not considered since they had supplemental feed). John Hoogland, in his book <u>The Black-Tailed Priarie Dog: Social Life of a Burrowing Mammal</u> (1995, The University of Chicago Press), also discusses a variation of burrow densities: from 10 to 250 per hectare. At RFETS, numerous mounds of earth, the apparent results of small mammal burrowing, have been visible in aerial photographs of the vicinity since at least 1937. This previous aerial photographic evidence compared to recent photographs of the same areas across the RFETS shows that some of these present-day burrow-mounds occupy the same locations that were occupied by prairie dog mounds during the 1960s and early 1970s. Small mammal trapping conducted within a study area of mounds and at nearby locations on the xeric tallgrass prairie during 2001 found deer mice, plains harvest mice, hispid pocket mice, western harvest mice, prairie voles, plains pocket mice, house mice, and 13-lined ground squirrels to be common inhabitants of the mound areas. No pocket gophers were trapped in the vicinity (2001 Annual Wildlife Monitoring Report for Rocky Flats Environmental Technology Site, written by Kaiser-Hill, LLC, August 2002). An additional study area encompassed approximately 28.3 hectares. A total of 287 small mammal mounds were mapped in the area. Therefore, the small

conservative, I question why they didn't do a better job of including more of the extant literature and particularly, measurements representing the upper limits for burrowing parameters.

The effect of using burrow densities of 100/ha instead of 62 as used in Appendix B, would reduce the area disturbed by a prairie dog burrow system in the subsurface as well as the area surrounding the mound by a factor of 1.6. This means that the value of 4800 in equation 2 would be reduced to 3000.

Likewise, larger mound diameters based on published data would affect the estimates of AF. Mound diameters of 1m and 7m would result in AF's of about 12 and <1 instead of 30 as calculated by RFETS in Appendix B for a mound diameter of 0.6m. This means that the constant of 4800 in equation 2 would be reduced to 800 for a 1 m diameter PD mound and, in the case of a 7m diameter mound (34m^2), the leaking OPWL area would be subject to the authorized soil limits (DOE, 2002; p. 30, Table 1) which I take to mean that AF would by default equal 1.

Another complicating factor is that mounds tend to spread out with time due to gravitational and erosion forces. This means that a mound when first constructed will not remain at the original diameter but will expand due to those physical forces.

I also question the derivation of DF and AF, which assumes that the area disturbed by PD's below ground or the area between surface mounds takes on a rectangular configuration. Concerning DF, I

mammal mound density in the study area was approximately 10 mounds/hectare (2001 Annual Vegetation Report for RFETS, written by KH, May 2002). W.C. Johnson, in 2002 for a Master's Thesis, studied the black-tailed prairie dogs in Boulder County. She found a positive correlation between urbanization and prairie dog burrow density, meaning, the more urban boundedness (building development and roads), the higher the burrow density. Non-urban areas (undeveloped areas) would have a lower density. 62 burrows per hectare was chosen for the model from White and Carlson (1984) as being on the high side of the range for Rocky Flats.

In contrast, the 0.6 meter (m) mound diameter (0.28 m^2 area) reported by White and Carlson (1984) appears to be somewhat small. The commenter indicates a mound diameter range of 1 to 7 m. A quick inspection of the local active prairie dog mounds indicates that about 3.5 to 4 feet (1.1 to 1.2 m) (0.95 to 1.1 m^2) is a typical mound diameter. The model was rerun using a 1 m^2 mound area as a mid point estimate. A more conservative, yet reasonable, mound area would be one that is an order of magnitude larger in area than the one chosen in Appendix B, i.e. 2.8 m^2 (1.9m diameter). The impact of those alternative values of the model parameters (burrow density and burrow area) on the model output is shown below:

Mound Density (burrows/hectare)	Mound Area (meter^2)	Equation Coefficient	Pu Concentration at 80 m^2 (nCi/g)[c]
10[a]	0.28[b]	30,000	18.8
10	1	10,000	6.3
10	2.8	6,000	3.8
62[b]	0.28[b]	4,800[b]	3.0[b]
62	1	1,600	1.0
62	2.8	960	0.6

	speculate that PD tunnel systems as viewed from above are roughly linear in shape between the two or three burrow entrances that are generally associated with each burrow system. Thus, it is entirely conceivable that most of a PD's burrow system would lie horizontally along an OPWL and not be spread over a rectangular area corresponding to the average area between surface mounds. Should this be the case, then DF as used by RFETS in Appendix B would be near a value of 1 (i. e., DF = $1m^2/A_{sc}$), not DF = $160m^2/A_{sc}$ as used in Appendix B. I recognize that prairie dog burrow systems are likely to be variable in physical dimensions and shape depending on soils, presence of nursery chambers, population density, and abundance of food sources. However, it seems certain to me that that the assumption of a rectangular shape to the area below ground disturbed by prairie dogs cannot be supported by data and results in overestimates (i. e., not conservative) of the area surrounding the subsurface soil contamination resulting from an OPWL leak. To further my case for a non-rectangular shape to prairie dog disturbance below ground, consider that BT prairie dogs build burrows approximately 12 cm in diameter, 10-30 m long, and 1-5 m deep with two or three entrances (Sheets et al., 1971). If a 12 cm diameter burrow with a 30 m length is projected on a horizontal plane (i. e., viewed from above), the area of the burrow system would cover about 3.5 m^2 (0.12m x 30m). Thus, the actual area of PD disturbance, $3.5m^2$ in this documented case, is about 50 times less than the 160 m^2 assumed in	Arithmetic Mean = 5.6 nCi/g a - based on on-site data b - used in Appendix B model c - The model initially showed that 80 m^2 subsurface contamination at a Pu activity concentration of 3 nCi/g was protective of human health at the "hot spot" burrow mounds. The 80 m^2 is maintained for the recalculation of the model with the new variables. As you can see by the table, the value of 3 nCi/g of Pu at 80 m^2 is below the arithmetic mean and in the lower quartile of the range of possible plutonium concentrations given the above combinations of burrow density and mound area. This indicates that the model output is relatively conservative. There are other considerations that also suggest the model and the chosen values for the variables be left unmodified: 1. The OPWL lines outside of the building footprints where the model is most relevant represents less than 1% of the total area in the IA, i.e., the area of concern is small, and therefore, any impacts from residual contamination in the subsurface is also small; 2. A human health and ecological risk assessment (Comprehensive Risk Assessment) will be performed at a later date which will provide input to determining the need for further remedial action for the final remedy; 3. The use of 50 pCi/g as the authorized limit in the equation (current surface soil action level for plutonium) is based on the lower end of the CERCLA acceptable risk range (excess cancer risk of 5 X 10^{-6} in the 10^{-4} to 10^{-6} risk range); and 4. Surface soil, down to 3 feet, will be at an activity level less than 50 pCi/g, according to the final modifications to RFCA Attachments. The model does not take into account that black-tailed prairie dogs will mix surface soil and the soil

	equation 1 above. What this means to me is that the assumption of 160 m^2 of PD disturbance for each burrow system in the subsurface is NOT conservative in that for a given A_{sc}, it potentially over-estimates DF by a factor of around 50. The net effect of correcting this overestimate would be to reduce the value of DF.	from 0 to 3 feet into soil that is brought up and used as mound material, thus potentially diluting the concentration of contaminants. Weathering of the inactive burrows is not incorporated into the model. The mound may tend to spread out due to gravitational and erosion forces. However, as it weathers, it will be diluted by adjacent top soil and deposition of airborne soil particles. Without extensive study, this process would be difficult to model. The model used a rectangle to simply depict the area surrounding the burrow. In reality, the area will be a more amorphous shape; however, it is not likely to be linear running adjacent to the underground lines. It is true that a prairie dog burrow is, for the most part, linear. The commenter states that it is entirely conceivable that the prairie dog burrow would lie horizontally along an OPWL, not spread out over a rectangular area, and therefore the dilution factor in the equation would become 1 m^2/A_{sc} not 160 m^2/A_{sc}. However, it is also entirely conceivable that the prairie dog burrow would not intercept the OPWL or contaminated soil, therefore the dilution factor in the equation would become ∞ m^2/A_{sc}. The model takes into account various burrow scenarios and essentially averages the scenarios over time and space.
	3. Assumption: All sub surface soil brought to the surface comes from the depth of the contaminated area. RFETS also considers this assumption to be conservative under the belief that under normal circumstances, most of the PD burrow system would be located outside the contaminated depth zone and that by constraining it to the leak depth zone, the chances of transporting contamination to	3. The focus of the model is contaminated material in the 3 to 6 foot zone. Any plutonium contamination originating in the upper 3 feet will be removed per the new ALF modifications, as appropriate. Any contamination deeper than 6 feet is less likely to be disturbed by the prairie dog. Contamination in the 3 to 8 foot interval will be characterized by sampling along and adjacent to the OPWL to determine the plutonium concentration and areal extent in order to render a decision on the need for accelerated actions. Due to the insolubility of plutonium and americium, it is not likely that migration of the Pu and Am

	the soil surface is increased. However, depending on the size of the leak, it is entirely conceivable that most of a PD burrow system (i. e., which encompasses and area of a few meters squared) may actually be located in the leak zone of an OPWL. However, the chance of this is less likely if it is assumed that PD disturbance includes an area that is larger than actually occurs. Let me relate a scenario, based on actual events that occurred at Hanford that could lead to direct access to subsurface contaminants associated with a leak at an OPWL. The American Badger (Taxidea taxus) is an important predator on prairie dogs and pocket gophers. Badgers catch PD's by rapidly digging into a PD burrow complex in hopes of trapping and catching a PD. As a consequence of Badger predation, PD burrow systems can be enlarged from the 10-12 cm that is typical of PD tunnels to 15-25 cm. These expanded tunnels can go as deep as the original PD burrow system which may be as deep as 15' below the ground surface (Sheets et al., 1971). Some studies show that over 25% of PD burrow systems in some colonies have been enlarged by Badger predation (Campbell and Clark, 1981). This scenario actually played out at Hanford when fission product sludge containing Sr^{90} in salt form was released to unlined cribs that were then backfilled with clean soil. The amount of soil backfill was not specified but was thought to be several feet in thickness. A large animal, thought to likely be a badger. burrowed down to the sludge in pursuit of pocket gopher prey. The large tunnel created by the Badger directly contacted the	would be extensive enough to account for the entire burrow of a prairie dog.

	radioactive sludge. This provided direct access for other animals seeking the radioactive salts. In particular, jackrabbits (O'Farrell and Gilbert, 1975) ingested the radioactive salts, became contaminated, and then excreted ^{90}Sr on the ground surface. Elevated levels of ^{90}Sr in excreta were found over an area of 15 km^2 around the burial cribs (O'Farrell and Gilbert, 1975). 4. Assumption: Risks To Burrowing Animals Not Important Appendix B mentions risks to wildlife but provides no discussion on the topic. While I am not overly concerned about exposure of animals to subsurface contamination that is on the ground surface, I do wonder about the possibility of direct exposure of burrowing animals such as prairie dogs while they are underground. This type of exposure could be important when a nest or resting chamber is constructed within a contaminated OPWL leak zone, where "safe" concentrations of contaminants may greatly exceed regulatory standards for surface soil. Actual radiation doses to free ranging animals at nuclear facilities have been measured using small dosimeters implanted or attached to individual animals. The first such study was conducted in the 1960's at Oak Ridge National Laboratory and involved attaching dosimeters to free ranging rodents living in contaminated sites (Kaye, 1965). Follow up studies with implanted dosimeters were conducted at Nevada Test Site with jackrabbits (French et al., 1974) and Los Alamos with several species of rodents (Miera and Hakonson, 1978). The Los Alamos studies, which used	4. The purpose of the model was to identify if there were risks to human health if subsurface soils containing plutonium were brought to the surface by burrowing animals. The risk to wildlife is addressed in other documents. Draft radiological benchmarks for wildlife were established in 1995 by RFETS, based on a dose limit of 100 mrad/d for any terrestrial or aquatic species. The draft radiological benchmarks will be added to Table 3 of Appendix 5 of the RFCA modifications. The radiological benchmarks and other risks to wildlife will be reviewed and updated in the Comprehensive Risk Assessment.

	thermoluminescent dosimeters implanted into rodents living in treated liquid waste outfalls, demonstrated that doses in the rads/year range were possible for small, burrowing mammals living in contaminated areas (Miera and Hakonson, 1978). Several other similar studies have also been conducted with animals such as free ranging rodents, coyotes and ungulates (Arthur et.al., 1986; Groves et al., 1986; Halford et al., 1982; Halford and Markham, 1978). 5. Assumption: Plant Uptake of OPWL Contaminants Not Important While nothing is mentioned about the potential for plant uptake of OPWL contaminants, it seems that some consideration of the topic would be advised given the shallow depth of the OPWL's, the potential mix of both radioactive and hazardous waste resulting from OPWL leaks, the intent to restore the IA with a vegetated soil surface, and the nature of the OPWL wastes that will be present for many millennia. Consider the following facts. Although vegetation is very important in controlling erosion and percolation in soils (Nyhan et al., 1984), deeply penetrating plant roots have the potential to access buried waste and bring plant available constituents including contaminants to the surface of the site (Klepper et al., 1979; Wenzel et al., 1987). Soluble contaminants such as tritium can be incorporated within plant tissue and enter the food web of herbivorous or nectivorous organisms. For example, at Los Alamos National Laboratory tritium transport away from a	5. The purpose of the model was to identify if there were risks to human health if subsurface soils containing plutonium were brought to the surface by burrowing animals. The uptake of contaminants by plants will be addressed in other documents. Dr. Ward Whicker and other researchers at CSU, have shown, in several studies that, due to the low solubility and large atomic size of plutonium, very little is taken up into the plants on RFETS. The uptake of other contaminants into plants (and incorporation into the food web) will be addressed in the Comprehensive Risk Assessment.

	controlled low-level waste site occurred via the soil moisture/plant nectar/honey bee/ honey pathway (Hakonson and Bostick, 1976). As another example, deep-rooted Russian Thistle (Salsola kali) growing over the waste burial cribs at Hanford penetrated into the waste, mobilized ^{90}Sr, and then transferred it to the ground surface. The contaminated surface foliage was transferred away from the cribs when the matured Thistle (tumbleweeds) blew away from the site (Klepper et al., 1979). Root distribution in the soil profile is strongly related to the depth of water penetration (Canadell et al., 1996; Jackson et al., 1996). Although average and maximal reported rooting depths vary with species and life form, there is a great deal of plasticity within most species to respond to variation in soil water availability. Hence, if water is available at deeper depths, roots of a species viewed as "shallow rooted" may occur there. A common misconception is the concept of "shallow rooted" plants. This concept ignores the fact that the rooting depth for most individual plant species encompasses a broad range. Consequently, if moisture is available at deeper depths, most plant species have the capability to send roots after that moisture. In a semiarid ecosystem in New Mexico, plant roots of a number of species have been observed to depths of at least a few meters in the pursuit of soil moisture (Foxx et al., 1984; Tierney et al., 1987). Alfalfa roots have been found over 40 m below the ground surface (Foxx et al., 1984).	

	If the root structure of certain species is confined to the upper few centimeters of the soil profile, it is largely because that is where most of the soil moisture is captured by the plants and removed from the soil. If moisture becomes available at deeper depths, most species have the potential to exploit this moisture by sending roots downward to capture available moisture, often to depths greater than previously recognized (Canadell et al., 1996). In normal situations where multiple species co-exist on a site, one species may exploit moisture near the ground surface while another exploits moisture deeper in the soil profile (Evans and Ehleringer, 1994, Golluscio et al., 1998, Breshears and Barnes, 1999). 6. Long-term Biological Intrusion While the procedures outlined in the paper study in Appendix B do not actually involve live prairie dogs in any way, I would question the wisdom of a one shot analysis that will decide the long-term fate of residual OPWL contaminants at RFETS. Cleanup decisions based on present knowledge (i. e., leaks and associated contamination) ignore possible changes that may happen during centuries to millennia post-closure. During long time frames, biological processes will continue to interface with the soil profile, including residual contamination from the OPWL leaks. The consequences of long-term biointrusion on the fate and effects of OPWL contaminants cannot be reliably predicted. Therefore, the long-term consequences of biological intrusion in unremediated OPWL areas will require at least	6. There will be monitoring of the Industrial Area after the cleanup to ensure the remedy is protective of human health and the environment. There will be active management of the Industrial Area to deter the immigration of prairie dogs. The decision of whether there needs to be monitoring of wildlife for contaminants has not been made at this point.

	some post-closure monitoring to evaluate the possible mobilization of contaminants to the ground surface by plants and animals. Additionally, there are many post-closure variables that will affect future potential for biological intrusion at the site, including final depth of "clean" soil placed over the OPWL waste, physical and chemical form of the contaminants, species of animal and insects that come to occupy the site, and bioavailability of the contaminants. It is not clear to me that RFETS intends to conduct post-closure monitoring in these OPWL sites or given thought to long term potential for transport of OPWL contaminants. To my knowledge, only one modeling study (McKenzie et al., 1982) looked specifically at the potential importance of long-term biological intrusion on dose to man under arid site conditions. They compared dose to man resulting from 100 years of animal intrusion at two reference low-level radioactive waste sites with the estimated dose based on the human intrusion scenario developed in 10 CFR 61. McKenzie et al., concluded that dose to man resulting from plant and animal intrusion was of the same order (about 50% less) as that resulting from the human intrusion scenario. This conclusion was based on modeling that used published data and assumptions about species of plants and animals present on the LLW sites, penetration depths of plant roots and animal burrows, cover thickness, depth to waste, and waste types and forms. SUMMARY OF APPENDIX B REVIEW- It is	

	my opinion that Appendix B describes a methodology that is not conservative as stated by the authors. One problem with the methodology is the assumptions and limited data that were used in developing the weighting factors, DF and AF. If more conservative published data and realistic burrow system characteristics were used to derive AF and DF as discussed above, then the effect of DF and AF on the concentration of contaminants that could be safely left in OPWL leak soil would be minimal. Based upon application of the Appendix B methodology, RFETS has calculated that OPWL leak area soils below 3 nCi/g *(based on standard of 50 pCi/g x 60, which is the weighting factor for an A_{sc} of $80m^2$)* for radionuclides can be safely left in place under a Refuge Worker scenario (background document #6). It is my opinion that derivation of this concentration limit is not supported by sound model assumptions or by a good representation of the extant literature. As such, it could be argued that this concentration limit is NOT conservative and may or may not be protective of a Refuge Worker. A related concern is the very poor description of the sampling methods that will be used to characterize subsurface contaminants in OPWL leak areas and how concentration data will be handled to determine if accelerated action is or is not warranted. A two dimensional sampling scheme would be inadequate to define the subsurface contaminant source areas and concentrations.	

33.b	2. DOCUMENT 3- RFCA Attachment 5, Figure 3: Soil Risk Screen I don't have any problems with the structure of the decision logic in Figure 3. However, I have problems with the details. As mentioned above, I believe the Appendix B methodology cannot be supported scientifically and as such, any decision based upon that methodology is also unsupportable. Likewise, I am not sure whether the subsurface soil sampling methods are adequate to fully characterize OPWL leak areas. The discussion in Document 2 as noted above is not detailed enough to judge the merit of the methods RFETS intends to use to characterize the subsurface contamination from OPWL leaks. Concerning the part of the decision logic that deals with ecological receptors, I presume that the exposure pathway considered in this analysis is only direct exposure to animals from soil surface contamination. As mentioned previously, I would worry more about the exposures that fossorial animals receive when tunnel systems, including resting and nesting chambers, are constructed in the relatively high concentration of contaminants immediately surrounding OPWL leaks. Such exposures have the potential to be orders of magnitude higher than those received from a surface exposure scenario.	Please see responses to Comment 33.a, Category E.
34.a	Attachment 5, Figure 3, Soil Risk Screen – In Screen 5, the question is whether COC concentrations are below Table 3 Soil Action Levels for ecological receptors. The ecological soil action levels were only developed for site-wide ecological contaminants of concern (ECOCs), a total of 21 chemicals. Screen 5	COCs for ecological receptors will be developed for each IHSS based on historical records, previous characterization and/or groundwater data, IHSS-specific characterization data, plus analysis of any other pertinent information that bears on whether any IHSS-specific COC is present in concentrations that could impact ecological receptors. The original proposal listed ecological action

	will only work if IHSS-specific ECOCs are developed for ecological receptors and put in Table 3, as they have been for human health.	levels for analytes where the ecological action level was lower than the wildlife refuge worker action level. In the final table, all ecological action levels that have been calculated to date are listed in the table. New analytes have been added to the final Table 3. These analytes do not include action levels at this time; however, in the location of a value are the letters "TBD." The Ecological Risk Working Group is reviewing these analytes to determine if the analyte was used or could have been used at RFETS. If it is determined that the analyte was used or could have been used at RFETS, then an action level will be determined in the same manner used to calculate the action levels in the table. (Note: This would apply to the wildlife refuge worker action levels as well as ecological action levels.) However, the Ecological Risk Working Group is evaluating all analytes listed in Table 3 to determine if the analyte is an ecological potential contaminant of concern. Action levels will be calculated by the Ecological Risk Working Group for analytes determined to be ecological potential contaminant of concern. After this evaluation, Table 3 will be modified, including a public comment period, if needed.
34.b	Attachment 5, Table 3, Soil Action Levels – The draft radiological PRGs for wildlife and IHSS-specific ECOC action levels need to be added to the table.	The ecological radiological PRGs will be added to Table 3.

61	PLUTONIUM MIGRATION: p. 11: The text says that "the potential for Pu and Am migration in the subsurface is very low because they are basically insoluble in groundwater." This is a dubious assertion. The question of solubility vs. insolubility of Pu in the Rocky Flats environment has not been settled. Though the issue was discussed at several Actinide Migration Evaluation (AME) meetings, key questions were never resolved. Attached is a letter I addressed to Christine Dayton and the AME researchers on 18 April 2000 raising a series of questions (Attachment D). Along with numerous studies regarding potential Pu mobility mentioned in this letter, I now cite only one, a presentation given at an AME meeting on 20 August 1997 by Dr. Bruce Honeyman of the Colorado School of Mines. According to minutes from this meeting, Honeyman said his research demonstrated that under some conditions 90% of the Pu in the Rocky Flats environment could become "very soluble" and potentially "very mobile in that form" and that the only question about its eventual migration off the site was the rate of its movement. His assertions were never withdrawn or corrected, in fact never adequately addressed by the AME team. In response to my request for written answers to the questions raised in my 18 April 2000 letter, Dave Shelton of Kaiser-Hill stated in the public meeting that Kaiser-Hill would not spend its money on such. My 4 September 2002 letter refers to these issues again; this letter has not even been acknowledged much less answered. In sum, the reported work of Bruce Honeyman was never refuted, and my own questions were never answered. I've since learned of a report on "factors affecting radionuclide transport" issued	In response to the commenter's letter of September 4, 2002 regarding plutonium (Pu) migration issues, the Actinide Migration Evaluation (AME) advisors have provided a series of short discussions that we hope will offer convincing answers to your questions. First, regarding the Institute for Energy and Environmental Research (IEER) and National Academy of Science (NAS) citations of the estimate of how long it takes for contaminants to reach the Snake River Aquifer - this graph was developed to refer to contaminants in general, and not Pu in particular. Unfortunately it was re-published by an NAS panel, and now no one seems to be able to identify the original source of the graph, or even the data used to construct it. Based on these observations, this situation definitely does not represent "robust science". The lack of data, documentation, and peer-review makes it impossible to comment beyond the notion that it is certainly not robust. The RFCA Parties do not believe this graph should be relied upon. We also reiterate that Idaho National Engineering and Environmental Laboratory (INEEL) has not gone through a detailed pathway analysis, and are still in an early stage in understanding of contaminant migration. This situation is quite different from the Rocky Flats Environmental Technology Site (RFETS or Site), where we have a much more detailed understanding of the transport pathways for Pu and americium (Am) migration. Regarding Dr. Litaor, and his assertion that physical transport was the principal means of Pu migration at RFETS - the AME was developed to deploy a multidisciplinary approach to develop a further understanding of actinide migration to benefit the closure design of the Site, and to attempt to answer questions raised by Litaor, not to ignore them. It is also worth recalling that Dr. Litaor had hypothesized that reducing conditions caused by the May 1995 storm event resulted in Pu reduction to Pu(III), and subsequent re-dissolution and transport as a soluble species. At that time, Stakeholders were focused on the use of K_d models and soluble

	for the Yucca Mountain site. It says forthrightly that under certain conditions Pu "in oxidized form . . . can be quite mobile" (see www .ymp. gov/documents/rn2nu dsect 1 O/sect 10-0 1 .htrn). Question v: Given the publicly available information and the unanswered questions, the assertion by the RFCA parties that Pu is "basically insoluble in groundwater" seems grounded more in desire than in evidence. Can the RFCAparties demonstrate that in fact Pu will does not and cannot become soluble and thus mobile in the Rocky Flats environment? If it does become soluble under some conditions, can it migrate in a way that eludes detection? Is it the case that the RFCA Parties are relying on unspecified controls to try to deal with the problem to which Dr. Honeyman referred? Is it not unwise for the RFCA Parties to base an important part of their cleanup plan on a non-verified assumption about Pu insolubility?	transport in order to account for surface water exceedences. Indeed, this more integrated multidisciplinary effort employed by the AME has forced the Site and the regulators to abandon the use K_d models in favor of scientifically-based erosion and sediment transport models. Moreover, the particles, colloids, and chemical forms of actinides has also been characterized, and taken together affords a much better understanding of actinide migration at RFETS. In this regard, we have come a long way towards answering the questions raised by Dr. Litaor. In the main body of the commenter's letter, he frames a hypothesis that oxidizing agents in the environment can change the oxidation state of Pu, so that some portion of it could migrate rapidly away escaping detection, then become reconstituted in colloidal form some distance from the source. He cites Haschke's *Science* article (*Science*, 2000, *287*, 285) as proof that Pu changes its oxidation state, and Kersting's *Nature* article (*Nature*, 1999, *397*, 56) as proof that Pu can migrate. To properly address the commenter's assertions, we must reiterate some fundamental aspects of Pu chemistry. Pu oxidation states. Depending on the redox conditions available, Pu both can and will change oxidation states in the environment. Since the solubility of Pu compounds will depend largely on the oxidation states, the AME group spent a good deal of time discussing oxidation states in the beginning of the AME study, making comparisons to uranium (U) behavior, and discussing the natural analog sites such as Oklo, Africa, and Koongarra, Australia. When Pu and U are in the same oxidation states their chemical behaviors are similar. However, no such similarity is found for U and Pu in different oxidation states. Under natural oxic aquatic conditions, U prefers oxidation state VI for soluble species, while Pu prefers oxidation state V for the soluble species, and IV as an insoluble species. Therefore, because U may demonstrate a given behavior does not mean that Pu shows the same behavior. This is the fundamental flaw in Dr. Selbin's assertion that the commenter's

		proposed mechanism might be feasible for U, and therefore that Pu may show similar behavior. The fundamental fact that the oxidation state characteristics of U and Pu are different has been known for about 25 years as reflected in it being a pervasive theme in our public discourse throughout the period of the AME activity. Based on decades of study, it is well-known that in natural waters, Pu solubility is limited by the formation of amorphous $Pu(OH)_4$ [sometimes referred to as $PuO_2 \cdot 2H_2O$] or polycrystalline PuO_2, both of which represent Pu in oxidation state IV. A reasonable conservative estimate for the solubility product (K_{sp}) of $Pu(OH)_4$ is approximately 10^{-54}, and the most recent detailed review (Neck, *Radiochim. Acta,* 2001, 89, 1) suggests that the correct value is approximately 10^{-58}, with a corresponding solubility of *ca.* 10^{-10} M in a low ionic strength solution (typical of natural waters). This estimate puts an upper limit on the amount of Pu that can be present in solution, even if Pu(V) or Pu(VI) are more stable solution forms under a given solution condition. As a result, even if Pu(V) or Pu(VI) are present in solution, the total solubility is still limited by the formation of the highly insoluble amorphous $Pu(OH)_4$. The high stability and low solubility of Pu(IV), and the strong tendency of $Pu(OH)_4$ to sorb on surfaces is a dominant and often controlling feature of Pu (geo)chemistry. For many years it had been asserted (see, for example, Harnish - *USGS/WRIR*-93-4175, 1994) that PuO_2 was the likely chemical form of Pu in RFETS soils. These assertions lacked definitive scientific data to support or refute the claim. The AME group employed state-of-the-art scientific techniques to examine soils from the Site. Key x-ray absorption studies identified not only that the Pu oxidation state was IV, but also that the chemical composition was PuO_2. Moreover, ultrafiltration studies (see, for example, Santschi, *Environ. Sci. Tech.* 2002, 36, 17) provided additional data demonstrating that the Pu in RFETS soils was associated with small particles and colloids. Taken together, these data provide the "demonstration" that the commenter is seeking,

		namely that Pu is highly insoluble and that Pu observed in RFETS waters is associated with small particles and colloids. Therefore, Pu migration at RFETS occurs not because Pu is in a soluble form, as the commenter asserts, but rather, because migration of a small amount of the insoluble form takes place through the movement of small particles and colloids. These findings are consistent with our basic understanding of Pu geochemical behavior from the past 60 years of scientific investigation, and are based on sound, defensible scientific data. Haschke's *Science* Article. The commenter cites Haschke's article in *Science* (2000, *287*, 285) as proof that Pu in the form of PuO_2 may "change from a condition where the material is insoluble to one where it can become soluble". The commenter also implies that the AME group was dismissive of this report because it challenged our fundamental understanding. For the record, Haschke's article reports indirect evidence (Pressure-Volume-Temperature data) that the composition of Pu oxide can change from stoichiometric PuO_2 to a non-stoichiometric solid of composition PuO_{2+x}, where x varies between 0 and 0.2. Up to this point in the article, Haschke offers credible data to support a change in stoichiometry, which is quite fascinating based on its intrinsic scientific interest. However, based on stoichiometry alone, Haschke went on to infer that the oxide must contain a higher oxidation state of VI, and extrapolates that it must, therefore, be more soluble. This portion of the Haschke article has most certainly been dismissed by the AME advisors, as it has by leading international experts on Pu solution chemistry, because it lacks direct experimental data on the actual oxidation state, and it speculates on the solubility of the oxide phase in the total absence of data. Haschke's interpretation of solubility is based on interpretation of Pu data prior to 1979, and does not offer any data or any proof of an oxidation state or solubility change. By ignoring all the research of the past 21 years, Haschke failed to cite the more recent data that disagreed with his hypothesis. Citing Haschke's

		reference as proof of an oxidation state change is inappropriate and indefensible. Many recent studies on the solubility of Pu(IV) have appeared. The most recent exhaustive study by Kim (*Radiochim. Acta* 1999, *86*, 101) was available, but ignored by Haschke at the time of the *Science* publication (2000, *287*, 285). More recent detailed reviews by Neck (*Radiochim. Acta,* 2001, 89, 1) and Fanghanel (*Pure Applied Chem.*, 2002, *74*, 1895) point out the difficulty with the early solubility studies - namely that they suffered interference from radiocolloid formation and oxidation state disproportionation reactions under the high concentrations used in laboratory experiments, which generated Pu(III) and Pu(VI) as contaminants. Therefore, while Haschke's (2000) work provided an improved description of the range of solid-state characteristics of Pu oxides, it does not change our understanding of the solubility behavior that has been extensively studied, and extensively reviewed by international experts on actinide solubility and solution chemistry. In the absence of explicit oxidation state or solubility information on PuO_{2+x}, the AME group adopted the pragmatic approach of asking whether PuO_{2+x} could form in the RFETS environment, and whether it would be identifiable using a direct experimental approach such as X-ray Absorption Fine Structure (XAFS) spectroscopy. In the interest of learning more about PuO_{2+x} and how it relates, if at all, to RFETS, an authentic sample of formula $PuO_{2.2}$ was obtained from one of Haschke's original scientific team, and the XAFS studies on this new material were found to be distinctly different from that of PuO_2, and the Pu in RFETS soil samples. The RFETS soil samples were nearly identical to PuO_2. Therefore, based on direct XAFS experimental evidence, the AME group does not believe that PuO_{2+x} is an important chemical species for RFETS soils, nor does a change in stoichiometry from PuO_2 to PuO_{2+x} provide a credible mechanism that alters the solubility of Pu and enhance its environmental migration.

		The identification of some amount of PuO_{2+x} in PuO_2 does not alter the observed experimental fact that Pu oxide is very *insoluble* in natural waters. The solubility of Pu dioxide is so low that it has always been subject to ambiguities regarding the true identity of the solid and solution phases, and decades of study reveal a range of solubility centered around 10^{-10} M (*Radiochim. Acta* 1999, *86*, 101) in water, at neutral pH, even after equilibration over a period of years. Dozens of measurements, performed all over the world, over a period of many decades inherently include the influence of this higher oxide (if it is present) on the solubility. Particles, Colloids, and Kersting's *Nature* Article. At this point it is worth recalling the original premise of the AME group that the fate and transport of Pu is governed by the solubility of its compounds in groundwater and surface waters, the tendency of Pu compounds to be adsorbed onto mineral phases in soil particles, and by the probability that the colloidal forms of Pu are removed through filtration by the soil or rock matrices, or adsorb or precipitate during transport. Indeed, much of the original AME effort was focused on examination of the solubility of Pu and identification of its chemical form as previously discussed. However, the fact that Pu is insoluble does not mean that Pu is immobile in the environment. It appears as though the commenter, like many other stakeholders, has intertwined the concept of insolubility with that of immobility. We reiterate that the key to understanding Pu mobility lies in the role of particles and colloids as a transport pathway. Kersting and coworkers published their observation (*Nature*, 1999, *397*, 56) of colloid-associated Pu at the Nevada Test Site (NTS), and the recognition that Pu transport occurred to a point 1.3 km from the underground blast source cavity. The Pu concentrations were exceedingly low at 10^{-14} M, and the results were consistent with Pu migrating as colloidal material from an underground detonation source term. The commenter claims that no one has explained how Pu could possibly move 1.3 km at NTS. This claim is mystifying in light of the clearly stated conclusion of Kersting's

		study that Pu mobility likely occurred through movement of colloidal particles. The role of colloidal particles has also been under investigation at RFETS, where we know that the colloid loads are very small, and we have inferential evidence (Honeyman's early work and Santschi's more recent studies at RFETS) that RFETS colloids may be comprised of either inorganic or organic varieties. The important question is not about the "rate of movement" as Honeyman once suggested at a public meeting, but whether colloids represent a significant exposure pathway. Honeyman also pointed out (*Nature*, 1999, *397*, 23) that the very properties of compounds that make them good candidates for colloidal transport - low solubility and high particle reactivity - limit the amount of contaminants that can be transported by colloids. Indeed, as suggested by Honeyman (*Nature*, 1999, *397*, 23), colloids are both the means and the bottleneck. Unfortunately, the commenter is trying to link Haschke's unsupported and erroneous claim of an oxidation state change with Kersting's observation of colloid transport. This is a serious error for the reasons outlined above. All the data accumulated so far indicates that Pu is insoluble, and that the insoluble Pu can associate with particles and colloids as a transport pathway for Pu in soils at RFETS. The fact that the *Nature* article concludes that any transport model for Pu migration "must take colloids into account" in fact agrees with our current approach to develop erosion/sediment transport models to predict actinide migration at the Site. Environmental Behavior of Pu/Am at RFETS. The data amassed during AME studies is consistent with our expectations of Pu and Am chemical behavior in the environment. The data indicate that Pu and Am in the dissolved fraction of RFETS surface waters have extremely low concentrations in the femptomolar (10^{-15} M) range, similar to global fallout. Site-specific studies indicate that reducing conditions do not remobilize Pu by solubility mechanisms, and that the bulk of Pu and Am is associated with particles that settle in

		ponded water, and small (< 2μm) colloidal particles that won't settle, but can be filtered out by soil and rock matrices. These results are consistent with the known chemical behavior of Pu(IV) and Am(III). X-ray Absorption Fine Structure (XAFS) studies show unambiguously that Pu in soils taken from the 903 Pad is in oxidation state (IV), in the chemical form (speciation) of very insoluble PuO_2. The identification of Pu(IV) in the chemical form of PuO_2 is consistent with the observed insolubility of Pu in Site-specific waters. The data from AME studies clearly indicate that physical (particulate) transport is the dominant mechanism for Pu migration in soils and surface waters at RFETS. Most important is the recognition that the insolubility of Pu does not equate to immobility. The association of Pu with small particles and colloids is the key to understanding, and ultimately predicting and controlling the migration of Pu and Am in RFETS soils and waters. We hope that the level of detail provided above has offered sufficient answers to the commenter's questions. We all agree that such dialogue is important, and it helps the advisors refine complex scientific data, concepts, and models into a form that is useful to the Site managers, the Regulators, and the Stakeholders.
62	In regard to surface cleanup levels, the City supports the proposed modifications of cleanup for plutonium of 50 pCi/g, and the definition of surface as 0-3 feet below grade. The former standards were simply to permissive and not protective enough. However, this	Please see response to Comments 1 and 91.a and b, Category E.

	standard should, absolutely, include all plutonium found in the 0-3 foot range, regardless of where the contamination originated. By supporting the proposed approach of the RFCA parties, the City understands that higher levels of contaminants may be left in the ground below 3 feet. It is clear, though, that a great deal of characterization needs to be done in order to understand just how much contamination exists in the subsurface. The City also believe it is imperative the RFCA parties conduct pathway analysis on all areas that are proposed to be left undisturbed. In addition, Arvada supports the proposal of the Coalition that calls for the provision of additional information when contamination is found above 1 nCi/g three to six feet below the surface and will not be remediated to below 1 nCi/g. Once such remedial action is taken, the RFCA parties must provide a written account of the action that specifically includes any impacts to long-term stewardship.	
91.a	<u>SUBSURFACE CONTAMINATION LEVELS</u> Three to Six Foot Depth Interval *If during characterization of soils between three and six feet total plutonium/americium contamination is found at an activity concentration of greater than 3 nCi/g, "step out" sampling will be performed to determine the areal extent of contamination. Based upon the results of the "step out" sampling, a removal action may be triggered depending on the areal extent of the contamination. If plutonium/americium soil contamination is found in the three to six foot depth that exceeds 3 nCi/g, and the areal extent of the contamination is found to be*	The final modifications to RFCA Attachments clarify the step out sampling and lowers the maximum concentration that would trigger an accelerated action in the 3-6 foot depth interval to 7 nCi/g. The hot spot methodology does not apply to the initial sample. The following table of the step out sampling points based upon the plutonium-239/240 concentration found at the initial targeted sample location has been added to Attachments 5 and 14 for clarity. The table shows that the spacing of the four step-out sample points is a function of the initial sample concentration. As the initial sample concentration increases the area circumscribed by the step out points decreases in increments.

greater than 80m^2, it will be removed to an activity concentration less than 3 nCi/g. Broomfield is concerned about the proposed language, which may potentially allow leaving an unknown amount of contamination in the subsurface. Strike any language pertaining to an areal extent of 80m^2. Broomfield would like to offer an alternative solution, as described below and in Attachment 2, which would be acceptable for our community and still reflect our commitment for relief on subsurface cleanup.

If plutonium/americium soil contamination is found in the three to six foot depth interval at activity concentrations greater than 10 nCi/g, it will be removed to an activity concentration less than 3 nCi/g without additional sampling to determine the areal extent. The use of 10 nCi/g as a ceiling for the three to six foot depth is unacceptable. Draft language would allow concentrations as high as 9.9 nCi/g to remain at shallow depths. The use of the hot spot methodology identified in the Industrial Area Sampling Plan (IA SAP) would allow for three times the soil action levels, potentially allowing 30 nCi/g at this depth. Broomfield finds the proposed concentrations unacceptable. Modify the language to reflect the consultative and notification process Broomfield is proposing as described below and in Attachment 2. Our proposal will bridge the gap for remediation between the 1-3 nCi/g concentrations and simplify the decision-making process to continue activities as scheduled.

The principle of ALARA will be applied such that if incidental additional excavation will result in significant additional source removal, (such as reducing the contamination level from 3 nCi/g to 1

Contamination Level (nCi/g)	Areal Extent Limit (m^2)	Volume Extent Limit (m^3)	Step-out Sample Locations
7	0	0	None
6	40	25	2m x 5m
5	50	31	2m x 6m
4	60	37	2m x 7.5m
3	80	50	2m x 10m

The final modification bridges the gap between 1 and 3 nCi/g by now specifying that once an accelerated action is triggered in the 3-6 foot depth, soil contamination will be removed to less than 1 nCi/g. This change, therefore, also obviates the community consultative process for contamination between 1 and 3 nCi/g for these accelerated actions. If contamination between 1 and 3 nCi/g is found at multiple sampling points for any IHSS or group of IHSSs in close proximity, the DOE and LRA will evaluate the potential for risk of exposure and consult with the community regarding the need for further action.

Rather than specifying a particular consultative process the RFCA Parties believe that the current practice of regularly scheduled information exchange meetings, such as the monthly Environmental Restoration/Decontamination and Decommissioning meetings, Citizen's Advisory Board meetings, etc., will provide the opportunity to consult with the community and discuss planned and ongoing accelerated actions. The results of characterization will be provided to the community through these informal exchanges. The requested types of information will be provided, including whether additional soil removal was conducted pursuant to the ALARA approach applied in the field.

	nCi/g or even background) then the additional removal will occur. Application of ALARA will be most appropriate when the extent of contamination is defined by a sharp concentration gradient; areas of diffuse contamination may not benefit from ALARA principals. If extensive contamination is detected from 1 nCi/g – 3 nCi/g, the RFCA Parties and the communities will use the consultative process to evaluate human health and environmental risks and implement actions as appropriate. The City and County of Broomfield requests that language be added to the draft to define specifically the consultative process and implementation of the process with stakeholders. Broomfield offers the following process to implement the consultative and notification process for the subsurface approach for the three to six foot depths. Notification Process: The notification process with the community will be implemented when field concentrations between >50 pCi/g and <1 nCi/g are encountered. Notification for final concentration level and depth shall be received via electronic notification or fax. Consultative Process: The consultative process with the community will be implemented when field concentrations are between 1 nCi/g and < 3 nCi/g. The consultative process shall occur per telephone conservation or meeting. Concurrence for final concentration levels and depth shall be received from the majority of the stakeholders. RFCA parties will meet informally with local governments on a monthly basis to be briefed on the accelerated actions. The briefings will allow Broomfield to keep	Also, the sample depth for targeted sample locations has been changed from 6 to 8 feet to provide information about the vertical extent of contamination that may originate from an OPWL leak in the 3 to 6 foot depth interval. This characterization information will be used in the risk screen evaluation to make accelerated action determinations for soil removal below six feet that may have originated from OPWL leaks in the three to six foot depth interval. The Subsurface Soil Risk Screen will be applied to evaluate the need for an accelerated action to remove soils at depths greater than six feet. Institutional controls and monitoring and other long-term stewardship activities will be part of the final remedy as appropriate to ensure the continued protectiveness of the final remedy. In response to community concerns over the subsurface approach and the original process waste lines, the RFCA Parties have decided to conduct more OPWL characterization. When an action is triggered, plutonium contamination between 3 and 6 feet will be removed to levels below 1nCi/g. The RFCA Parties evaluated the completed and planned sampling and analysis points for UBC and OPWL associated IHSSs. Based on this evaluation, additional OPWL targeted sampling locations are required in the final modification, which will result in thorough characterization of the OPWL. DOE will substitute this scope for accelerated actions at the three IHSSs mentioned in this comment. EPA and CDPHE agree that based upon the application of the risk screen methodology, no accelerated action is required for subsurface contamination in T-7, the Ash pits and the soils wrapped in geotextile that were returned to T-4 as part of the T-3/T-4 accelerated action. Thus, the budget resources for these three IHSSs will allow for the additional characterization and soil removal resulting from the changes.

	abreast of the amount of residual contamination remaining at the site and evaluate long-term stewardship criteria. As a minimum the following information shall be provided to Broomfield: 1.) Individual Hazardous Substance Site (IHSS) number, 2.) areal extent and volume of contamination, 3.) concentration of contaminant, 4.) identification of any other contaminants of concern or potential contaminant of concern, 5.) basis for pathway analysis, 6.) application of ALARA, 7.) basis for risk assessment, 8.) proximity to process waste lines, 9.) determining if the IHSS is in an area with a potential for erosion, and 10.) stewardship evaluation, both near-term and long-term. <u>Remediation/Excavation:</u> Remediation/excavation will occur when field concentrations reach or exceed 3 nCi/g. In keeping with the general principal of removing to greater degree contaminants that pose the greatest potential risk to the community, Broomfield is amenable to having DOE explore tradeoffs that are revenue neutral, but that provide lower potential future risk to the environment. A case may be to remove contaminated OPWLs to a deeper depth below six feet to a specific depth of ten feet and not remediating potentially less contaminated IHSSs such as the Ash Pits, trenches, or other areas within the three to six foot depth. Greater than Six Feet *Soils beneath "below-grade" structures, e.g., basements, valve vaults, pits, etc., will be addressed through the application of the Soil Risk Screen in Figure 3.* Broomfield does not agree with the RFCA draft language to remediate below six feet based	

	merely on a risk screen and a pathway analysis. We do not know the extent of contamination at depths greater than six feet. Uncertainties remain with the potential for new pathways to form if the hydrology changes at the site post-closure. In addition, modeling for potential pathway streams including actinides and volatile organics must be performed to evaluate migration paths at such depths. Modify the language to include a ceiling of 10 nCi/g for the subsurface depth greater than six feet. Also include language to support our proposal for the consultative process and notification process for our approach at depths greater than six feet. Broomfield offers the following process to implement the consultative and notification process for the subsurface approach for the depths greater than six feet. <u>Notification Process</u>: The notification process with the community will be implemented when field concentrations between >50 pCi/g and <3 nCi/g are encountered. Notification for final concentration level and depth shall be received via electronic notification or fax. <u>Consultative Process:</u> The consultative process with the community will be implemented when field concentrations are between 3 nCi/g and < 10 nCi/g. The consultative process shall occur per telephone conservation or meeting. Concurrence for final concentration levels and depth shall be received from the majority of the stakeholders. RFCA parties will be meet informally with local governments on a monthly basis to be briefed on the accelerated actions. The briefings will allow Broomfield to keep abreast of the amount of residual contamination	

	remaining at the site and evaluate long-term stewardship criteria. As a minimum, the following information shall be provided to Broomfield: 1.) Individual Hazardous Substance Site (IHSS) number, 2.) areal extent and volume of contamination, 3.) concentration of contaminant, 4.) identification of any other contaminants of concern or potential contaminant of concern, 5.) basis for pathway analysis, 6.) application of ALARA, 7.) basis for risk assessment, 8.) proximity to process waste lines, 9.) determining if the IHSS is in an area with a potential for erosion, and 10.) stewardship evaluation, both near-term and long-term. <u>Remediation/Excavation:</u> Remediation/excavation will occur when field concentrations reach or exceed 10 nCi/g.	
91.b	5. Page 5-17, 4.2 A, Non-Radionuclide Contaminated Soils For volatile organic compounds (VOCs) that have contamination levels that approach free product concentrations such as HISS 118.1, the contaminant (source of contamination) <u>shall be removed</u>. Broomfield requests draft language be added to state the community will be informed of the proposed remediation plans pertaining to VOCs with concentrations approaching free product concentrations. Life cycle costs should be included in the close-out report.	The RFCA Parties are committed to keeping the communities informed on accelerated actions. For example, the ER RSOP notifications, as well as draft decision documents, are generally provided to the community at the same time they are submitted to the regulators. In addition, informal updates on accelerated actions and draft decision documents are provided in many public forums, e.g., ER/D&D status meeting, etc. With respect to lifecycle costs, long-term stewardship considerations are included in development of accelerated actions.
91.c	6. Page 5-17, 4.2B, Action Determination *Where characterization data indicate that soil contamination exceeds action levels to a depth of six inches, DOE will propose to remove the contamination, unless this is not appropriate considering Section4.3 and 4.4.* Strike any	The RFCA Parties have decided that this language will provide needed flexibility for non-radionuclide contaminants in situations where removal may not be needed to control or remove a risk that may be short term in nature (e.g., volatile organic that will naturally attenuate) or where it may cause more harm than is warranted (e.g., destruction of habitat that cannot be effectively mitigated or

	language that would allow non-radionuclide contaminants above the action level to remain in the zero to three foot depths. Revise the language to reflect our agreement of additional remediation in the surface and remediation relief in the subsurface. Strike the proposed language to solely use the risk screen in the surface to determine remedial actions.	restored). The RFCA Parties have determined that the Subsurface Soil Risk Screen approach is appropriate for the accelerated action determinations. We do not believe the characterization of the proposed modification provides "relief" from any existing requirements that response actions must be protective of human health and the environment. Rather, the final modifications to RFCA Attachments implement an approach that applies resources to surface and near-surface contamination rather than to subsurface contamination that has only remote, indirect or incomplete pathways to exposure.
91.d	Page 5-18, E, Action Determinations See our comment referring to ecological action levels and the use of accelerated action such as biota barriers and target species management actions. Refer to our general comment regarding target species.	No decision has been made to use biota barriers as part of accelerated actions. In the future, if it is determined that biota barriers might be appropriate, such a proposal would be included in a decision document subject to public comment.
91.e	Page 5-18, H, Action Determinations *Soils beneath "below-grade" structures, e.g., basements, valve vaults, pits, etc., will be addressed through the application of the Soil Risk Screen in Figure 3.* Broomfield does not agree the use of the risk screen solely should be utilized to determine an action. Revise the language to include Broomfield's proposed ceilings for specific depths and our consultative process. Page 5-18, 4.3B Factors to be considered for all Action Determinations Define best management practices and provide us with the criteria for these practices.	There is a ceiling for subsurface plutonium soil contamination between 3 and 6 feet. The application of the Subsurface Soil Risk Screen evaluation will be done in a consultative manner and the RFCA Parties will include the community in this process. We fully expect the samples will be taken early enough in the decision making process to afford a thorough evaluation of the risk screen criteria in determining whether an accelerated action is warranted, and the type of action to be taken. Please see response to Comment 91.h, Category E.
91.f	Page 5-19, 4.4 Isolated Data Points Clarify both A and B of this section: *Single geographically isolated data points of*	Please see response to Comment 91.h, Category E.

	contamination greater than action levels will be evaluated using the data aggregation methodology outlined in the IA SAP and the BZ SAP, and action will be taken as warranted. Is this language referring to the hot spot methodology? These single data points will not trigger a source removal, remedial, or management action, in the absence of the source evaluation. Identify the source evaluation process.	
91.g	34. Page 5-21, D 1-4, Action Determinations Strike any proposed RFCA language pertaining to the areal extent of 80 m^2 or the use of 10 nCi/g to be used as an action level for depths of three to six feet. Revise the RFCA language to incorporate our proposal. Incorporate the process to define how ALARA is applied. In addition, the application of ALARA should also be included in the project specific close-out report. Broomfield does not agree with the OPWL characterization approach as described in Attachment 14.	34. Please see response to Comment 33.a, Category E. In response to community concerns over the subsurface approach and the original process waste lines, the RFCA parties have decided to conduct more OPWL characterization. When an action is triggered, plutonium contamination between 3 and 6 feet will be removed to levels below 1nCi/g. ALARA is applied through field consultation taking into consideration the circumstances presented by specific volumes, anticipated concentration gradients of radionuclides and the accessibility for removal using the equipment already deployed. The RFCA Parties believe that in a typical excavation action, in most instances the practical result of this process will be to remove one or two additional backhoe buckets of soil. We do not believe that a complicated or time consuming process should be applied, but that under ALARA an action should not be planned and implemented to just remove the bare minimum of soil if appropriate equipment and personnel are already mobilized for an action. In response to comments that can be found in Category K, the OPWL characterization approach has been modified.
91.h	35. Page 5-22, E, Action Determinations Include language to identify the process to evaluate if additional soil contamination may be needed or managed to protect surface water	35. The RFCA Parties believe that each situation will be different and is likely to require the full use of the consultative process instead of any prescriptive process. Evaluation of the decision points will be documented in the Closeout Reports or Data

	quality. The evaluation process should also be documented and included in the project specific close-out report. 36. Page 5-22, H, Action Determination Define best management practices and provide us with the criteria for these practices. 37. Page 5 –23, I, Isolated Data Points 1. *Single geographically isolated data points of contamination greater than action levels will be evaluated using the data aggregation methodology outlined in the IA SAP and the BZ SAP, and action will be taken as warranted.* Is this language referring to the hot spot methodology? *These single data points will not trigger a source removal, remedial, or management action, in the absence of the source evaluation.* Identify the source evaluation process.	Summary Reports. 36. As with the previous response, the RFCA Parties have determined that each situation will be different and the criteria for best management practices will be considered in the consultative process. However, it should be noted that the management practices include the types of long-term stewardship controls evaluated and described in an ER RSOP Notification or in any IHSS-specific decision document and Close Out Reports. 37. The language has been clarified in the final modification to include the hot spot methodology. The single data point approach means that an action will be taken if this single spot is the only sample where soil contamination exceeds the action level. Rather, an evaluation of the possible origination source of contamination and whether the data point indicates that an action to remove the source that caused the isolated spot is warranted.
91.i	40. Figure 3: Soil Risk Screen Revise the risk screen to reflect our agreement of additional surface cleanup for cleanup relief in the subsurface. Incorporate our action levels into the screening process. Clarify how Screen 4 will be evaluated if the Site has not determined where a new groundwater treatment unit will be located. Broomfield is very concerned the details of the evaluation for the soil risk screen have not been defined or documented. All the decision points to	Several changes have been made to the Subsurface Soil Risk Screen: 1. The screen has been clarified to apply to subsurface soil only; 2. Surface soil is addressed through the action levels; 3. Screen 4 has been changed to evaluate whether the contamination may have an impact on surface water quality pursuant to the criteria in Section 2.0, Surface Water.

	evaluate further remediation should also be documented in the project specific close-out report.	Evaluation of the decision points will be documented in the closeout reports.

RFCA Attachment Proposed Modifications

Response to Comments

Category: F. Long-Term Stewardship

Commenter No.	Comment(s)	Response
1.a	Furthermore, for the issues addressed in this letter, our guiding end-state principles are reducing risk to a future user, protecting water quality, addressing uncertainty, developing and implementing a strong and comprehensive post-closure monitoring regime, and developing mechanisms to become aware of and address problems as they arise.	The modifications to RFCA Attachments were expressly developed with risk to the anticipated future user, the refuge worker, in mind. The new lower RSALs reduce risk to the refuge worker and also are protective of a hypothetical rural resident within the acceptable risk range. The RFCA action levels and standards for surface water and action levels for groundwater are protective of water quality. The results of post-closure monitoring and periodic remedy reviews will provide a means to become aware of problems as they arise. RFCA Attachment 5, section 1.2 provides that the need for and extent of long-term stewardship activities, such as monitoring, information management and remedy review will be analyzed in the RCRA Facility Investigation-Remedial Investigation/Corrective Measures Study-Feasibility Study (RFI/RI-CMS/FS). Appropriate requirements for these activities will be described as part of the preferred alternative in the Proposed Plan, which is subject to formal public review and comment prior to issuance of the CAD/ROD. The RFCA Parties will continue to consult with the community as the RFI/RI-CMS/FS and Proposed Plan are developed, in addition to considering public comment from formal comment periods.
1.b	Despite assurances DOE has provided regarding its confidence in managing the stewardship program, the Coalition is concerned about the enormity of the	The final modifications to RFCA Attachments provide the framework for the conduct of accelerated actions that are protective of human health and the environment, notwithstanding

	challenge facing future management of residual contamination. Our trepidation about leaving contamination in the subsurface is exacerbated by the lack of clarity on steps that will be taken and programs that will be implemented as part of a comprehensive stewardship plan. We believe DOE-Rocky Flats has made great strides over the past year to elevate the importance of stewardship. In particular, DOE's draft RFCA stewardship section, if modified and approved, would help meet many of the interests and needs raised in this letter. However, much more can and must be done. More specifically, the Coalition needs to know with sufficient certainty the controls that would be used, measures to enforce the controls (e.g., provisions in the Record of Decision, state environmental covenant, etc.), clarity on who can enforce the controls, the details of the operational and performance monitoring program, frequency of CERCLA reviews, communication mechanisms with the community, and frequency of reporting monitoring and maintenance information to the local communities. As the Coalition has argued, a stewardship analysis must be integral to the development of remedies, but stewardship also goes beyond this analysis. Stewardship also includes DOE taking all necessary steps to ensure controls are enforced, and developing and implementing monitoring and reporting mechanisms so that as problems arise they are quickly and summarily addressed. Proactive stewardship planning also necessitates the RFCA parties selecting remedies that will reduce long-term requirements, such as operations monitoring and maintenance, and the risk associated with the failure or malfunction of a	the fact that all contamination may not be removed by these actions. DOE recognizes that since decisions regarding long-term stewardship activities have yet to be made there will continue to be some concerns in the community related to contamination that is not removed based upon the risk-based approach. However, DOE is committed to maintain post-cleanup controls. DOE has been developing a Rocky Flats Long-Term Stewardship Strategy (Strategy), in consultation with the community and CDPHE and EPA. The Strategy contains information about the elements of draft long-term stewardship plans for Rocky Flats. The RFCA Parties will continue this consultation in the development of the Rocky Flats long-term stewardship plans. The need for and extent of specific institutional controls and other long-term stewardship activities, such as monitoring, maintenance, information management and remedy review, have not been determined and will be analyzed in the RFI/RI-CMS/FS. The types of controls anticipated are found in Attachment 5, Section 1.2 and listed in the response to 30.a, below. The RFCA Parties anticipate that enforceable post-closure requirements will exist to ensure the protectiveness of the remedy in accordance with the CERCLA remedy selection process and the corrective action and closure process in RCRA/CHWA. The RFCA Parties will continue to use the consultative process to discuss the post-closure regulatory approach. Appropriate requirements will be contained in all final CAD/RODs and in any modified RFCA Agreement consistent with RFCA Paragraph 286. As of May 2003, DOE and CDPHE have not reached agreement as to whether a post-closure permit (or, alternatively, an enforceable document as defined in 6 CCR 1007-3, § 100.10(d)) will be required for Rocky Flats, and if so, whether that permit (or enforceable document) will also contain appropriate requirements for institutional controls and other long-term stewardship activities. The parties will endeavor to resolve this matter. Failing an agreed upon resolution, each party reserves its rights as

	treatment unit and/or an institutional control.	provided in RFCA Part 18. The RFCA decision documents are developed using the consultative process, and preliminary draft documents are generally shared with the community prior to completion of the public comment draft. Long-term stewardship is considered when evaluating accelerated actions and community consultation includes discussions related to this analysis.
	In addition, the Coalition supports the following: 1. Adequate funding for long-term stewardship must be ensured. The Coalition remains concerned about funding long-term stewardship through annual appropriations. The most certain way to ensure Congress provides sufficient stewardship funding is to develop a dedicated fund. The Coalition needs to know which specific mechanisms DOE intends to use to ensure reliable funding for the indefinite periods of times contemplated by long-term stewardship analyses. We also need to know how such mechanisms will be protected from the normal ups and downs of the annual budget process that may cause a raid on line items by temporary demands for funding. While this question is most appropriate for Congress, DOE plays a significant role in stewardship funding and thus knowing DOE's commitment and strategies remains pivotally important.	Regarding the specific concerns raised in this comment: 1. DOE recognizes the community's concern regarding assuring funding for long-term stewardship. DOE cannot commit to developing a dedicated fund, but will submit requests for appropriate funding related to post-closure activities.
	2. DOE must have onsite personnel assigned to Rocky Flats post-closure to conduct long-term stewardship activities. Management from afar, such as out of the Grand Junction office, without employees assigned to work at	2. DOE also recognizes the community's desire to have onsite DOE personnel to conduct long-term stewardship activities. No decision has been made as to whether onsite personnel will be assigned.

	or near Rocky Flats post-closure is unacceptable.	
	3. Long-term stewardship must be legally enforceable by third parties. The RFCA must also state how the federal government will enforce access restrictions, and specify in detail which stewardship controls will be enforceable and which will not. We understand the Defense Department is questioning the enforceability of implementing, operating, maintaining and reviewing land use controls, as well as the EPA enforcement authority. Enforcement of controls remains a key ingredient of managing contamination. If a control is not enforceable, then its value to the long-term protection of human health and the environment is compromised. It is imperative the RFCA parties agree on how enforcement would be implemented prior to approving amended RFCA language.	3. The RFCA Parties will continue to use the consultative process to discuss the post-closure regulatory approach. As stated above, institutional controls and other long-term stewardship activities, such as monitoring, maintenance, information management and remedy review will be analyzed in the RFI/RI-CMS/FS. The RFCA Parties anticipate that enforceable post-closure requirements will exist to ensure the protectiveness of the remedy in accordance with the CERCLA remedy selection process and the corrective action and closure process in RCRA/CHWA.
	4. CPDHE and EPA must have a continuing regulatory role post-closure. Due to the enormity of implementing and maintaining a stewardship program, it remains imperative that CDPHE and EPA have a continuing role post-closure. We understand DOE, CPDHE, and EPA are exploring various options, including a post-closure RFCA-type agreement. We support such an approach. With respect to CDPHE, the Coalition also supports the applicability of the state of Colorado's environmental covenants bill (SB 145). Arvada and Broomfield lobbied for SB 145 with the expectation	4. Appropriate requirements will be contained in all final CAD/RODs and in any modified RFCA Agreement consistent with RFCA Paragraph 286. As of May 2003, DOE and CDPHE have not reached agreement as to whether a post-closure permit (or, alternatively, an enforceable document as defined in 6 CCR 1007-3, § 100.10(d)) will be required for Rocky Flats, and if so, whether that permit (or enforceable document) will also contain appropriate requirements for institutional controls and other long-term stewardship activities. The parties will endeavor to resolve this matter. Failing an agreed upon resolution, each party reserves its rights as provided in RFCA Part 18. The RFCA Parties anticipate that CDPHE and EPA will have

	that it would be applied to Rocky Flats. Should DOE resist its applicability, DOE must provide an account of its position to the Coalition prior to final approval of the revised RFCA language.	a continuing regulatory role post-closure at Rocky Flats. The RFCA Parties will continue to use the consultative process to discuss the post-closure regulatory approach. As of May 2003, CDPHE and DOE have not yet come to agreement on the applicability of the State environmental covenant to the Federal government. DOE and CDPHE hope to reach an agreed upon resolution. Failing an agreed upon resolution, each party reserves its rights as provided in RFCA Part 18.
	5. Controls must be layered in order to reduce uncertainty, and contingency plans must be developed in the event of a failure or malfunction of a remedy. The Coalition is concerned about DOE's reticence to layer controls, despite the National Research Council's recommendation to that end to DOE in its August 2000 report. There is ample evidence in Colorado of stewardship controls failing. One way to mitigate any potential problems resulting from the failure or malfunction of a control is to layer controls. Another way is ensuring there are strong enforcement provisions.	5. DOE is committed to implement appropriate controls on post-closure hazards and will integrate those controls to ensure their long-term success. It is DOE Policy to use institutional controls as essential components of a defense in depth strategy that uses multiple, relatively independent layers of safety to protect human health and the environment. This strategy uses a graded approach to attain a level of protection appropriate for the risks involved.
	6. Frequency of CERCLA reviews must be established. In addition to regular operational and performance monitoring, and maintenance of the remedies, the Coalition recognizes periodic reviews of remedies are required by CERCLA. For the first nine years following closure, however, the review shall take place every three years, and every five years thereafter. While not all of the aforementioned stewardship needs must be captured in the RFCA, they remain critical to the Coalition's support of the cleanup of Rocky Flats.	6. The RFCA Parties will consult with the community regarding the need for a review more frequent than the 5 year period required by CERCLA. The frequency of CERCLA reviews will be contained in all final CAD/ROD(s). The RFCA Parties will consider more frequent reviews and the frequency of CERCLA reviews will be contained in all final CAD/ROD(s).

1.c	Clearly, not all of the Coalition's end-state and related stewardship issues are presented in this letter. For instance, per the parameters outlined by the RFCA parties, we have not addressed the critical question of remediating the original landfill and the solar ponds, nor the need for mineral acquisition. We trust that we will continue to work with the RFCA parties on these issues.	The RFCA Parties will continue to consult with the community as RFCA decision documents are developed for actions to address Individual Hazardous Substance Sites, and will work with the community on other issues, as appropriate.
4	The Coalition supports the inclusion of long-term stewardship into the RFCA, including the language in Section 1.2 specifying stewardship will be in all final CAD/ROD(s), in any post-closure CHWA permits, and in any modified RFCA agreement. This provision clearly meets the Coalition's interest in making certain that both EPA and CDPHE have enforcement roles post-closure. In addition, the Coalition supports the provisions delineating lands that may require continuing restrictions post-closure, and provisions outlining the types of institutional controls that will be needed at closure. As discussed below, we believe that the language can be strengthened and thus offer the following recommendations. 1. Include provisions expressly prohibiting residential development "The Rocky Flats National Wildlife Refuge Act of 2001" serves as an important institutional control by, among other things, prohibiting certain uses such as residential use. However, as with all acts of Congress, future congresses can enact laws that undermine key elements of the refuge bill, including prohibitions on residential uses and other uses inconsistent with final site remedies. Thus the draft RFCA language, "[t]he	1. As identified in Section 1.2 of Attachment 5, the RFCA Parties presume that there will be no residential development at Rocky Flats post-closure, or any other uses that would be inconsistent with the final remedy. The RFCA Parties will use the RFCA consultative process to discuss the areas for which engineered and institutional controls must be implemented. While the institutional controls listed in RFCA Attachment 5, Section 1.2 will be used as appropriate to protect human health and the environment, the need for and extent of specific institutional controls and other long-term stewardship activities, such as monitoring, maintenance

	Parties additionally presume that there will be no residential development at Rocky Flats," remains insufficient. The RFCA and subsequent regulatory documents must explicitly state that residential use of the Site and other such uses inconsistent with the final remedies shall be prohibited, as current reliance on the refuge bill alone does not provide the necessary restrictions. We believe such a provision is consistent with the intent of the refuge bill. The bill presumes institutional controls would be implemented to prohibit a number of uses – drilling of groundwater, access to areas with residual contamination, restrictions in areas above subsurface contamination, and other restrictions to protect engineered controls and monitoring stations. Some might argue that including a provision prohibiting residential uses is redundant and not necessary. However, as the National Research Council pointed out in a comprehensive report to DOE, layering of stewardship controls remains imperative. In this case, the additional control should not increase the federal government's long-term stewardship costs. 2. RFCA milestones must be established for the development of the stewardship strategy and plan One of the core elements of the Coalition's stewardship comments in its September 9th letter is EPA and CDPHE enforcement of long-term stewardship. The Coalition continues to believe that DOE has made great progress over the past twelve months to elevate stewardship, and believes that the ongoing dialogue with the community has served to resolve numerous issues. Nonetheless, as Coalition staff noted in a recent memo to DOE, key elements of long-term stewardship	information management and remedy review, have not been determined. 2. The Strategy is a policy document that is being prepared by DOE in consultation with the other RFCA Parties and with the community. Therefore, the RFCA Parties do not believe that it is appropriate to have the Strategy become an enforceable regulatory document. Rather, RFCA Attachment 5, section 1.2 provides that the need for and extent and

	planning have been bucked from regulator-enforceable documents to the long-term stewardship plan. We are concerned about relegating stewardship to a document (the Site's long-term stewardship strategy) that does not require regulator approval and is subject to changing policy direction and commitment by DOE. Without regulator approval of the stewardship plan as it is developed, the potential exists that the development of the CAD/ROD and other closure/post-closure regulatory documents could become mired in differing expectations about the scope of the stewardship plan. While we presume this situation would not surface at Rocky Flats, DOE is facing such a situation at its Weldon Spring site. One way to avoid such a situation and bring greater parity to the development and approval of the final site-wide stewardship plan is to establish RFCA milestones for the development of the stewardship plan. The Coalition therefore requests that a RFCA milestone be crafted that both holds DOE accountable to a timeline for developing the long-term stewardship plan and, more importantly, establishes a common set of criteria between the RFCA parties as to the scope and content of the stewardship plan. We believe the establishment of such a milestone is consistent with RFCA paragraph 142 because long-term stewardship is part of the remedy. We recognize that crafting such a milestone is difficult, but we suggest DOE – Headquarters' guidance for the development of site stewardship plans is a good place to start. We trust that the RFCA parties can agree to a timeline that is achievable and that provides sufficient time to develop a plan that meets all reasonable and necessary expectations.	enforceability of long-term stewardship activities, such as monitoring, information management and remedy review will be analyzed in the RCRA Facility Investigation-Remedial Investigation/Corrective Measures Study-Feasibility Study (RFI/RI-CMS/FS). The Strategy will help inform the RFI/RI-CMS/FS. DOE believes that it is important to continue to develop the Strategy in a timely fashion. However, a milestone for the Strategy is outside the scope of the modifications to RFCA Attachments, but will be discussed amongst the RFCA Parties.

15	Finally, if the RFCA Parties reject the foregoing recommendations in favor of the partial cleanup they have proposed, I recommend that as a condition of moving ahead they work with the affected public to establish a rigorous long-term stewardship program that includes a plan to research technology needed for better site cleanup as well as assured and dedicated funding to cover all long-term stewardship costs, including contingencies.	RFCA paragraph 254 establishes criteria for conducting CERCLA's 5-year reviews. Specifically, it requires an evaluation of whether additional remedial action could be taken that would reduce the need to rely on institutional controls. The availability of new technologies, costs, and other relevant factors will be considered in making this evaluation. Further, the final modifications to RFCA Attachments will result in the conduct of accelerated actions that are protective of human health and the environment, notwithstanding the fact that all contamination may not be removed by these actions. The RFCA Parties believe that the new RSALs provide a substantial improvement in both short-term and long-term risk over the approach in the 1996 RFCA Attachment 5. DOE has been developing a Rocky Flats Long-Term Stewardship Strategy (Strategy), in consultation with our stakeholders. The Strategy contains information about the elements of draft long-term stewardship plans for Rocky Flats. The RFCA Parties anticipate that periodic reviews will incorporate appropriate technology reviews, per EPA and DOE guidance. DOE recognizes the community's concern regarding assuring funding for long-term stewardship. DOE cannot commit to developing a dedicated fund, but will submit requests for appropriate funding related to post-closure activities.
5.A.1	In the case of long-term stewardship, there's a number of recommendations we've made, and I won't go into all of them tonight, but I'd just like to kind of broadly group them. We're very concerned about funding. There's no assured funding method yet provided by DOE, so that we're certain that the money will be available to continue the monitoring and continue the on-site activities. We're also concerned that there's not a funding method that would handle contingencies in case there was some sort of a major storm event that uncovered some	DOE recognizes the community's concern regarding assuring funding for long-term stewardship. DOE cannot commit to developing a dedicated fund, but will submit requests for appropriate funding related to post-closure activities. An initial estimate of long-term stewardship costs is believed to be about $7 million per year. The Strategy will also discuss contingencies and will describe some general approaches for reducing uncertainty as stewardship proceeds. Long-term stewardship is considered when evaluating accelerated actions. Regarding the concept of performing additional remediation to

	contamination. We also feel that DOE needs to develop life-cycle cost estimates for stewardship and they need to do this in the near term, and the reason for this is that, to a large degree, we're going to be looking into whether we pay them now or do a pay-them-later-type thing. It may be cheaper, in some cases, to actually do additional remediation now, as opposed to waiting for something to happen when there will be no people on-site, and just one example of this would be if a pipeline was left and, during an erosion event, that pipeline would come to the surface. It would require a mobilization of a radiation hazard crew to come onto the site to look at that pipe. It possibly could be much cheaper at this time just to go ahead and remove the pipe.	offset potential long-term stewardship costs, this concept is already embodied in the Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Removal and was recently implemented for hot spot removals at the Solar Evaporation Ponds. RFFO will continue to consider opportunities for reducing long-term stewardship costs as it designs and executes its remedies at Rocky Flats. In the situation described in this comment (a pipe exposed due to erosion) we believe that the application of the Subsurface Soil Risk Screen process described in RFCA Attachment 5, sections 4 and 5 would have likely resulted in pipe removal, since it would have been located in an erosion-prone area subject to landslides.
5.A.2	We feel that there should be legally enforceable mechanisms for the stewardship program. These are being developed by DOE right now, but we want to be a part of that discussion. A few of these that we'd like to see are physical and engineering controls, mechanisms for those, information management systems, methods to inform and educate environmental monitoring of all media, surveillance and maintenance of controls, periodic performance reviews, continued scientific research in the better clean-up technologies, continued public participation, and program funding. The board also recommends strongly that new state environmental covenant law be enforced. This covenant law provides for enforceable institutional controls for all – for the entire state. The federal government at this point has taken the attitude that it	Since this comment is similar to Comments 1.b and 15, Category F, please also see the response to those comments. Appropriate requirements will be contained in all final CAD/RODs and in any modified RFCA Agreement consistent with RFCA Paragraph 286. As of May 2003, DOE and CDPHE have not reached agreement as to whether a post-closure permit (or, alternatively, an enforceable document as defined in 6 CCR 1007-3, § 100.10(d)) will be required for Rocky Flats, and if so, whether that permit (or enforceable document) will also contain appropriate requirements for institutional controls and other long-term stewardship activities. The parties will endeavor to resolve this matter. Failing an agreed upon resolution, each party reserves its rights as provided in RFCA Part 18. Appropriate requirements will address activities for the continuing protectiveness of the remedy, such as maintenance, monitoring, information management and periodic review. As of May 2003, CDPHE and DOE have not yet come.to agreement on the applicability of the State environmental

	does not apply to federal properties. We strongly ask DOE to voluntarily apply this to federal properties and to the State to continue to pursue this.	covenant to the Federal government. DOE and CDPHE hope to reach an agreed upon resolution. Failing an agreed upon resolution, each party reserves its rights as provided in RFCA Part 18.
5.B.1	Future use and federal control: Because the immediate future use of Rocky Flats after closure will be as a wildlife refuge, the RFCA Parties assume permanent federal control of the site and propose a clean-up designed to protect a wildlife refuge worker. A few questions: Can the RFCA Parties guarantee that Rocky Flats will be a wildlife refuge in 200 years, in 500 years, in 2400 years, which is 10 percent of the half-life of plutonium? If you go backward from now, 2400 years will take us to within about three years of the death of Socrates. That's the time period we're talking about. That's only 10 percent of the half-life of plutonium. Will the site remain in federal hands through all these periods? Can agency personnel imagine a time when fences fall and memory fails? If so, what provision are they making for this eventuality?	The RFCA Parties cannot assure what the land use will be thousands, or even hundreds of years from now, but continuing Federal ownership of the property (with the possible exception of a highway corridor at the eastern boundary of Rocky Flats as called for in the Refuge Act) is specified in the Refuge Act. The risk-based approach in the final RFCA Attachment 5 modifications is based upon a wildlife refuge as the reasonably foreseeable future land use and the wildlife refuge worker as the reasonably maximally exposed person, Based on the Refuge Act this use is certain for the foreseeable future and resistant to change. The Parties also analyzed the risk from plutonium soil contamination to a hypothetical rural resident. The RFCA Parties have calculated that surface soil cleanup to 50 pCi/g will fall within the CERCLA prescribed risk range for the rural resident. The subsurface will be well-characterized prior to closure, and will be remediated to be protective of the reasonably maximally exposed person, the refuge worker, as well as to ensure that surface water is protected and to ensure that contamination is not exposed due to erosion events. . The Parties also analyzed the risk from plutonium soil contamination to a hypothetical rural resident to determine that the risk would not be unacceptable if the refuge use was not maintained.
5.B.2	The next aspect of the proposed clean-up that I want to speak about is controls. Because they plan to leave contaminants behind, the RFCA Parties intend to contain the residual contamination with institutional controls and engineered controls. A recent National Academy of Sciences study concluded that reliance on	Since this comment is similar to Comment 1.b, Category F, please see the response to that comment. DOE is committed to implement appropriate controls on post-closure hazards and will integrate those controls to ensure their long-term success. It is DOE Policy to use institutional controls as essential components of a defense in depth strategy that uses

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	institutional and engineered controls to contain residual contamination at DOE sites is, quote, inherently failure-prone. What provisions are the RFCA Parties making to meet this likelihood of failure? If their original controls fail, what will be put in their place? What new kinds of controls are anticipated? What will they cost, and how will they be paid for, and by whom? Have the RFCA Parties estimated the potential long-term cost of controls, replacing controls, and requiring ongoing maintenance and monitoring? Have they compared an estimate of this sort with what they think they are now saving by instituting a plan that requires controls? Is their present plan cost-effective in the long-term?	multiple, relatively independent layers of safety to protect human health and the environment. This strategy uses a graded approach to attain a level of protection appropriate for the risks involved. Institutional and engineering controls required by any final CAD/ROD will be evaluated in the remedy review, and actions taken as appropriate to address failures affecting the protectiveness of the remedy. Pursuant to the Refuge Act, DOE will retain jurisdiction over real property and facilities related to response actions. Cost will be analyzed in developing the comprehensive final remedy. An initial estimate of long-term stewardship costs is believed to be about $7 million per year. Since this comment is similar to comments 5.A.1 and 30.a, Category F., please also see the response to those comments.
5.B.3	The sixth recommendation: If the RFCA Parties reject the foregoing recommendations in favor of the partial clean-up they have proposed as a condition of moving ahead, they should work with the affected public to establish a legally-binding, long-term stewardship program that includes but is not limited to the following: Public participation and oversight; comprehensive environmental monitoring; surveillance and maintenance of all controls; information management systems; ongoing education of the public regarding the condition of the site; research on better clean-up technology that can be applied at the site; research for evidence of adverse health effects in plant, animal, and human life, with particular attention to genetic effects; assured and dedicated funding to cover all long-term stewardship costs, including contingencies. That one can't be underscored enough, and we will be making some additional recommendations in the comment period as it moves	The RFCA Parties agree with the need for long-term stewardship planning. RFCA Parties will continue to use the consultative process to discuss the post-closure regulatory approach. As stated above, institutional controls and other long-term stewardship activities, such as monitoring, maintenance, information management and remedy review will be analyzed in the RFI/RI-CMS/FS. The RFCA Parties anticipate that enforceable post-closure requirements will exist to ensure the protectiveness of the remedy in accordance with the CERCLA remedy selection process and the corrective action and closure process in RCRA/CHWA. DOE has been developing a Rocky Flats Long-Term Stewardship Strategy (Strategy), in consultation with the community and CDPHE and EPA. The Strategy contains information about the elements of draft long-term stewardship plans for Rocky Flats. Pertinent epidemiological information is considered in determining the toxic or carcinogenic effects of contaminants of concern, which will be one of the factors addressed in remedy

	along.	review. DOE recognizes the community's concern regarding assuring funding for long-term stewardship. DOE cannot commit to developing a dedicated fund, but will submit requests for appropriate funding related to post-closure activities.
5.C	First of all is the details of a long-term stewardship plan, you know, what specifically happens post-closure, how it's funded, whose responsibility is what. It's absolutely essential that we know that we've actually, as an organization, pushed that you look at long-term stewardship, not as an afterthought, but it's actually an integral component to remedy selection, and so that's one issue we're going to continue to work with, these modifications and beyond.	The RFCA decision documents are developed using the consultative process, and preliminary draft documents are generally shared with the community prior to release of the public comment draft for the formal public comment period. Long-term stewardship is considered when evaluating accelerated actions and community consultation includes discussions related to this analysis.
5.Q.1	One of the biggest uncertainties is the National Wildlife Refuge Act of 2001, which created the national wildlife refuge out there. What we don't know is we were going to leave the site basically intact. We're going to turn it over when it's cleaned, and we don't know what a wildlife refuge means out there. Are there going to be new buildings? Are there going to be new species? Will some of these species have a bigger impact on what we have out there now, such as horses or cows or Buffalo or Rhinoceroses? I don't know. How many visitors are we going to have out there? What sort of carrying capacity are they going to weigh? Are they going to feed their animals? How are they going to provide water for them? Where is that water going to come from? Are they going to need treatment? Is there going to be surface soils that are going to be, you know, disturbed, heavily disturbed by what we don't know? Are they going to build buildings? Are they going to build, you know, observation blinds? How far are they going to dig	Importantly, the Refuge Act prohibits transfer of the federal property (with the possible exception of a highway corridor at the eastern boundary of Rocky Flats as called for in the Refuge Act), and the Act requires that activities on the Refuge comply with any response actions taken by DOE. The specific types of activities that will take place on the Refuge are being decided in the context of the Comprehensive Conservation Plan (CCP) for the Refuge, now being prepared by the U.S. Fish and Wildlife Service. The public has had, and will continue to have, the opportunity to provide input in the preparation of this document. The contact person is for the CCP is: Laurie Shannon Planning Team Leader U.S. Fish and Wildlife Service Rocky Mountain Arsenal NWR Building 121

	down for their foundations?	Commerce City, CO 80022 Ph: (303) 289-0980 Fax: (303) 289-0579 Email: rockyflats@fws.gov Online: http://rockyflats.fws.gov
5.Q.2	I also think, because of the changes from the clean-up and from the refuge groundwater, surface water migration of pathways will continue on. The single most important issue here is plutonium and the levels we suffer of plutonium. I will highly go with as new a background as we can get. I agree we have too much in our environment already. I think this has been proven time and time again, and I'd like to make a point here that I think, with plutonium, you're not dealing in picocuries. You may be dealing in a single dose that may have tragic consequences for somebody, a single dose. That is very much different than exposure to pesticides in a low dose or high dose. A single dose is a very serious matter. Finally, I think the legacy that I haven't heard mentioned is I would like to see and, in 1969, I was an activist at Rocky Flats and I want to talk just in general that it is my hope and my dream that all of you who have control over long-term EPA studies of visitors, refuge workers, Biota, as I mentioned before, and I'd like those to be started down and continued over a good many years after this refuge goes into effect.	The final modifications to RFCA Attachments provide a framework for the conduct of accelerated actions that are protective of human health and the environment, notwithstanding the fact that all contamination may not be removed by these actions. The risk-based approach is also expected to achieve a lifetime excess cancer risk to the reasonably maximally exposed individual (wildlife refuge worker) of not more than $1x10^{-5}$. Both the use of a wildlife refuge worker and the basis for action levels and risk level specified in the final RFCA Attachment 5 are consistent with the Federal and State regulatory requirements and implementing guidance.
7	Westminster understands DOE is currently performing interim action, but when the final remedy is in place, Westminster, as an asset holder, expects to be a key member of the stewardship team to develop and analyze the long-term stewardship activities in the	

	CAD/ROD or any post- closure document. In addition, the City recommends the following: 1. DOE shall commit to developing a long-term stewardship plan for Rocky Flats that is finalized and enforceable at closure. Optional funding mechanisms, i.e. trusts should be investigated. Because Rocky Flats will not be cleaned up to background, DOE shall ensure and provide the funding for the long-term stewardship monitoring, maintenance, and implementation of contingencies that will be required for an extended period of time. 2. DOE shall provide additional cleanup at Rocky Flats in the future to background levels of contamination when technology and funds to do so becomes available. 3. DOE shall have onsite personnel assigned to Rocky Flats post-closure to conduct long-term stewardship activities and implement contingencies as needed. 4. Long-term stewardship shall be legally enforceable by CDPHE and the EPA. The RFCA shall also state how the federal government will enforce access restrictions, and specify in detail which stewardship controls will be enforceable and which will not.	1. The Strategy is a policy document that is being prepared by DOE in consultation with the other RFCA Parties and with the community. Therefore, the RFCA Parties do not believe that it is appropriate to have the Strategy become an enforceable regulatory document. Rather, RFCA Attachment 5, section 1.2 provides that the need for and extent and enforceability of long-term stewardship activities, such as monitoring, information management and remedy review will be analyzed in the RCRA Facility Investigation-Remedial Investigation/Corrective Measures Study-Feasibility Study (RFI/RI-CMS/FS). DOE recognizes the community's concern regarding assuring funding for long-term stewardship. DOE cannot commit to developing a dedicated fund, but will submit requests for appropriate funding related to post-closure activities. 2. Please see response to Category G, Comment 30.a. 3. DOE recognizes the community's desire to have a local DOE presence following closure. No decision has been made as to whether onsite personnel will be assigned. 4. The RFCA Parties will continue to use the consultative process to discuss the post-closure regulatory approach. The need for and extent of specific institutional controls and other long-term stewardship activities, such as monitoring, maintenance, information management and remedy review, have not been determined and will be analyzed in the

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		RFI/RI-CMS/FS. The types of controls anticipated are found in Attachment 5, Section 1.2 and listed in the response to 30.a, below. The RFCA Parties anticipate that enforceable post-closure requirements will exist to ensure the protectiveness of the remedy in accordance with the CERCLA remedy selection process and the corrective action and closure process in RCRA/CHWA. The RFCA Parties will continue to use the consultative process to discuss the post-closure regulatory approach. Appropriate requirements will be contained in all final CAD/RODs and in any modified RFCA Agreement consistent with RFCA Paragraph 286. As of May 2003, DOE and CDPHE have not reached agreement as to whether a post-closure permit (or, alternatively, an enforceable document as defined in 6 CCR 1007-3, § 100.10(d)) will be required for Rocky Flats, and if so, whether that permit (or enforceable document) will also contain appropriate requirements for institutional controls and other long-term stewardship activities. The parties will endeavor to resolve this matter. Failing an agreed upon resolution, each party reserves its rights as provided in RFCA Part 18.
	5. Controls shall be layered in order to reduce uncertainty, and contingency plans shall be developed, with input from the City, in the event of a failure or malfunction of a remedy.	5. DOE is committed to implement appropriate controls on post-closure hazards and will integrate those controls to ensure their long-term success. It is DOE Policy to use institutional controls as essential components of a defense in depth strategy that uses multiple, relatively independent layers of safety to protect human health and the environment. This strategy uses a graded approach to attain a level of protection appropriate for the risks involved.

	6. In addition to regular operational and performance monitoring, and maintenance of the remedies, the City recognizes that periodic reviews of remedies are required by CERCLA. The RFCA parties shall therefore commit to CERCLA reviews at a minimum of every three years for the first nine years following closure. At the end of the nine-year period, the periodic review shall be evaluated to determine the frequency of reviews. These reviews shall be conducted in accordance with the EPA's "Comprehensive Five-Year Review Guidance" and meet the information needs of the impacted local governments. 7. Quarterly stakeholder meetings will be held for the first three years after closure to provide updates on operations and maintenance, data, inspection logs, etc. At the end of the three years, the periodicity and necessity of the meetings will be reexamined. DOE shall maintain a document repository at the College Hill Library and work with local governments to determine which documents will be maintained.	6. and 7. The RFCA Parties will consult with the community regarding the need for a review more frequent than the 5 year period required by CERCLA. The frequency of CERCLA reviews will be contained in all final CAD/ROD(s). The RFCA Parties will consider more frequent reviews and the frequency of CERCLA reviews will be contained in all final CAD/ROD(s). The RFCA Parties agree that it is important to maintain and make available to future users information regarding the Site's history and environmental conditions, specifically including information on contamination remaining after cleanup. This information will be maintained as part of the Site's required Administrative Record File. Local communities will be consulted regarding the availability of the Administrative Record File and its location.
29	The proposed surface treatment and fence, which will deteriorate with time, plus the absence of monies to safeguard this area forever is a solution that is fraught with a non-protective outcome.	Please see response to Comment 1.b, Category F.
30.a	Recommendation 8: Institutional and engineered controls must be implemented for any areas of residual contamination exceeding a 10^{-6} risk level for a future residential user, consistent with the state environmental covenants law.	The RFCA Parties will use the RFCA consultative process to discuss the areas for which engineered and institutional controls must be implemented. While the institutional controls listed in RFCA Attachment 5, Section 1.2 will be used as appropriate to protect human health and the environment, the need for and extent of specific institutional controls and other long-term stewardship activities, such as monitoring, maintenance

		information management and remedy review, have not been determined. These listed controls are: • prohibition of construction and use of buildings in contaminated areas; • prohibition on drilling wells for water use into contaminated groundwater, the use of contaminated groundwater and/or pumping groundwater that could adversely affect the remedy; • restrictions on excavation in areas above subsurface contamination or intrusion into subsurface contamination; • restrictions on activities that cause soil disturbance in areas with surface soil contamination; and • other restrictions to protect engineered controls (such as covers, groundwater barriers and treatment cells) and monitoring systems. The anticipated extent of areas with institutional controls at closure is shown in RFCA Attachment 5, Figure 1. The anticipated boundary of areas that will be subject to institutional controls depicted in Figure 1 is subject to modification based upon characterization, future response actions, the results of the comprehensive risk assessment, and the final remedial/corrective action decision in the final CAD/ROD. The Parties additionally presume that there will be no residential development at Rocky Flats. As of May 2003, CDPHE and DOE have not yet come to agreement on the applicability of the State environmental covenant to the Federal government. DOE and CDPHE hope to reach an agreed upon resolution. Failing an agreed upon resolution, each party reserves its rights as provided in RFCA Part 18.

30.b	For any areas where residual contamination above background levels of contamination will be left behind, members of the Rocky Flats Citizens Advisory Board believe a comprehensive and legally enforceable long-term stewardship program is necessary. Rocky Flats is the model site for DOE's accelerated closure program. The Board believes Rocky Flats should also become the model site for an effective and comprehensive long-term stewardship program. The following recommendations address the minimum criteria for a model stewardship program. Note: Long-term stewardship subjects marked with an asterisk (*) should be subject to legally enforceable mechanisms. Please see recommendation 31 for a full range of stewardship activities that should be legally enforceable.	Since this comment is similar to comment 15, Category F, please see the response to that comment. The final modifications to RFCA Attachments provide the framework for the conduct of accelerated actions that are protective of human health and the environment, notwithstanding the fact that all contamination may not be removed by these actions. The need for and extent of specific institutional controls and other long-term stewardship activities, such as monitoring, maintenance, information management and remedy review, have not been determined and will be analyzed in the RFI/RI-CMS/FS. The types of controls anticipated are found in Attachment 5, Section 1.2 and listed in the response to 30.a, below. The RFCA Parties anticipate that enforceable post-closure requirements will exist to ensure the protectiveness of the remedy in accordance with the CERCLA remedy selection process and the corrective action and closure process in RCRA/CHWA. The RFCA Parties will continue to use the consultative process to discuss the post-closure regulatory approach. Appropriate requirements will be contained in all final CAD/RODs and in any modified RFCA Agreement consistent with RFCA Paragraph 286. As of May 2003, DOE and CDPHE have not reached agreement as to whether a post-closure permit (or, alternatively, an enforceable document as defined in 6 CCR 1007-3, § 100.10(d)) will be required for Rocky Flats, and if so, whether that permit (or enforceable document) will also contain appropriate requirements for institutional controls and other long-term stewardship activities. The parties will endeavor to resolve this matter. Failing an agreed upon resolution, each party reserves its rights as provided in RFCA Part 18.
30.c	Legally Enforceable Mechanisms for All Stewardship Program Elements With the need for stewardship measures post-closure to provide long-term protection to human health and	Since this comment is similar to Comment 1.b, Category F, please see the response to that comment. DOE consulted with the Rocky Flats Long Term Stewardship Working Group in the development

	the environment, combined with the need to provide greater funding incentives, legally enforceable mechanisms requiring stewardship are necessary. These mechanisms must include the full range of stewardship program needs. Recommendation 31(*): The Board recommends the RFCA parties develop legally enforceable mechanisms for long-term stewardship as an integral part of RFCA. These enforcement mechanisms must be comprehensive to address all the stewardship components outlined below. (Further details concerning these program components can be found in "The Rocky Flats Stewardship Toolbox: Tools for Long-Term Planning," prepared by the Rocky Flats Stewardship Working Group.) • Physical and engineered controls • Institutional controls • Information management systems • Methods to inform and educate • Environmental monitoring of all media (air, groundwater, surface water, and soil) • Surveillance and maintenance of controls • Periodic performance review and assessment of all program activities and features • Delegation of authority to responsible parties to make sure the program is maintained • Continued scientific research into better cleanup technologies and the effects of contamination on human health and the environment	of the "Toolbox" and has used the toolbox in developing accelerated action decision documents.

	• Continued public participation and oversight • Program funding	
30.d	Data for Recom 37 - RFCAB understands an "institutional control zone" (RFCA Attachment 5, figure 1) – anticipated to be approximately 1,000 acres within which there will be institutional, physical, and engineered controls – will be established at the site. Recommendation 37(*): RFCAB recognizes that the Rocky Flats site is a distinctly valuable site for research on how to remediate a plutonium-contaminated site. Lessons learned at Rocky Flats could be beneficial for cleanup of plutonium-contaminated sites elsewhere. With the understanding that wildlife and workers with the U.S. Fish and Wildlife Service will have access to the "institutional control zone" at Rocky Flats, RFCAB believes this area should remain in the primary jurisdiction of DOE and should serve as a test bed for research on future promising remediation technologies.	The Refuge Act requires the Secretary of the Energy to consult with the Secretary of the Interior, the Administrator of EPA, and the Governor of the State of Colorado on the identification of all real property and facilities to be retained for response actions. The RFCA Parties have not yet determined what portions of an "institutional control zone" as referred to here will remain under the administrative jurisdiction of DOE. At this point no decision regarding the use of this property for remediation technology research has been made. RFCA Attachment 5, section 1.2 provides that the anticipated boundary of areas that will be subject to institutional controls depicted in Figure 1 is subject to modification based upon characterization, future response actions, the results of the comprehensive risk assessment, and the final remedial/corrective action decision in the final CAD/ROD.
30.e	Public Involvement and Oversight Data for Recom 39 - Public Involvement and Oversight Public involvement in the development of a long-term stewardship program for the site is necessary for its successful implementation. An important part of this program is environmental monitoring. Long-term stewardship is a major part of the Board's work plan for 2003. • *Recommendation 39: The Board recommends DOE and the other RFCA parties continue to engage RFCAB and the other stakeholders in development*	DOE has been developing a Rocky Flats Long-Term Stewardship Strategy (Strategy), in consultation with the community and CDPHE and EPA. DOE will continue this consultation.

	of a long-term stewardship program for the site.	
30.f	State Environmental Covenants Data for Recom 33 - The state of Colorado requires environmental covenants for properties where residual contamination will remain after active remediation. DOE, as part of the federal government, has questioned the applicability of this requirement for federal facilities, as alluded to in the following language from Attachment 5, Section 1.2, p. 5-4: "Section 25-15-320, C.R.S., requires an environmental covenant under certain conditions. As of October 2002, the Parties have not reached an agreement on the applicability of this statute to the federal government." • *Recommendation 33(*): The Board believes the state-required covenants provide another layer of meaningful and enforceable institutional control that will provide greater protection of human health and the environment into the future. The Board urges DOE to argue strongly for the acceptance of the environmental covenants provision in its discussions with other federal government entities as a valuable and necessary control mechanism to protect human health and the environment for future generations. The Board further urges the state of Colorado to hold steadfast in its position that such a requirement on the federal government is indeed appropriate and necessary for those same reasons.*	As of May 2003, CDPHE and DOE have not yet come to agreement on the applicability of the State environmental covenant to the Federal government. DOE and CDPHE hope to reach an agreed upon resolution. Failing an agreed upon resolution, each party reserves its rights as provided in RFCA Part 18.
30.g	History has shown that our knowledge of the risks posed by environmental contaminants changes over time, particularly for radionuclides. • *Recommendation 35(*): The Board recommends a*	Changes to standards, guidance or policy resulting from emerging epidemiological evidence, as it relates to the risk posed by contamination at Rocky Flats, will be one of the subjects addressed in the remedy review required by CERCLA. The U.S. Fish and Wildlife Service will analyze mule deer tissue samples

	research program be established at the site post-closure to monitor the body burdens of the wildlife onsite to determine to what extent they are exposed to contaminants of concern at Rocky Flats and to assess the risk to their health. Particular attention should be given to long-term genetic effects of exposures.	recently collected at Rocky Flats for radionuclides. This sampling will be performed as part of the Level 3 contaminants survey prior to transfer of Rocky Flats for use as a National Wildlife Refuge. Based on observations of wildlife at Rocky Flats, the RFCA Parties do not believe that a long-term program, such as the one described, will be necessary.
30.h	*Recommendation 36(*): The Board recommends DOE work closely with stakeholders to establish a well-publicized program of screening the health of people who live near or visit the Rocky Flats site by screening for possible adverse effects from exposure to contaminants left in the Rocky Flats environment, with such screening made available to any who seek it on a strictly voluntary basis. Data from the screening program should be made available to stakeholders on a regular basis.*	The final modifications to RFCA Attachments provide the framework for the conduct and completion of accelerated actions that are protective of human health and the environment and conform with all regulatory requirements. The RFCA Parties do not believe, therefore, that a screening program such as the one described, will be necessary.
36	Thirdly, I would like to see a strong stewardship section added to the agreement. Just today, I read an article in the Hamilton Journal about citizen concern of DOE backing out of stewardship promises regarding the 1,050 acre former uranium processing plant in Ross and Crosby Counties, OH. I am deeply concerned that if the stewardship plan is not included in RFCA, DOE may attempt to back out of stewardship plans otherwise promised at Rocky Flats. You must take humanitarian responsibility for the	Section 1.2 of Attachment 5 already identifies the types of long-term stewardship activities, including such things as monitoring, maintenance, information management, remedy review and the use of institutional controls, as appropriate, that will be used to protect human health and the environment. DOE recognizes that since decisions regarding long-term stewardship activities have yet to be made, there will continue to be some concerns in the community related to contamination that is not removed based upon the risk-based approach. However, DOE is committed to maintain post-cleanup controls. DOE has been developing a

	actions and mistakes of the past at Rocky Flats by assuring that the Rocky Flats site will be guarded and monitored, that the public input process will continue indefin[i]tely, and as new technologies arise, complete cleanup continues on the site by including a strong stewardship section in the RFCA document.	Rocky Flats Long-Term Stewardship Strategy (Strategy), in consultation with the community and CDPHE and EPA. The Strategy contains information about the elements of draft long-term stewardship plans for Rocky Flats. DOE will continue this consultation.
42.a	Rather than assuming that Rocky Flats will remain always unaltered as a wildlife refuge, we urge you to take a longer look at the future use of the site. It is altogether possible that intense human activity such as roads, home construction, family food gardens, and playgrounds could happen there within the next 240,000 years! This is how long it takes for plutonium to become non-deadly! This is a quarter of a million years from now!	Since this comment is similar to comment 5.B.1., Category F, please see the response to that comment.
42.b	Align your RFCA Parties with the citizens of Colorado to establish a rigorous, long-term stewardship program. This program would continually research, monitor, and apply better cleanup technologies into the future. It will require assured funding to cover all long-term stewardship costs. Stewardship of the site would be passed on from generation to generation, in perpetuity.	Since this comment is similar to comment 15, Category F, please see the response to that comment.
42.c	Adopt a proactive stance in regard to fences and barriers constructed around any residual contaminants. These will need to be replaced before they fail. How will you measure when this needs to happen?	With regard to fences and other barriers, DOE will be responsible to ensure that those that are needed to maintain the protectiveness of the remedy are adequately maintained.

47	Page 24, Section 3.7. We (the Coalition and Westminster), "ask that RFCA milestones be established for the development of the long-term stewardship strategy and plan. We are concerned that stewardship is being relegated at this point to a document (the Site's long-term stewardship strategy) that currently is not legally enforceable by EPA and CDPHE and is subject to changing policy direction and commitment by DOE. Thus we request that a RFCA milestone be crafted that both holds DOE accountable to a timeline for developing the long-term stewardship plan and, more importantly, establishes a common set of criteria between the RFCA parties as to the scope and content of the stewardship plan."	The Strategy is a policy document that is being prepared by DOE in consultation with the other RFCA Parties and with the community. Therefore, the RFCA Parties do not believe that it is appropriate to have the Strategy become an enforceable regulatory document. The need for and extent of specific institutional controls and other long-term stewardship activities, such as monitoring, maintenance, information management and remedy review, have not been determined and will be analyzed in the RFI/RI-CMS/FS. The types of controls anticipated are found in Attachment 5, Section 1.2 and listed in the response to 30.a, below. The RFCA Parties anticipate that enforceable post-closure requirements will exist to ensure the protectiveness of the remedy in accordance with the CERCLA remedy selection process and the corrective action and closure process in RCRA/CHWA. The RFCA Parties will continue to use the consultative process to discuss the post-closure regulatory approach. Appropriate requirements will be contained in all final CAD/RODs and in any modified RFCA Agreement consistent with RFCA Paragraph 286. As of May 2003, DOE and CDPHE have not reached agreement as to whether a post-closure permit (or, alternatively, an enforceable document as defined in 6 CCR 1007-3, § 100.10(d)) will be required for Rocky Flats, and if so, whether that permit (or enforceable document) will also contain appropriate requirements for institutional controls and other long-term stewardship activities. The parties will endeavor to resolve this matter. Failing an agreed upon resolution, each party reserves its rights as provided in RFCA Part 18. The Strategy will help inform the RFI/RI-CMS/FS. DOE believes that it is important to continue to develop the Strategy in a timely fashion. However, a milestone for the Strategy is outside the scope of the modifications to RFCA Attachments, but will be discussed amongst the RFCA Parties.

62.a	With regards to long-term stewardship, the City is pleased with the progress being made and the increase of attention this important topic deserves. However, the City believes that the RFCA should very clearly state that all elements of the Site's Long-term Stewardship Strategy be contained within enforceable documents. It is important and appropriate that long-term stewardship is fully enforceable by the EPA, CDPHE, and third parties.	The Strategy is a policy document that is being prepared by DOE in consultation with the other RFCA Parties and with the community. Therefore, the RFCA Parties do not believe that it is appropriate to have the Strategy become an enforceable regulatory document. The need for and extent of specific institutional controls and other long-term stewardship activities, such as monitoring, maintenance, information management and remedy review, have not been determined and will be analyzed in the RFI/RI-CMS/FS. The types of controls anticipated are found in Attachment 5, Section 1.2 and listed in the response to 30.a, below. The RFCA Parties anticipate that enforceable post-closure requirements will exist to ensure the protectiveness of the remedy in accordance with the CERCLA remedy selection process and the corrective action and closure process in RCRA/CHWA. The RFCA Parties will continue to use the consultative process to discuss the post-closure regulatory approach. Appropriate requirements will be contained in all final CAD/RODs and in any modified RFCA Agreement consistent with RFCA Paragraph 286. As of May 2003, DOE and CDPHE have not reached agreement as to whether a post-closure permit (or, alternatively, an enforceable document as defined in 6 CCR 1007-3, § 100.10(d)) will be required for Rocky Flats, and if so, whether that permit (or enforceable document) will also contain appropriate requirements for institutional controls and other long-term stewardship activities. The parties will endeavor to resolve this matter. Failing an agreed upon resolution, each party reserves its rights as provided in RFCA Part 18. The Strategy will help inform the RFI/RI-CMS/FS. DOE believes that it is important to continue to develop the Strategy in a timely fashion.
62.b	Funding for long-term stewardship must also be addressed in the very near future. Dependence upon	DOE recognizes the community's concern regarding assuring funding during long-term stewardship. At this point, DOE

	annual congressional appropriations may not be sufficient to ensure the necessary consistent needs of the site post-closure. The development of a dedicated fund is crucial to the success of long-term stewardship. Arvada believes that the Department of Energy must recognize the issue of funding as an integral part of any commitments to long-term stewardship.	anticipates that funding for long-term stewardship activities will be requested on an annual basis, as funds are now.
62.c	. . . the City expects that individual cleanup decisions will strive to minimize the need for intrusive institutional controls such as fencing. If the long-term use of the site is to be of benefit to area residents, cleanup decisions need to account for any negative future impact to visitor experiences. That said, of course, human health and environmental safety should not be sacrificed in order to minimize the intrusiveness of institutional controls.	Please see response to Comment 30.a.
67.a	We understand that over the years various bodies have recommended that Rocky Flats be cleaned to the maximum extent possible with today's technology. We know too that in 1995 the broadly representative Rocky Flats Future Site Use Working Group, the Citizens Advisory Board, and other entities recommended that the ultimate goal for cleanup of Rocky Flats be to average background levels. Cleaning the site today to the maximum extent possible with current technology would move toward this ultimate goal. Clearly, the DOE and the regulators have rejected this approach in favor of providing the cleanup that *can* be paid for with the limited sum available. There's a self-reinforcing logic in which the RFCA Parties reinforce past decisions, which reinforce their present positions. The cleanup they intend to provide is woefully inadequate, especially for the long term. It is the sort of cleanup that makes long-term	The RFCA Parties believe that the new RSALs and implementation of the risk-based approach provide a substantial improvement in both short-term and long-term risk over the approach in the 1996 RFCA Attachment 5. Since this comment is similar to comment 15, Category F, please also see the response to that comment.

	stewardship an absolute necessity. Yet the RFCA includes no provisions for LTS. It refers to postclosure institutional and engineered controls, environmental monitoring, information management and the like, but it makes no provision for how these items will be managed or paid for. In the view of ANA, without legally enforceable provisions for a good LTS program the RFCA is deficient. The only way Rocky Flats can be a model for cleanup is for it to be a model as well for LTS. A legally enforceable program of LTS therefore should be written into the RFCA as an integral part of the cleanup plan and indeed as a condition for implementation of the plan. Without such, RFCA assurances about postclosure measures to protect the public health and environmental integrity become a packet of hollow promises. Below we will specify some items that we believe need to be included in a legally enforceable LTS program.	
67.b	6. The RFCA should be revised to incorporate provision for a legally enforceable long-term stewardship program that includes the following: Assured funding. - Public participation and oversight. - Information management systems. - Surveillance and maintenance of all controls, whether institutional, physical, or engineered. - Methods to inform and educate the public. - Environment monitoring for all media (soil, air, groundwater and surface water). - Periodic performance review and assessment of program activities.	DOE is committed to maintain post-cleanup controls. DOE has been developing a Rocky Flats Long-Term Stewardship Strategy (Strategy), in consultation with the community and CDPHE and EPA. The Strategy contains information about the elements of draft long-term stewardship plans for Rocky Flats. The RFCA Parties will continue this consultation in the development of the Rocky Flats long-term stewardship plans. RFCA Attachment 5, section 1.2 provides that the need for and extent of long-term stewardship activities, such as monitoring, information management and remedy review will be analyzed in the RCRA Facility Investigation-Remedial Investigation/Corrective Measures Study-Feasibility Study (RFI/RI-CMS/FS). Appropriate requirements for these activities will be described as part of the preferred alternative in the in the Proposed Plan, which is subject to formal public review and comment prior to issuance of the CAD/ROD. The RFCA Parties will continue to consult

	- Ongoing scientific research into better cleanup technologies that may be applied at the site to achieve better cleanup. - Ongoing scientific research regarding effects of residual contamination on human, plant, and animal life.	with the community as the RFI/RI-CMS/FS and Proposed Plan are developed, in addition to considering public comment from formal comment periods. The RFCA Parties will continue to use the consultative process to discuss the post-closure regulatory approach. The need for and extent of specific institutional controls and other long-term stewardship activities, such as monitoring, maintenance, information management and remedy review, have not been determined and will be analyzed in the RFI/RI-CMS/FS. The types of controls anticipated are found in Attachment 5, Section 1.2 and listed in the response to 30.a, below. The RFCA Parties anticipate that enforceable post-closure requirements will exist to ensure the protectiveness of the remedy in accordance with the CERCLA remedy selection process and the corrective action and closure process in RCRA/CHWA. The RFCA Parties will continue to use the consultative process to discuss the post-closure regulatory approach. Appropriate requirements will be contained in all final CAD/RODs and in any modified RFCA Agreement consistent with RFCA Paragraph 286. As of May 2003, DOE and CDPHE have not reached agreement as to whether a post-closure permit (or, alternatively, an enforceable document as defined in 6 CCR 1007-3, § 100.10(d)) will be required for Rocky Flats, and if so, whether that permit (or enforceable document) will also contain appropriate requirements for institutional controls and other long-term stewardship activities. The parties will endeavor to resolve this matter. Failing an agreed upon resolution, each party reserves its rights as provided in RFCA Part 18.
82	Public health issues are great concern; better to keep RF off limits to public if more stringent requirements of 5pc or less are ignored.	The final modifications to RFCA Attachments provide the framework for the conduct of accelerated actions that are protective of human health and the environment, notwithstanding the fact that all contamination may not be removed by these actions. The RFCA Parties believe that upon completion of cleanup the land will be safe for use as a wildlife refuge. The

		need for and extent of specific institutional controls, including any that are appropriate to ensure that no excessive exposures to residual contamination are received either by the public or by workers at the refuge, have not been determined and will be analyzed in the RCRA Facility Investigation-Remedial Investigation/Corrective Measures Study-Feasibility Study. The RFCA Parties anticipate that enforceable post-closure requirements will exist to ensure the protectiveness of the remedy in accordance with the CERCLA remedy selection process and the corrective action and closure process in RCRA/CHWA. The RFCA Parties will continue to use the consultative process to discuss the post-closure regulatory approach. Appropriate requirements will be contained in all final CAD/RODs and in any modified RFCA Agreement consistent with RFCA Paragraph 286. As of May 2003, DOE and CDPHE have not reached agreement as to whether a post-closure permit (or, alternatively, an enforceable document as defined in 6 CCR 1007-3, § 100.10(d)) will be required for Rocky Flats, and if so, whether that permit (or enforceable document) will also contain appropriate requirements for institutional controls and other long-term stewardship activities. The parties will endeavor to resolve this matter. Failing an agreed upon resolution, each party reserves its rights as provided in RFCA Part 18.
34.a	Although this comment doesn't pertain directly to the RFCA modifications, the Service feels that it needs to be brought forth in the same discussion, since it involves long term stewardship and the end-state of the Site. The Service agrees that there will probably be some agreement for secondary jurisdiction on all or portions of the land that the Department of Energy (DOE) retains primary jurisdiction. However, there are several issues that need to be resolved before any final decisions of jurisdiction can be made. The Service is confident that continuing discussions between our RFCA Parties will conclude in a mutually	DOE looks forward to working with the Service on these issues. Like the Service, DOE is confident that this working relationship will evolve into a long-term partnership that will result in the entire Site being managed for the public's benefit. DOE especially agrees that final grading and revegetation aspects of restoration of the Site should be carefully planned and take into consideration appropriate success criteria. DOE looks forward to developing these plans in close consultation with Service personnel.

	satisfactory agreement. The issues that need further discussions include the approval of the RFCA modifications and cleanup levels, the development and implementation of a robust long-term stewardship plan, defining the institutional controls, final surface water configurations of the ponds, final remediation of the landfills, and defining the tasks that DOE would like the Service to perform on a reimbursable basis. Another significant item that our RFCA Parties need to work on is the final restoration plan. The Service recommends that this plan include, at a minimum, a final grade plan and a revegetation plan. The Service also recommends that both plans have success criteria incorporated into them and a means for monitoring those criteria. The revegetation plan has remedy implications as well, if vigorous vegetation is not established, that will almost insure that prairie dogs and other burrowing animals will eventually invade the site. Additionally, without well established vegetation, the chances of erosion of soils will also be an issue.	
34.b	Attachment 5, Page 5-4, bullet 3 – Restrictions on excavation in areas of subsurface contamination or intrusion into subsurface contamination can be enforced on human activities, however, burrowing animals will be harder in the long run, especially if there is minimal vegetative cover. Vegetation management will be very important for managing burrowing animals in areas of residual contamination.	DOE agrees that vegetation management will be an important consideration for managing burrowing animals in areas where intrusion into the subsurface must be appropriately controlled.
34.c	Attachment 5, Figure 1 and Figure 2 – On both maps, the additional 25 acres transferred by congress to the National Wind Technology Center through the Rocky Flats National Wildlife Refuge Act needs to be shown. Also, the page number on Figure 2 needs to be updated.	Agreed; these changes will be made.

41	As I spoke of future inhabitants, I must stress that this is not my only area of concern. Any person unfamiliar to the history of Rocky Flats, as many are, would take the description "Wildlife Refuge" as a welcoming for peaceful, clean lands, a place to take the dogs and children. This could not be more misleading. If proposed cleanup is allowed, at the very least, there MUST be a sign, warning people of the partial cleanup of radioactive and toxic wastes allowed left in the soil. This sign should warn of plutonium levels in the soil, the inhalation risks of plutonium, and the health effects. People entering this land should be advised of the risks, advised to never allow children to enter, and that they themselves should also not enter. The public has a right to this information.	The RFCA Parties agree that future users should have access to information regarding the Site's history and environmental conditions. Regarding the specific suggestions in this comment for signs, the final modifications to RFCA Attachments provide the framework for the conduct and completion of accelerated actions that are protective of human health and the environment, notwithstanding the fact that all contamination may not be removed by these actions. The RFCA Parties believe that upon completion of cleanup the land will be safe for use as a wildlife refuge. The RFCA Parties do not believe that signs such as the ones proposed in this comment will need to be in place, nor do they believe that it will be necessary to restrict access for children or other persons visiting the refuge. The RFCA Parties agree that it is important to maintain and make available to future users information regarding the Site's history and environmental conditions, specifically including information on contamination remaining after cleanup. This information will be maintained as part of the Site's required Administrative Record File.
60	The DOE has not chosen to warn the future about the hazardous of radiation, but to warn them away from the sites of radioactive burial grounds. Here one could argue that the DOE is not only predicting the geological nature of the earth but also attempting to predict the future of human communication. Guardianship requires that citizens become more actively part of radioactive waste management. And for the future, a deliberate transferal of knowledge about nuclear dangers is paramount: that radioactivity must not escape into the biosphere, or it will have adverse effects, many of which we in the present have already experienced. And in passing this information on, we keep the knowledge alive.	The RFCA Parties agree that it is important to maintain and make available to future users information regarding the Site's history and environmental conditions, specifically including information on contamination remaining after cleanup. This information will be maintained as part of the Site's required Administrative Record File. Signage, if appropriate, for Rocky Flats post-closure will be determined as part of the CAD/ROD and its long-term stewardship requirements.

86.a	It is uncertain what impact the US Fish and Wildlife Service (USFWS) will have on the site, its visitors, its volunteers, its workers, and the surrounding area, and the potential for migration of uncharacterized contamination and/or under-remediated contamination off the wildlife refuge. Will new invasive species of wildlife or plants be introduced or controlled? If species are added or uncontrolled what effects will there be on erosion, burrowing, car[ry]ing capacity, increased off-site animal migration, etc.? Will there be increased usage of groundwater, surface water? Will there be additional water needed, stored and retained on site above and or in potential contaminated pathways? Will additional food be imported increasing the possibility of its being contaminated and spread off-site by wind, water, or wildlife? Will the preservation and development of wildlife habitat interfere or limit cleanup activities? This is of particular interest because of the way the wildlife refuge worker has reduced the protectiveness of the soil action levels away from a more protective level that might be set for a family of subsistence farmers. Which in light of a quarter of million years of danger from radioactive decay is a far more realistic level of protection. Will habitat changes cause flooding, new wind pathways, impacts to groundwater and surface water?	DOE will retain administrative jurisdiction over portions of Rocky Flats after the Site is transitioned to a National Wildlife Refuge, per the requirements of the Refuge Act. The Act requires that activities on the Refuge comply with any response actions taken by DOE. Fish and Wildlife Service activities on the portions of Rocky Flats that will be managed only by the Service will be determined as part of the Comprehensive Conservation Plan (CCP) for the Refuge. The CCP is now being prepared by the Service with public involvement and contact information is provided in the response to comment 5.Q.1, Category F. The Parties also analyzed the risk from plutonium soil contamination to a hypothetical rural resident. The RFCA Parties have calculated that surface soil cleanup to 50 pCi/g will fall within the CERCLA prescribed risk range for the rural resident. The subsurface will be well-characterized prior to closure, and will be remediated to be protective of the reasonably maximally exposed person, the refuge worker, as well as to ensure that surface water is protected and to ensure that contamination is not exposed due to erosion events.
86.b	It is highly uncertain how in a so-called "adequate remedy" heavily dependent on containment, monitoring, and institutional controls that there will be enough monies and/or resources to accomplish the pivotal tasks needed to ensure that this "adequate remedy" has no failures. I know of no way that Congress can or will provide guaranteed long-term funding in order to safeguard this site and provide	DOE is committed to maintain post-cleanup controls. DOE recognizes the community's concern regarding assuring funding for long-term stewardship. DOE cannot commit to developing a dedicated fund, but will submit requests for appropriate funding related to post-closure activities.

	long-term stewardship. If containment fails, if institutional controls fail, if action levels were not protective enough and need new remediation it will have been Rocky Flats greatest failure and our most despicable legacy to the future.	
86.c	It is uncertain how to judge if the decisions and actions taken are in fact protective. Will there be large long-term epidemiological studies? Will they have enough statistical power to make them meaningful? If so, how will they be funded? Will they study visitors, workers, and the proximate population? Will there be community Health monitoring? How will soil remediation dust and contaminates be monitored and contained?	Changes to standards, guidance or policy resulting from emerging epidemiological evidence, as it relates to the risk posed by contamination at Rocky Flats, will be one of the subjects addressed in the remedy review required by CERCLA. DOE-Rocky Flats is currently working with the U.S. Fish and Wildlife Service to analyze mule deer tissue samples recently collected at Rocky Flats for radionuclides. This sampling will be performed as part of the Level 3 contaminants survey prior to transfer of Rocky Flats for use as a National Wildlife Refuge. Based on observations of wildlife at Rocky Flats, the RFCA Parties do not believe that a long-term program, such as the one described, will be necessary.
86.d	Cease all USFWS activities until the cleanup is complete and a comprehensive detailed 100-year plans has been submitted by USFWS for public comment.	The RFCA Parties believe that upon completion of cleanup the land will be safe for use as a wildlife refuge.
90	Finally, if the RFCA Parties reject the foregoing recommendations in favor of the partial cleanup they have proposed, we recommend that as a condition of moving ahead they work with the affected public to establish a rigorous long-term stewardship program that includes a plan to research technology needed for better site cleanup as well as assured and dedicated funding to cover all long-term stewardship costs, including contingencies.	Since this comment is similar to comments 1.b and 15, Category F, please see the response to those comments.
91.a	<u>LONG-TERM STEWARDSHIP</u> Long-term stewardship is a key concern for Broomfield. Residual contamination will remain at the site for future generations to monitor and maintain. We	DOE also recognizes the community's desire to have a local DOE presence following closure. No decision has been made as to whether onsite personnel will be assigned. Similarly, no decisions have been made regarding the fate of the reading room.

	appreciate the efforts that have been made to draft a *Long-Term Stewardship Plan*, but the goals and objectives of the plan have yet to be clearly identified. Our key concern post-closure is that DOE have a presence at the site to disseminate information pertaining to activities associated with residual contamination. We expect to receive information directly from DOE. In addition, we expect DOE to maintain and fund a reading room for us to access information readily. We suggest DOE work with the impacted governments to determine their information needs and incorporate this information into the Rocky Flat's Stewardship Plan. We support the delineation of lands requiring continuing restrictions and some form of institutional controls. We also reiterate the comments of the Coalition letter dated January 6, 2002, specifically related to stewardship. It is imperative to establish a long-term stewardship milestone in the draft RFCA language. The milestone should include a schedule and a set of criteria to clearly define the objectives of a long-term stewardship plan. It is imperative DOE continue a presence at the site post-closure. We also support layering of stewardship controls in the event a control would fail. We believe DOE has taken great measures to work with us to develop a *Long-term Stewardship Strategic Plan,* and we appreciate their efforts. Broomfield will continue to work with DOE to identify the goals and objectives of a strong enforceable plan to ensure residual contamination does not pose an unacceptable risk to our community. We recommend DOE work closely with the asset holders to develop the objectives of the plan. We also recommend the plan clearly define the	DOE will consult with the community regarding the information process suggestions presented in this comment and the ways in which information needs could be met. The Strategy is a policy document that is being prepared by DOE in consultation with the other RFCA Parties and with the community. The Strategy will help inform the RFI/RI-CMS/FS. DOE believes that it is important to continue to develop the Strategy in a timely fashion. However, a milestone for the Strategy is outside the scope of the modifications to RFCA Attachments, but will be discussed amongst the RFCA Parties. The need for and extent of specific institutional controls and other long-term stewardship activities, such as monitoring, maintenance, information management and remedy review, have not been determined and will be analyzed in the RFI/RI-CMS/FS. The types of controls anticipated are found in Attachment 5, Section 1.2 and listed in the response to 30.a, below. The RFCA Parties anticipate that enforceable post-closure requirements will exist to ensure the protectiveness of the remedy in accordance with the CERCLA remedy selection process and the corrective action and closure process in RCRA/CHWA. The RFCA Parties will continue to use the consultative process to discuss the post-closure regulatory approach. Appropriate requirements will be contained in all final CAD/RODs and in any modified RFCA Agreement consistent with RFCA Paragraph 286. As of May 2003, DOE and CDPHE have not reached agreement as to whether a post-closure permit (or, alternatively, an enforceable document as defined in 6 CCR 1007-3, § 100.10(d)) will be required for Rocky Flats, and if so, whether that permit (or enforceable document) will also contain appropriate requirements for institutional controls and other long-term stewardship activities. The parties will endeavor to resolve this matter. Failing an agreed upon resolution, each party reserves its rights as provided in RFCA Part 18. DOE is committed to implement appropriate controls on post-

	mechanism for DOE to disseminate information to these impacted governments post-closure. Broomfield offers its assistance with the development of the plan and identifying the needs of our government post-closure. To ensure the effectiveness of the remedy post-closure, Broomfield requests the following information process be developed and implemented: 1. Continue quarterly data exchange meetings for impacted stakeholders for the first three years. Local governments, the regulators, and DOE should reevaluate the schedule at the end of this time period. 2. Provide an annual report to the general public to include all stewardship activities. 3. Continue 48-hour pre-discharge notification of pond releases as outlined in the current IMP. 4. Maintain a reading room and work with us to identify our record needs. 5. Notification shall be made within 24 hours in the event of implementing a contingency plan in the event of a water standard exceedance, triggering a surface water evaluation, failure of a treatment unit, or any other unplanned event or upset. 6. Notification shall be made directly from DOE to Broomfield when media is being exchanged from the treatment units. 7. The CERCLA review shall be performed every three years for the first nine years. Local governments, the regulators, and DOE should reevaluate the schedule at the end of this time period.	closure hazards and will integrate those controls to ensure their long-term success. It is DOE Policy to use institutional controls as essential components of a defense in depth strategy that uses multiple, relatively independent layers of safety to protect human health and the environment. This strategy uses a graded approach to attain a level of protection appropriate for the risks involved. The RFCA Parties will consult with the community regarding the need for a review more frequent than the 5 year period required by CERCLA. The frequency of CERCLA reviews will be contained in all final CAD/ROD(s).
91.b	7. Page 5-4, ¶ Environmental Covenant Broomfield supports Section 25-15-320, C.R. S.,	As of May 2003, CDPHE and DOE have not yet come to agreement on the applicability of the State environmental

	the states' environmental covenant. The covenant will provide layering of institutional controls.	covenant to the Federal government. DOE and CDPHE hope to reach an agreed upon resolution. Failing an agreed upon resolution, each party reserves its rights as provided in RFCA Part 18.
91.c	39. Figure 1 We agree with the proposed boundaries that will be subject to institutional controls. We also understand the map may be modified in the final CAD/ROD.	No response is needed.

RFCA Attachment Proposed Modifications

Response to Comments

Category: G. Commitment to greater level of cleanup if technology allows

Commenter No.	Comment(s)	Response
13	As a citizen who has lived in the Boulder Denver area for 24 years, I am horrified again to learn that the DOE is once again skimping on the clean up plans for the Rocky Flats site. We the people let this plant run for year after careless, dishonest year, with lazy standards of care and handling of poisons that live a quarter of a million years. We the people must do all that is possible to right our wrongful acts of the last 50 years at Rocky Flats. Let's be honest about the mess we have made of our air, water and soil at the Flats, and then be scrupulous about repairing our mistakes. We are the ones who must bare the burden of the mess the last lazy ones left us. To do less that the most careful job here, will bring shame and strange sorry repercussions on us, our families and thousands in the generations that follow us. We must buy the technology and skill necessary for this job to be done completely, and then watch dog those people to make certain that they perform as well	The risk-based approach in the final RFCA Attachment 5 modifications is based upon a wildlife refuge as the foreseeable future land use and the wildlife refuge worker as the reasonably maximally exposed person. Based on the Refuge Act, this use is certain for the foreseeable future and resistant to change. The Parties also analyzed the risk from plutonium soil contamination to a hypothetical rural resident. The RFCA Parties have calculated that surface soil cleanup to 50 pCi/g will fall within the CERCLA prescribed risk range for the rural resident.

	as they are contracted. We all know there is now way to beat this deadly reaper, but head on.	
21	Finally, if the RFCA Parties reject the foregoing recommendations in favor of the partial cleanup they have proposed, we recommend that as a condition of moving ahead they work with the affected public to establish a rigorous long-term stewardship program that includes a plan to research technology needed for better site cleanup as well as assured and dedicated funding to cover all long-term stewardship costs, including contingencies.	DOE recognizes that since decisions regarding long-term stewardship activities have yet to be made there will continue to be some concerns in the community related to contamination that is not removed based upon the risk-based approach. However, DOE is committed to maintain post-cleanup controls. DOE has been developing a Rocky Flats Long-Term Stewardship Strategy (Strategy), in consultation with the community and CDPHE and EPA. The Strategy contains information about the elements of draft long-term stewardship plans for Rocky Flats. The RFCA Parties will continue this consultation in the development of the Rocky Flats long-term stewardship plans. The RFCA Parties anticipate that reviewing environmental remediation technology will be part of the periodic review that will be conducted at the Site as prescribed by CERCLA. DOE recognizes the community's concerns regarding assuring funding for long-term stewardship costs. DOE cannot commit to developing a dedicated fund, but will submit requests for appropriate funding related to post-closure activities.
5.A	We also believe that Rocky Flats could function as a continued environmental testing site for contaminated materials where new remediation technologies perhaps could be used to continue the clean-up.	The use of the Site to help develop and test new remediation technologies after closure, assuming that such activities are consistent with the needs of the remedy and with management of the larger Site as a Refuge, has not been determined. No specific proposals for such testing have been made at this point. While no specific criteria for technology deployment have been developed, DOE anticipates that new technologies would most likely be used in one of the following circumstances: 1) If a remedy fails, and new technology is appropriate for addressing such a failure; or, 2) If a new technology emerges that promises to lower the overall cost of long-term stewardship obligations. DOE would probably not deploy new technologies only to further

		improve an already protective cleanup. However, DOE does not plan at this time to fund any new remediation research or other technologies after closure.
5.U.1	Another question: Do you have a plan right now to periodically assess the state of clean-up technology and to apply new technologies for more clean-up at Rocky Flats in the future? I'm glad you're looking at that, Joe, but what I'm referring to is post-closure. Do you have a plan for doing that post-closure? But, from what I gather, you do not, at this point, have a plan and a stated commitment to apply that technology at Rocky Flats.	The RFCA Parties anticipate that a review of cleanup technologies will take place as part of the periodic review of the remedy required by CERCLA after closure. No specific scope for these reviews has been decided upon yet.
5.U.2	We need to make sure we have the very best clean-up that we can get. We either need to have it now or in the future, and we shouldn't be asked to trade off clean-up at Rocky Flats for clean-up at any other site. There's no reason for us to have any trade-offs.	The RFCA Parties have determined that the accelerated action approach in the RFCA Attachment 5 modifications will be protective of human health and the environment, and that the land will be suitable for use as a National Wildlife Refuge. While long-term stewardship will be needed for the Site, this would be true of any practical approach to Site remediation. There is not a trade-off of cleanup at Rocky Flats, either for long-term stewardship or for cleanup at another Site. There is, however, a finite Site budget that allows for a conservative, compliant cleanup.
30.a	Continued Research Data for Recom 34 - The Board believes that important continued research programs should be included as enforceable provisions in regulatory agreements that are developed for the stewardship program. Recommendations 34 through 37 identify specific research programs that are recommended by the Board. <u>Recommendation 34(*)</u>: The Board recommends DOE include continued research into ecologically sensitive	The RFCA Parties will continue to use the consultative process to discuss the post-closure regulatory approach. The need for and extent of specific institutional controls and other long-term stewardship activities, such as monitoring, maintenance, information management and remedy review, have not been determined and will be analyzed in the RFI/RI-CMS/FS. The types of controls anticipated are found in Attachment 5, Section 1.2 and listed in the response to 30.a, below. The RFCA Parties anticipate that enforceable post-closure requirements will exist to ensure the protectiveness of the remedy

	cleanup technologies as a necessary part of the long-term stewardship program and commit to employing new technologies should they prove effective in moving toward the ultimate goal of cleanup to background.	in accordance with the CERCLA remedy selection process and the corrective action and closure process in RCRA/CHWA. The RFCA Parties will continue to use the consultative process to discuss the post-closure regulatory approach. Appropriate requirements will be contained in all final CAD/RODs and in any modified RFCA Agreement consistent with RFCA Paragraph 286. As of May 2003, DOE and CDPHE have not reached agreement as to whether a post-closure permit (or, alternatively, an enforceable document as defined in 6 CCR 1007-3, § 100.10(d)) will be required for Rocky Flats, and if so, whether that permit (or enforceable document) will also contain appropriate requirements for institutional controls and other long-term stewardship activities. The parties will endeavor to resolve this matter. Failing an agreed upon resolution, each party reserves its rights as provided in RFCA Part 18. However, DOE does not believe that continued research programs should constitute enforceable commitments, inasmuch as they will likely not be required for ensuring that the remedy remains protective. DOE's goal during long-term stewardship is to ensure that the remedy remains protective, not to continue cleanup to background. While no specific criteria for technology deployment have been developed, DOE anticipates that new technologies would most likely be used in one of the following circumstances: 1) If a remedy fails, and new technology is appropriate for addressing such a failure; or, 2) If a new technology emerges that promises to lower the overall cost of long-term stewardship obligations. DOE would probably not deploy new technologies only to further improve an already protective cleanup. However, DOE does not plan at this time to fund any new remediation research or other technologies after closure.
30.b	Recommendation 7: RFCAB recommends DOE	DOE anticipates continuing to refine the soil vacuum technology,

	carefully examine and apply technologies other than soil excavation (for example, soil vacuuming) for areas where the plutonium contamination is less than 50 pCi/g. We further request that tests of these technologies be open to outside observers and that DOE provide quarterly updates to the Board on the progress of these tests.	and hopes that it will prove to be an effective, environmentally-sensitive alternative to excavation for remediation of surface soil contamination. DOE does not, however, anticipate using this or other techniques to remediate surface soils that are shown to have less than 50 pCi/g of Pu. Any tests of remediation technologies would be made available to outside observers, where practicable.
48	The current plan calls for inadequate clean up, in order to save money and hasten our forgetting of the contamination resting there. I urge that the plan be changed to allow for the most thorough clean up technically possible at this time and that the planners lobby for the money and time needed to protect this present generation's health and that of countless future generations as well.	The RFCA Parties have determined that the accelerated action approach in the RFCA Attachment 5 modifications will be protective of human health and the environment, and that the land will be suitable for use as a National Wildlife Refuge.
51	3. Lack of a 'stewardship' plan Because of the long-lived danger of Plutonium, the cleanup done now will affect people in the Denver metro area essentially forever. Funding provisions should be built into the current Rocky Flats cleanup proposal to ensure a long-term stewardship program that includes ongoing monitoring as well as additional future clean-up when more advanced technologies become available. Funding for onsite research on such technology should be an integral part of the long-term stewardship program. The long-term stewardship program should also include ongoing research on adverse health effects to human, animal, or plant life from exposure to contaminants in the Rocky Flats environment. Such research could include collection and publication of data from a voluntary screening program for people who work at, visit, or live near the site, as well as a data base	The RFCA Parties have determined that the accelerated action approach in the RFCA Attachment 5 modifications will be protective of human health and the environment, and that the land will be suitable for use as a National Wildlife Refuge. While appropriate long-term stewardship will be needed for the Site, this would be true of any practical approach to Site remediation. There is not a trade-off of cleanup at Rocky Flats, either for long-term stewardship or for cleanup at another Site. There is, however, an anticipated Site budget that allows for a conservative, compliant cleanup. DOE's goal is to ensure that the remedy remains protective post-closure, not to continue cleanup to background. While no specific criteria for technology deployment have been developed, DOE anticipates that new technologies would most likely be used in one of the following circumstances: 1) If a remedy fails, and new technology is appropriate for addressing such a failure; or, 2) If a new technology emerges that promises to lower the

	showing the body burdens of wildlife from the site. Particular attention needs to be paid to possible genetic effects in all species.	overall cost of long-term stewardship activities.
56	Finally, if the agencies reject the foregoing [cleanup to the subsistence farmer scenario] in favor of the partial cleanup they have proposed, I recommend that as a condition of moving ahead they work with the affected public to establish a rigorous long-term stewardship program that includes a plan to research technology needed for better site cleanup as well as assured and dedicated funding to cover all long-term stewardship costs, including contingencies.	The RFCA Parties have determined that the accelerated action approach in the RFCA Attachment 5 modifications will be protective of human health and the environment, and that the land will be suitable for use as a National Wildlife Refuge. While long-term stewardship will be needed for the Site, this would be true of any practical approach to Site remediation. There is not a trade-off of cleanup at Rocky Flats, either for long-term stewardship or for cleanup at another Site. There is, however, a finite Site budget that allows for a conservative, compliant cleanup. DOE's goal is to ensure that the remedy remains protective post-closure, not to continue cleanup to background. While no specific criteria for technology deployment have been developed, DOE anticipates that new technologies would most likely be used in one of the following circumstances: 1) If a remedy fails, and new technology is appropriate for addressing such a failure; or, 2) If a new technology emerges that promises to lower the overall cost of long-term stewardship activities.
61	Recommendation 3: The federal government should continue to pursue new technology to improve cleanup at the site with the long-term goal of cleanup to average background level. The current state of technology and the possibility of improving site conditions should be reviewed regularly. Such reviews should be stipulated in a legally binding document such as the Record of Decision (ROD).	DOE's goal is to ensure that the remedy remains protective post-closure, not to continue cleanup to background. While no specific criteria for technology deployment have been developed, DOE anticipates that new technologies would most likely be used in one of the following circumstances: 1. If a remedy fails, and new technology is appropriate for addressing such a failure; or, 2. If a new technology emerges that promises to lower the

		overall cost of long-term stewardship activities. DOE would probably not deploy new technologies only to further improve an already protective cleanup. However, DOE does not plan at this time to fund any new remediation research or other technologies after closure.
85	In regard to neutron, proton and photon proposed transmutation techniques. Dr. Roy knew about these various schemes and told me why his Roy Process (photon method) is the best way to go. Both the neutron and proton methods only partially reduce half-life and creates more nuclear waste to be buried for an uncertain future. The Roy Process transmutes 100% of each isotope. With repeated treatment plutonium 239 can be transmuted into non-radioactive lead, producing heat which can power the existing electric generators at each nuclear power plant where the waste is stored. The Roy Process patent application (apparatus & theory) contains completed electrodynamic calculations for Pu239, Sr90 and Cs137. Others treated by the same method. It is available to a company capable of realization who contracts with us. A brief description is below: **THE ROY PROCESS BRIEF DESCRIPTION** Is there a safe process to get rid of nuclear waste? Maybe! One possible solution is a process invented by Dr. Radha R. Roy, former professor of Physics at Arizona State University, and designer and former director of the nuclear physics research facilities at the University of Brussels in Belgium and at Pennsylvania State University. Dr. Roy is an internationally known nuclear physicist,	While it may be applicable to other radioactive isotopes, to our knowledge, the process of transmutation has yet to be demonstrated as a cost-effective method for converting plutonium/americium into non-radioactive lead.

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	consultant, and the author of over 60 articles and several books. He is also a contributing author of many invited articles in a prestigious encyclopedia. He is cited in American Men and Women of Science, Who's Who in America, Who's Who in the World and the International Biographical Centre, England. He has spent 52 years in European and American universities researching and writing recognized books on nuclear physics. He has supervised many doctoral students. Roy invented a process for transmuting radioactive nuclear isotopes to harmless, stable isotopes. This process is viable not only for nuclear waste from reactors but also for low-level radioactive waste products. In 1979, Roy announced his transmutation process and received international attention. The Roy process does not require storage of radioactive materials. No new equipment is required. In fact, all of the equipment and the chemical separation processes needed are well known. What's the basis for the Roy Process? If you examine radioactive elements such as strontium 90, cesium 137 and plutonium 239, you will see that they all have too many neutrons. To put it very simply, the Roy process transmutes these unstable isotopes to stable ones by knocking out the extra neutrons. When a neutron is removed, the resulting isotope has a considerably shorter half-life which then decays to a stable form in a reasonable amount of time. How do we knock out neutrons? By bombarding them with photons (produced as x-rays) in a high- powered	

	electron linear accelerator. Before this process, the isotopes must be separated by a well-known chemical process. It is feasible that portable units could be built and transported to hazardous sites for on-site transmutation of nuclear wastes and radioactive wastes. To give an example, cesium 137 with a half-life of 30.17 years is transformed into cesium 136 with a half-life of 13 days. Plutonium 239 with a half-life of 24,300 years is transformed into plutonium 237 with a half-life of 45.6 d a y s. Subsequent radioactive elements which will be produced from the decay of plutonium 237 can be treated in the same way as above until the stable element is formed. The Roy Process could be developed in three distinct phases, according to Roy. Phase I consists of a theoretical feasibility study of the process to obtain needed parameters for the construction of a prototype machine. Phase II will involve the construction of a prototype machine and supporting facilities for demonstrating the process. Phase Ill will consist of the construction of large scale commercial plants based on the data obtained from Phase II. Cost estimates for Phase I and II are in the neighborhood of $10 million. For Phase Ill, Roy estimates a cost of $70 million. Says Roy, 'It will be interesting to do a cost analysis of eliminating nuclear waste by using my process and by burying it for 240,000 years - ten ha if-lives of plutonium - under strict scientific control. There is also an ethical question: can we really burden the thousands of	

	generations yet to come with problems which we have created? There is no God among human beings who can guarantee how the geological structure of waste burial regions will change even after ten thousand years, not to mention 240,000 years."	

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RFCA Attachment Proposed Modifications

Response to Comments

Category: H. Funding and use of potential savings

Commenter No.	Comment(s)	Response
1	Further, in revising the end-state, the Coalition trusts DOE's assertion that the funds available for the cleanup of Rocky Flats are limited to an amount roughly equal to the current contract between DOE and Kaiser-Hill, currently valued at $3.963 billion. This limitation, we understand, necessitates developing a new end-state configuration that will not result in a net change to the overall target cost of the closure contract (hereafter called "revenue neutral"). We continue to struggle with what changes could be made so that the revised end-state will be revenue neutral. While the answer remains unclear, we expect that the individual cost of each remediation project shall be provided to us detailing the actual cost versus the estimated costs and any cost savings realized. If the cost of remediation for the entire site cost less than target costs, the federal government's share of such savings should be used for additional remediation at Rocky Flats.	The RFCA Parties believe that the proposed new RSALs and risk-based approach described in the final modifications to RFCA Attachments can be implemented within the current projected closure project budget resources. The conduct of accelerated actions in accordance with the final modifications will result in more risk reduction than would be achieved under the former RSAL and RFCA accelerated action requirements. However, based on the *Results of the Interagency Review of Rocky Flats Radionuclide Soil Action Levels,* September 30, 2002, cleanup to the 1996 RSALs or the new, lower RSALs would result in risks within the CERCLA risk range for a reasonably anticipated future user, the wildlife refuge worker. The entire scope of the closure project contract, including packaging and transfer of special nuclear materials, decontamination and demolition of all buildings and management of all waste, and completion of environmental restoration scope must be completed within the target cost. The estimated costs for conducting cleanup at Individual Hazardous Substance Sites do not form a basis for determining savings that are available to be applied to additional remediation. Savings can only be determined upon completion of all contract scope. DOE believes that if the closure project is completed for below the target cost it is most appropriate to make funds available to reduce high priority risks at other DOE Sites.
15.a	Call on DOE to apply the full $7 billion dollars allocated for closure of Rocky Flats on cleanup and closure activities at the site.	Since the subject matter of this comment is similar to that of Comment 1, Category H, please also see that response. The $7 billion referred to is the estimated total to complete cleanup and

		closure work in the scope of the 2000 closure project contract, and the preceding 1995 integrated management contract. All funds allocated for Rocky Flats were and are being applied to cleanup and closure activities at the site. The goal of the project is not to assure that the anticipated budget for the closure project contract target cost is spent at Rocky Flats. The DOE is committed to find ways to perform work in a manner that possibly could reduce the cost of the closure project. Any budget that does not have to be devoted to Rocky Flats is available to reduce high priority risks at other DOE Sites.
15.b	If the above cannot be accomplished with funds currently available, the government RFCA Parties should estimate the cost and seek public support to get the requisite funding from Congress.	Since the subject matter of this comment is similar to that of Comment1, Category H, please also see that response. The RFCA Parties understand that some in the community do not accept a cleanup and closure that does not remove all contamination, but meets all regulatory requirements. The final modifications to RFCA Attachments will result in a safe and environmentally compliant cleanup and can be implemented to meet a target completion date of 2006. Correspondence from Senator Allard and Congressman Udall to the RFCA Parties dated December 16, 2002, emphasizes that there are very serious limitations on the federal budget.
3	I continue to support and recommend the following: • That the full $7 billion appropriated for closure be spent on cleanup and closure activ[ities] at Rocky Flats. • That, if necessary, the agencies seek additional funding from Congress	Since the subject matter of this comment is similar to that of Comment 15.a, Category H, please see that response. The RFCA Parties agree that if additional actions are necessary to adequately protect human health and the environment and to comply with legal obligations, then DOE will seek the appropriate funds needed to take these actions. We have determined that additional funding is not necessary to implement these modifications to RFCA Attachments, including establishment of an RSAL that is 13 times lower than the 1996 RSAL. We expect accelerated actions to remove sufficient soil contamination will result in a lifetime excess cancer risk well within the CERCLA-required risk range to either a hypothetical rural resident or to a wildlife refuge worker.
18	I am a resident of Boulder, and would like to express my concern about the level of clean up at Rocky Flats that the DOE is proposing. The Rocky Flats area is so close to a couple million people, one would think that the	Since the subject matter of this comment is similar to that of Comment 15.a, Category H, please also see that response. Implementing accelerated actions in accordance with the final modifications to RFCA Attachments will result in a safe and

	commitment to cleaning up the site to truly safe levels would be a #1 priority. While the expenses of such a clean-up are high, we should be allocating funds for things like that as opposed to military build-ups. The fact that many people are unaware of the dangers inherent in an incomplete clean-up should not be used as a justification for that inadequate clean-up. We live here, and we are American citizens. Part of "homeland security" is the knowledge that we are doing what we can as a society to assure a safe environment for a major metropolitan area. Therefore, put me on a record as a concerned citizen who wants the remaining plutonium levels (which we shall live with for tens of thousands of years) at the Rocky Flats site to be no more than 5 picocuries per gram, who wants you to not restrict clean-up efforts to an arbitrary ending time (but to go on as long as is required) or to a budgetary figure that may not be enough, and who wants you to thoroughly clean all remaining buildings, waste pipelines, and toxic soils--all of these considerations to bring about an adequate and safe clean-up of an area so close within metropolitan Denver.	environmentally compliant cleanup.
16	Conducting the cleanup on a fast-track basis with rewards for quicker cleanup and penalties for slower cleanup creates an almost certain potential for inadequate cleanup.	The adequacy of the cleanup is governed by RFCA and the CDPHE and EPA. The decisions regarding what and how much to clean up are made by the regulatory RFCA Parties after consultation and proposed actions are submitted. In addition, DOE and the regulatory agencies maintain oversight and approval of accelerated actions to control the conduct, quality and final results of each cleanup action. The cleanup must also meet all appropriate legal requirements.
12	The full $7 Billion dollars needs to be applied to this site so that all surface and subsurface soil reads less than 5 picocuries per gram, allowing this site to be safe for all uses that may come up in the future. It should be cleaned up to the maximum extent possible. If the $7 Billion is not enough we need to allow the citizens to decide how much	Since the subject matter of this comment is similar to that of Comment 15.a, Category H, please also see that response. The final modifications to RFCA Attachments do not minimize cleanup, but result in more risk reduction than would be achieved under the former RSAL and RFCA accelerated action requirements.

	to spend; it is Our money and OUR PLANET!! This is not just about minimizing the cost of cleanup, this is about saving both future inhabitants and the planet itself. Do the right thing and Clean UP Rocky Flats Properly! Our future is at stake.	
21	We call on DOE to apply the full $7 billion dollars allocated for closure of Rocky Flats on cleanup and closure activities at the site. If the above cannot be accomplished with funds currently available, the government RFCA Parties should estimate the cost and seek public support to get the requisite funding from Congress.	Please see response to Comment 18, Category H.
5.A.1	Our first recommendation deals with funding. The board has, in the past, said that, if possible, we would like to see the clean-up, both surface and subsurface, go to one chance in a million of cancer, ten to the minus sixth. The first thing that we are recommending is that we would like to see DOE show us what the cost of that would be. We understand that they made the statement that the budget, at current, doesn't support that kind of a clean-up, but we would at least like to see what that would cost.	An estimate of the cost to clean up the surface and subsurface to result in a lifetime excess cancer risk to a rural resident of less than $1x10^{-6}$ can be roughly computed based on estimates to remove the diffuse Pu-239/240 surface soil contamination in the eastern buffer zone to below 5 pCi/gm. This cost is estimated to be more than $500 million and could be more than $1 billion for the dispersed contamination at the 903 lip area alone. This is based upon the approximate additional acreage (between 450 acres at 5-10 pCi/gm and 1,000 acres at 1-5 pCi/gm) from which soil would have to be removed and by using standard excavation techniques plus disposal costs. The estimated excavation depth is 6 inches. While DOE may be able to implement cleanup methods that do not result in full excavation (e.g., soil vacuuming), the effectiveness, cost, schedule and implementability of alternatives is not known, and may not be any less expensive. Additional soil removals to achieve this risk level would raise the estimated cost to several billion dollars. The RFCA Parties note that the action levels are used to trigger an accelerated action, and while the goal of an accelerated action is to reduce soil contamination (where soil removal is the accelerated action) to levels that will achieve at least a $1x10^{-5}$ risk, in many instances the removal process will result in more than just the

		minimum amount of contamination being removed.
5.A.2	The second recommendation is we'd like to see that the full money that's been budgeted for Rocky Flats clean-up is spent on Rocky Flats clean-up. The current contract calls for about 3.9 billion dollars be spent on clean-up. If they were to come in under that budget, which is a possibility, we'd like to see them spend the additional funds on additional clean-up. As a minimum, the board would like to see the approximately $340,000,000 that's been budgeted for environmental restoration on the surface and subsurface be spent on that clean-up. The board would also like to see more cost estimates from DOE so that we're able to evaluate these trade-offs. In effect, the community is being asked to make a trade-off here. Do we want to see more surface clean-up and less subsurface clean-up? We don't feel that we can fully evaluate this trade-off we're being asked for without knowing what the costs are going to be.	Since the subject matter of this comment is similar to that of Comment 1, Category H, please also see that response. The RFCA Parties have evaluated the baseline cost estimates for the soil removal work that is expected to result from the modifications to RFCA Attachments and believe that the resulting scope change does not substantially impact the current baseline estimate. These are the best estimates available and they have been shared with the communities. We note that some work will ultimately cost more than currently estimated and some work could cost less. A good example of increased costs and scope is the current accelerated action being implemented at the 903 Pad, which is being conducted to achieve results consistent with the new, lower RSAL in the final modifications to RFCA Attachments. With approximately 40% of the area requiring excavation completed, about 80% of the volume actually removed for disposal likely would not have been removed under the 1996 RSAL (651 pCi/g). Based upon the RFCA Parties' review and consideration of the baseline cost estimates, the cost estimates to implement these modifications to RFCA Attachments and the reasonableness of the underlying assumptions and cost basis are no more accurate than the current baseline estimates used to make the comparisons.
5.B.1	There's also a hidden history about Rocky Flats clean-up. To get assured funding from Congress for clean-up and closure of Rocky Flats, the Department of Energy and the contractor, Kaiser-Hill, agreed to meet three conditions: Close the site by the arbitrary date of 2006; complete all closure activities for the fixed sum of seven billion dollars; curtail conflict in the community. This agreement was made without consulting the affected public and without determining the requirements of a real clean-up.	The RFCA Parties believe careful project planning and project execution based upon clear goals and expectations is the appropriate approach to achieving a "real cleanup". The RFCA Parties believe that demonstrated good performance in executing the plan resulting in substantially accelerated risk reduction is the reason Congressional support is so strong, as reflected by the Rocky Flats budget. However, funding through the federal budget process is never assured. The closure date is not arbitrary. It is based upon careful consideration of the scope of work and a balance of project risks and potential rewards for successful performance, including consideration

		of opportunities for development of faster, better, more cost-effective ways to conduct work safely. There is neither a "hidden history" nor any agreement to "curtail conflict in the community". The Rocky Flats closure plan was formulated in consultation with Congress and with full recognition of community priorities.
5.B.2	Priority in spending has been gone to security, removal of weapons material and bomb-production waste, and demolition of buildings. It is only the funds left over -- $473,000,000, or not quite 7 percent of the 7 billion total -- that are designated for clean-up of soil and water.	By far the greatest risks posed by Rocky Flats activities relate to safely placing and maintaining weapons useable special nuclear material in forms required for shipment and transfer to designated off-site storage facilities. The cost of performing this responsibility is very expensive when compared to mitigating the risks posed by low levels of contamination in soil and water on the Rocky Flats Site. However, it will still require hundreds of millions of dollars to conduct that part of the cleanup. The RFCA Parties do not understand the relevance of a percentage comparison in this regard. However, we have observed that the cost per gram to remove plutonium from soil and water is orders of magnitude higher than the cost per gram of special nuclear material security, removal of weapons material and wastes, and the demolition of contaminated buildings.
5.B.3	Funding, closure, and clean-up: The RFCA Parties say we are getting the best clean-up possible for the limited sum available. DOE now says clean-up and closure are ahead of schedule and that the site may close early, with a possible savings of $210,000,000. This sum, we are told, is not available to get a better Rocky Flats clean-up, and my comment is: Several times over the past two years the RFCA Parties have been urged to seek the funding required to accomplish a better clean-up. This proposal has been met with scorn. It was not until June 2001 that the DOE explicitly revealed to the focus group that clean-up was limited by the fixed sum available and that this necessitated trade-offs. "Bringing this out in the open," a DOE person later said "was like throwing a dead rat on the table."	The goal of the Rocky Flats cleanup and closure project is to complete all work necessary to achieve a safe, fully compliant cleanup by the target date of December 15, 2006. If additional actions are necessary to adequately protect human health and the environment and to comply with legal obligations, the DOE will seek the appropriate funds needed to take these actions. The goal is not to assure that the anticipated budget for the closure project contract target cost is spent at Rocky Flats. We are committed to find ways to perform work in a manner that possibly could reduce the cost of the closure project. Any budget that does not have to be devoted to Rocky Flats is available to reduce high priority risks at other DOE Sites.

	Had the DOE worked with the public back in 1995, '96, or maybe '94, '96, to determine the cost of a real clean-up and then secured public support to seek the requisite funding from Congress, the resultant clean-up would be an object of pride and a fit model for other sites. It would also be the outcome of a more democratic public process.	
5.B.4	Fourth: Apply the full seven billion allocated for closure of Rocky Flats on clean-up and closure activities at the site.	Please see response to Comment 21, Category H.
5.B.5	Fifth, if the above [1. Characterize entire site; 2. Clean up to resident subsistence farmer scenario = less than 5 pCi/g in surface and subsurface; 3. Remove all process waste lines; 4. Apply full seven billion allocated to closure of Rocky Flats on cleanup and closure activities at the site] cannot be accomplished with funds currently available, DOE should estimate the cost and seek public support to get the requisite funding from Congress.	Please see response to Comment 21, Category H.
5.B.6	We need to make sure we have the very best clean-up that we can get. We either need to have it now or in the future, and we shouldn't be asked to trade off clean-up at Rocky Flats for clean-up at any other site. I want Oakridge cleaned up. I want Hanford cleaned up. I want the test site cleaned up. I want Rocky Flats cleaned up. There's no reason for us to have any trade-offs. I sat in numerous meetings when DOE agreed to the budget for Rocky Flats, and they signed the contract with Kaiser-Hill, and that budget and the contract was based on a 650-picocurie level. I heard DOE say a number of times that if the soil action level and the clean-up level were revised downward, they would seek more money from Congress, and that hasn't happened. You have not gone back and asked for more money. DOE should be looking for more money, and for the regulators, for EPA and the health department, I would ask you to make sure that you do not	The RFCA Parties believe this comment ignores resource limitation realities. The accelerated actions triggered by the new lower RSALs and the risk-based approach can be implemented within the current target cost and schedule. The RFCA Parties agree that if additional actions are necessary to adequately protect human health and the environment and to comply with legal obligations, then DOE will seek the appropriate funds needed to take these actions. We have determined that additional funding is not necessary to implement these modifications to RFCA Attachments, including establishment of an RSAL that is 13 times lower than the 1996 RSAL. We expect accelerated actions to remove sufficient soil contamination will result in a lifetime excess cancer risk well within the CERCLA-required risk range to either a hypothetical rural resident or to a wildlife refuge worker. Not all contamination will be removed from Rocky Flats (nor does

	sign up for an agreement that relies on institutional and engineer controls, that relies on long-term stewardship without a detailed long-term stewardship plan, and a firm commitment from the federal government to implement that and to fund it. That means we need to see the funding. We don't expect DOE to be looking out for our long-term interests. There's nothing to be said that is bad about any individuals, but as an agency, it's an agency that's still building bombs. Institutionally, we don't expect you to look out for the public's interests, but we do expect EPA and the State of Colorado to do that, and I'd ask that you not sign up for any plan that relies on these controls without seeing the plan for that and without seeing the funding for it. We need to make sure we get a protective clean-up for any scenario at Rocky Flats.	CERCLA require this result) and the RFCA Parties expect that institutional controls will be implemented to manage and further reduce risk, as appropriate, and in accordance with the final remedy. DOE is obligated to implement all requirements of the remedy in this regard and must budget for them. It is also expected that required monitoring of all contamination not removed and required periodic reviews of the protectiveness of the remedy will allow DOE to plan and obtain funding for any response determined to be necessary. EPA and CDPHE do not plan to approve a final remedy without knowing the type and extent of institutional controls and how they will be enforced.
5.I	Since there are no plans to clean the deepest surface -- and that has come up before too -- where the contaminated pipes are, I'm concerned about landslides, because the USGS maps show the whole area full of unstable soil and, as we've talked about -- and before the occurrence of breaks after the site is open to the public -- and the RFCA documents which I have state that there will be monitoring, maintenance, and information management; yet, DOE does not have a dedicated fund to do this. If such a fund is not available, the Rocky Flats site should have limited access. They are in danger of infecting flora and fauna. They should be safe, and so should be the safety and the health of the public.	DOE agrees that if additional actions are necessary to adequately protect human health and the environment and to comply with legal obligations, it will seek the appropriate funds needed to take these actions. DOE cannot commit to developing a dedicated fund, but will submit requests for appropriate funding related to post-closure activities.
5.J.1	Just the range of risk that's being talked about now in terms of small-pox vaccinations has many, many, many people in this community really concerned about the risk to their own health. That one in a million or so figure that's being bandied around is a lot of people to be	The RFCA Parties have determined that if accelerated actions are implemented using the final Action Levels and the Subsurface Soil Risk Screen methodology, the resulting reduction in contamination will not pose an unacceptable risk to human health and the environment. Accelerated actions reduce risk and expedite the

	concerned about, and, lastly, I'd say that, again, there's a history of being penny wise and a pound foolish in many areas of the DOE and ERDA and AEC over the last 50 years. It seems to me that this spending on this clean-up is part of our homeland stewardship that we're all concerned about at the moment.	cleanup process. They are expected to contribute to the efficient performance of the anticipated final remedy of the Site.
5.J.2	In terms of the home-land security, I just find it ironic that we're throwing so much money at a serious problem. We have a home-land security problem right here, and that's what I want, a little bit more money spent wisely in that area. It will probably benefit health more than the other aspect.	The RFCA Parties do not agree that comparisons to homeland security and related costs are relevant to the resources that are being applied to achieve a safe and compliant cleanup of Rocky Flats.
5.K	Setting the clean-up funding at seven billion, which is the amount that was set, when you had the much, much higher picocurie level, is just absolutely ludicrous, and I think everybody in this room knows and is very aware that funding levels for anything that Congress sets funding for is arbitrary and can be changed. All it takes is will, the will to change that, so that the funding is really adequate to do the kind of clean-up that we need to have, and I can also assure you that there are tons of people in the public who would be right behind you, going to Congress with you, to get that funding level changed and to increase that funding so that we could get the kind of clean-up that's required . . .	Please see response to Comment 15.a, Category H.
5.L	Now, I know everybody says, "Well, we can't clean it up because we don't have enough time and we don't have enough money," and I can only look at those two things and say, "Hogwash." We have from now to the end of time to get that job done, and there's no reason we don't, and as for money, the federal government seems to be able to come up with endless amounts of money to kill people in Afghanistan, endless amounts of money to kill people in Iraq, endless amounts of money to make a home-land	Please see response to Comments 1 and 15.a, Category H.

	security department, endless amounts of money to make a missile system that doesn't work, endless amounts of money to spy on American people. Don't tell me there's not enough money. We can get the money from the same place as all those other projects and, compared to cleaning up Rocky Flats, those other projects, I have to say, compared to cleaning up Rocky Flats, all those other things I mentioned are stupid, needless, and dangerous, and I also know something about the land.	
5.M	Now, we do believe that it's crucial that the approach of going after higher-risk areas is crucial to the eventual success of the clean-up, taken, however, that we do believe that there does need to be funding for long-term stewardship, as has been discussed by several folks here tonight, and we look forward to continuing to work with all the RFCA parties and all those trying to ensure the end-state proposal, as well as how DOE plans to monitor and maintain any institutional controls to remain on the site, and that is of crucial importance to us.	There will be appropriate requirements for monitoring and maintenance of the remedy and to implement and preserve institutional controls in order to assure the continuing protectiveness of the remedy. The RFCA Parties will continue to use the consultative process to discuss the post-closure regulatory approach. DOE recognizes the community's concern regarding assuring funding for long-term stewardship. DOE cannot commit to developing a dedicated fund, but will submit requests for appropriate funding related to post-closure activities.
5.N	When you do cost-benefit analysis -- and we do cost-benefit analysis for all sorts of things, for example, when we build a building, when we build a road, when we build a bridge -- that cost benefit analysis is done for our generation, the generation that does that cost benefit analysis, and maybe for another generation or two. It is never done for thousands of generations. This is a whole different kind of thing for which we need money. In our society, we are generally asking for money for things that we are going to enjoy, and so we weigh our costs for that against the benefits that we are going to get. We don't have to think about 10, 15, a thousand, 10,000 generations from now. We don't ever do that. What we're really talking about here is intergenerational justice, I think, and I think that is only served in a situation like this if we really take the long-term into effect and spend the money	The new lower RSALs have been evaluated for the resident rancher land use scenario, even though this land use is not reasonably foreseeable. This evaluation, as described in the *Results of the Interagency Review of Rocky Flats Radionuclide Soil Action Levels*, September 30, 2002, shows that implementing the new RSALs would achieve a lifetime excess cancer risk for a rural resident of about $3x10^{-5}$, which is well below the upper end of the allowable CERCLA risk range of $1x10^{-4}$. The RFCA Parties believe that, a) based upon the good results of the accelerated actions for soil removal taken to date, b) the expected results of accelerated actions that will be triggered by the new lower RSAL, and c) the application of the Subsurface Soil Risk Screen, that the comprehensive risk assessment for the Site will likely show even lower lifetime excess cancer risk to a hypothetical rural resident.

	that needs to be spent, not to protect a wildlife refuge worker who will spend 2000 hours a week -- 2000 hours a year on a site, but to protect a resident rancher who is going to spend 8500 hours a year on the site, and his family, because there isn't a soul here that has any idea what that land is going to be used for hundreds and thousands of years from now, no way we'll know. It's going to be totally changed, and I think we have the obligation, since we got the benefits from Rocky Flats -- and believe me. I appreciate those benefits. Those benefits were winning the cold war. That was one huge benefit. Now we have to pay the cost for that benefit. We got a tremendous benefit. Let's put up the cost, and I've got to tell you: The estimates have not been made for how much it would really cost to clean it up properly. I don't mean the background, but to clean it up properly for a resident rancher for future generations, but those amounts of money are minuscule, compared to the cost overruns continuously run by the military on equipment which becomes obsolete, usually, before it is even useful. Billions and billions of dollars are spent in this country for obsolete stuff. Well, it seems to me we can spend, if necessary, hundreds of millions of dollars to do the job right. That's peanuts. A B-2 bomber costs 2.2 billion dollars, so let's give up half of a B-2 bomber and do this right.	The RFCA Parties have determined that a safe, effective and fully compliant cleanup of Rocky Flats can be achieved within the current projected funding for the closure project. DOE doubts that a cleanup that would eliminate all or most of its long-term stewardship obligations can be achieved. It is also cost-prohibitive and unnecessary for the protection of human health and the environment and not required by regulation. The Strategy contains an estimated cost for such a cleanup, which is believed to be several billion dollars and could cause significant damage to potentially sensitive habitat.
5.O.1	We really need independent testing and independent funding, sort of like a trust account.	DOE agrees that if additional actions are necessary to adequately protect human health and the environment and to comply with legal obligations, it will seek the appropriate funds needed to take the actions. DOE cannot commit to developing a dedicated fund, but will submit requests for appropriate funding related to post-closure activities.
5.O.2	But they'll get one-third of the money saved, so if you meet the clean-up dates, there will be $210,000,000 saved	The proposed modifications to RFCA Attachments did not change the terms and conditions of the closure project contract related to total

	and 70,000,000 will be retained by Kaiser-Hill.	project target cost and contractor incentives. Whether the contractor will earn any allowable incentives and the amount of such earnings will only be determined when the entire project is completed. DOE believes that the incentive provisions of the contract strongly encourage the contractor to perform the scope of work in a cost efficient manner that could free up projected budget resources and that this is in the best interest of the government and the nation's taxpayers.
5.P	However, I think that the reason, if it's going -- if this is the fix, if your proposal for a partial clean-up is going to end up being the fix, it's only because people, I think, in Colorado and people in the whole western world right now are not engaged. If most people knew what you were doing with Rocky Flats and what's going to happen in post-closure, which, after all, is 240,000 years, we couldn't -- we'd have to have this thing at Folsom Field, this meeting, or there wouldn't be -- it would be impossible for you to do it. We wouldn't have a partial clean-up. We would have a huge, excellent clean-up, the very best that technology can do today, and, of course, we'd find the money, so the only reason there can be a partial clean-up is that there aren't enough people engaged, in my opinion, even though I know you've tried to put out a lot of information, so you need to think of each one of us activists equaling about a thousand people and take that into consideration, and then don't you wish there could be a consensus, as Joel was saying, all the people, all the generations to come?	The RFCA Parties believe that the public participation process and dialogue regarding the proposed modifications to RFCA Attachments has provided numerous opportunities for the public to monitor and understand the cleanup progress at Rocky Flats and for the public to be engaged in the many decisions we must make. The RFCA Parties have no way of knowing how many people's opinions are represented by an activist, but we can assume that many people are represented by local elected officials and local governments, who have also been engaged in this process and provided comments.
5.R	I will be very happy to do anything I can to assure that there is the time and that there is the money that you need to do the very best job that you possibly can do.	Comment noted.
5.T	I have visited a lot of the other complex sites and I stood on a hill over the Y-12 complex at Oakridge. They showed us where, in the subsurface, there's 2,000,000 pounds of Mercury moving through the topography	The continued Congressional budgetary support for cleanup and closure of Rocky Flats, which may delay funding other work, reflects the firm expectation that the project can be completed within the target cost and schedule. DOE believes that if the closure project is

	heading for the Tennessee River. It's a very poor area in that part of Tennessee, and there's a lot of subsistence fishermen that actually gain a lot of their protein from the river. If that Mercury enters the water, there's going to be a lot of fishermen that are either going to have to not eat the fish or get sick from eating it. The reason why it's not being cleaned up is, right now, Rocky Flats has priority for money and only when we finish the clean-up here will the Y-12 complex clean-up start, so I would find it unconscionable, in fact, immoral, for me, to clean up and spend more money at Rocky Flats when we're going to expose people to Mercury poison at Oakridge.	completed for below the target cost it is most appropriate to make funds available to reduce high priority risks at other DOE Sites.
28	In a time when government and corporate executives boast of the wealth of our nation, it is discouraging to see the lack of interest put towards a "maximum extent" cleanup at Rocky Flats. As a Boulder County resident and land owner, the idea that time and money, not hea[l]th and safety, dictate the p[a]rameters of the clean-up is mind-boggling. It is the hard work of Boulder County residents and tax-payers within this state and nation-wide that allows for our county, state, and nation to have surplus monies. It is unacceptable to budget only 7% of the 7 billion total clean-up cost for environmental remediation. Rocky Flats should be cleaned to a level more protective than mandated both because the resources exist to do so and because leaving so much plutonium in the soil is unsafe and short-sighted.	Since the subject matter of this comment is similar to that of Comment 1, Category H, please also see that response. The $7 billion referred to is the estimated total to complete cleanup and closure work in the scope of the 2000 closure project contract, and the preceding 1995 integrated management contract. All funds allocated for Rocky Flats were and are being applied to cleanup and closure activities at the site. The goal of the project is not to assure that the anticipated budget for the closure project contract target cost is spent at Rocky Flats. The DOE is committed to find ways to perform work in a manner that possibly could reduce the cost of the closure project. Any budget that does not have to be devoted to Rocky Flats is available to reduce high priority risks at other DOE Sites.
29	A paltry $470 million or 7% is programmed to clean up soil and water. This sum will no doubt fall short of the amount needed to clean up all the pollution that will be identified during a thorough characterization of the site.	All funds allocated for Rocky Flats were and are being applied to cleanup and closure activities at the site. The goal of the project is not to assure that the anticipated budget for the closure project contract target cost is spent at Rocky Flats. The DOE is committed to find ways to perform work in a manner that possibly could reduce the cost of the closure project. Any budget that does not have to be devoted to Rocky Flats is available to reduce high priority risks at other DOE Sites.

30.a	General Comments on Tradeoff, Risk, Budget - With respect to the second question, there are numerous qualifications we need to make. First, there is the issue of a limited site budget for cleanup. We recognize that DOE and the regulators believe the site will get only the resources for cleanup outlined in Kaiser-Hill's baseline proposal presented to Congress in the late 1990s. Our major concern with the site's cleanup budget is that it was developed with minimal stakeholder input. At the time the baseline was developed, we were not asked our views on such important issues as old process waste line removal, 903 Pad remediation, and other major cleanup projects. Given the fact that specific proposals for addressing these areas of contamination were only developed recently, our confidence that the site was able to develop adequate budget projections that incorporate stakeholder concerns for these projects is low. The Board also notes the current closure baseline assumes a surface soil cleanup for plutonium of 651 pCi/g, a level already under DOE-sponsored review at the time the baseline was developed. In response to community concerns raised at the time regarding the possibility that lower cleanup levels might someday be approved, DOE asserted that additional funding would be sought to comply with its regulatory obligations. The Board believes DOE has an obligation to seek additional cleanup funds given these circumstances	The accelerated actions triggered by the new lower RSALs and the risk-based approach are legally compliant and can be implemented within the current target cost and schedule. The RFCA Parties agree that if additional actions are necessary to adequately protect human health and the environment and to comply with legal obligations, then DOE will seek the appropriate funds needed to take the actions. We have determined that additional funding is not necessary to implement an RSAL that is 13 times lower than the 1996 RSAL. We expect accelerated actions to remove sufficient soil contamination to result in a lifetime excess cancer risk to either a hypothetical rural resident or to a wildlife refuge worker well within the CERCLA required risk range.
30.b	Another concern the Board raises in addressing the second question is the notion of tradeoffs. In the near term, such a tradeoff emphasizing surface soil remediation over subsurface might make sense as DOE seeks to address the areas of greatest risk. The Board believes just as importantly, however, that tradeoffs must be considered in a much longer timeframe. As explained in more detail	Specific requirements will not be established until the a comprehensive final remedy decision is made through a CAD/ROD for the Site, but DOE has estimated that its annual costs to implement anticipated institutional controls, including requirements for monitoring and maintenance and periodic reviews to assure the continuing protectiveness of the remedy will be about $7 million per year in the first five years following the CAD/ROD. These

	later, the Board believes DOE must quantify the life-cycle costs required for long-term stewardship and compare those to the costs of a complete cleanup at the site. By focusing on near-term cost savings, the site may be leaving a legacy of a much larger bill for future taxpayers.	anticipated controls are further described in RFCA Attachment 5, Section 1.2, but consist primarily of management controls that are not costly to implement, e.g., no groundwater wells, no buildings in areas where contamination has not been removed, etc. DOE does not anticipate that these costs will be significantly reduced unless virtually all contaminated soil is removed from the Site and all contaminants are removed from the several plumes of contaminated groundwater at the Site. Such a cleanup would require much more extensive surface soil excavation, additional subsurface contaminant removal, complete excavation of landfills and trenches, and aggressive treatment for removal of all contamination in subsurface soils and groundwater. DOE doubts that a cleanup that would eliminate all or most of its long-term stewardship obligations can be achieved. It is also cost-prohibitive and unnecessary for the protection of human health and the environment and not required by regulation. The Strategy contains an estimated cost for such a cleanup, which is believed to be several billion dollars and could cause significant damage to potentially sensitive habitat. The costs of achieving a remedy that does not require any maintenance and monitoring (e.g., an "unrestricted release" of the Site) will be estimated in the RFCA Facility Investigation/Remedial Investigation-Corrective Measures Study/Feasibility Study based upon results achieved or expected to be achieved through the completion of all accelerated actions at the Site. There will be appropriate requirements for monitoring and maintenance of the remedy and to implement and preserve institutional controls in order to assure the continuing protectiveness of the remedy. The RFCA Parties will continue to use the consultative process to discuss the post-closure regulatory approach. DOE recognizes the community's concern regarding assuring funding for long-term stewardship. DOE cannot commit to developing a dedicated fund, but will submit requests for appropriate funding related to post-closure activities.
30.c	An additional concern is the lack of sufficient cost information to evaluate the tradeoff proposal. DOE	The RFCA Parties believe that this concern focuses on whether implementing the new lower RSALs and the risk-based approach to

	stresses its proposal is revenue-neutral. Without specific dollar information showing what money might be saved by doing less work in one area, compared with what additional cost might be required to do more work in another, the Board does not have sufficient information to determine whether the proposal is indeed revenue-neutral.	subsurface contamination is expected to result in significantly lower costs than the estimated baseline for soil cleanup. We note that the minor changes to the RFCA Action Level Framework for groundwater and surface water did not change the baseline estimates for actions associated with those media. The cost elements of removing much more surface soil and near-surface soil contaminated with Pu-239/240 (i.e., down to 3 feet below the surface if necessary to meet the 50 pCi/g RSAL) are fairly well understood and much of the characterization is completed to determine what areas must be cleaned up. The subsurface characterization costs, especially for those areas associated with original process waste lines with reported or suspected leaks, which as yet have not been well characterized, are also well understood. It is only the amount of subsurface soil removal that will be triggered by implementing the proposed risk-based approach that is not entirely known at this time. However, it was not entirely known under the 1996 RFCA soil action levels. The RFCA Parties have determined that the estimated budget savings that are expected to result from implementing the risk-based approach are reasonable and would not result in an anticipated change to the target cost estimates for the environmental restoration portion of the work.
30.d	Based on the budget concerns raised above, the Board offers these recommendations. <u>Recommendation 1</u>: The Board proposes the following budgeting and spending steps for the site with respect to environmental restoration work. • As a first step, the Board recommends DOE develop a cost baseline to clean the site to a 10^{-6} risk level for both the surface and subsurface. Having this information will give stakeholders a better understanding of cost options for the various cleanup projects, including whether it makes sense to seek additional funding. • DOE recently announced that Rocky Flats might close early with a total cost savings of more than $200	Since the subject matter of this comment is similar to that of Comments 1 and 15.a, Category H, please also see those responses. The accelerated action approach at Rocky Flats is expected to result in cleanup and closure that contributes to the efficient performance of the anticipated final remedy. It also will not preclude any additional cleanup that may be required to assure the protectiveness of the remedy. If the final comprehensive remedy decision is that the Site must be cleaned up to meet a lifetime excess cancer risk to a hypothetical user of $1x10^{-6}$, a budget request for the funds to implement the remedy would have to be submitted to Congress. However, if the closure project contract scope can be completed for less than the target cost, and "savings" to the government are realized, it does not mean that Rocky Flats will be able to automatically apply that money to reduce risks further.

	million. The Board recommends as a second step that DOE's entire share of any cost savings that may be realized by 2006 be applied toward further environmental restoration work. We anticipate that most if not all our recommendations can readily be fulfilled with this additional funding. • As a third step, the Board recommends DOE spend no less than the full baseline amount currently budgeted for environmental restoration work at the site. Any projected cost savings from the proposed approach should be applied toward achieving a 10^{-6} risk level.	The completion of work under the current closure project contract to achieve cleanup and closure of Rocky Flats in accordance with the new lower RSALs and the subsurface risk-based approach is anticipated to result in risks well within the CERCLA risk range and in compliance with all applicable or relevant and appropriate requirements.
30.e	Recommendation 2: The Board recommends DOE provide cost estimates of its end-state tradeoff proposal as part of any response it may have to any of our recommendations they are unable to implement.	Baseline cost estimates have already been provided to the public. Based upon community concerns over uncertainties related to OPWLs and the subsurface, the RFCA Parties have decided not to remove the contents of the 4 Ash Pits, Trench 7 and the soil that was wrapped in geotextile and returned to Trench T-4 (the "burrito") because they present low risk. This frees up approximately $16 million (according to the baseline) to provide additional characterization and soil removal.
30.f	Data for Recommendation 26 – Long-term stewardship at Rocky Flats will be necessary far into the future. Given the current federal budget process, long-term funding for stewardship is uncertain. When DOE and Kaiser-Hill developed their accelerated closure plan for the site, they were successful in persuading Congress to provide funding assurance beyond the normal bounds of the two-year federal budget process. It is just as important to develop and promote a long-term stewardship program. Congress needs to be made aware of the legacy that will remain post-closure and the federal government's commitment and responsibility far into the future.	An initial estimate of long-term stewardship costs is believed to be about $7 million per year. DOE recognizes the community's concern regarding adequate funding to meet all requirements for monitoring and maintenance of the remedy and to implement and preserve institutional controls in order to assure the continuing protectiveness of the remedy. DOE intends to continue working with the community and the regulators in the development of its Long-Term Stewardship Strategy. DOE cannot commit to developing a dedicated fund, but will submit requests for appropriate funding related to post-closure activities.
30.g	Recommendation 27: The Board requests DOE open its budget process to allow stakeholder input into the	DOE is developing its long-term stewardship estimates in a public forum, the Stewardship Working Group, as part of the development

	development of the new five-year budget planning process so we may better understand and comment on the stewardship funding proposals.	of the Rocky Flats Long-Term Stewardship Strategy. Public input on these estimates is welcome, and is being received.
30.h	Funding for Contingencies Recommendation 28(*): After closure, institutional, physical and engineered controls may fail, assumptions regarding contaminant migration may prove false, and new pathways to contaminant exposure may be shown to exist. In such cases, compensatory measures will be necessary. As part of its budget projections, DOE must include a funding mechanism (such as a reserve fund or trust fund) to cover such contingencies. *Recommendation 28(*): After closure, institutional, physical and engineered controls may fail, assumptions regarding contaminant migration may prove false, and new pathways to contaminant exposure may be shown to exist. In such cases, compensatory measures will be necessary. As part of its budget projections, DOE must include a funding mechanism (such as a reserve fund or trust fund) to cover such contingencies.*	DOE recognizes that contingencies regarding the final remedy will need to be planned for. The budget projections in the Rocky Flats Long-Term Stewardship Strategy include percentages for contingency, although post-closure budgets will be requested and appropriated on a yearly basis.
30.i	Data for Recom[mendation] 29 - Development of Life-Cycle Cost Estimates for Long-Term Stewardship Given the long-lived nature of the contaminants at Rocky Flats, implementation of a long-term stewardship program at the site will require substantial resources far into the future. The Board understands that as the site evaluates remediation options, cost comparisons are made. These cost comparisons may strongly influence the choice of options. Life-cycle stewardship costs for options that do not result in complete cleanup may be significant. An important consideration should be at what point do life-	Specific requirements will not be established until the a comprehensive final remedy decision is made through a CAD/ROD for the Site, but DOE has estimated that its annual costs to implement anticipated institutional controls, including requirements for monitoring and maintenance and periodic reviews to assure the continuing protectiveness of the remedy will be about $7 million per year in the first five years following the CAD/ROD. These anticipated controls are further described in RFCA Attachment 5, Section 1.2, but consist primarily of management controls that are not costly to implement, e.g., no groundwater wells, no buildings in areas with residual contamination, etc. DOE does not anticipate that these costs will be significantly reduced unless virtually all contaminated soil is removed from the Site and all contaminants are removed from

	cycle stewardship costs for options involving partial remediation exceed the costs of a complete cleanup. Recommendation 29: The Board recommends the site develop life-cycle cost estimates, which include LTS needs, for each remediation option it may develop for a particular project. These cost estimates should be an important consideration in determining the most suitable option. Analysis should be included in any draft decision document and made available for public review and comment before a remediation decision is made. Support data on Recommendation 29 DOE and the regulators have presented a remediation scheme for the site to reduce the highest risk by calling for greater surface soil remediation than previously planned and less remediation for the subsurface. The Board is concerned that the site has not presented cost information that shows whether such a tradeoff is revenue-neutral based on current project costs. The Board believes that life-cycle costs for long-term stewardship must be factored into this overall discussion of tradeoffs. Leaving greater amounts of subsurface soil contamination is committing DOE and the federal government to a larger financial burden in the long term by trying to save resources in the near term.	the several plumes of contaminated groundwater on the Site. Such a cleanup would require much more extensive surface soil excavation, additional subsurface contaminant removal, complete excavation of landfills and trenches, and aggressive treatment for removal of residual contamination in subsurface soils and groundwater. The estimated cost for such a cleanup is believed to be several billion dollars and could cause significant damage to potentially sensitive habitat. The preponderance of the contaminants that are found in the subsurface of the Industrial Area are volatile organics, which are anticipated to degrade in a matter of decades, within the anticipated lifespan of the remedies that are or will be in place at closure, and within the timeframe of the National Wildlife Refuge. Baseline cost estimates have already been provided to the public. Based upon the RFCA Parties review and consideration of the baseline cost estimates, the cost estimates to implement these modifications to RFCA Attachments and the reasonableness of the underlying assumptions and cost basis are no more accurate than the current baseline estimates used to make the comparisons.
36	First, I urge the DOE to clean up RF site to near background levels by actively seeking additional funding and public input. President Bush has 400 billion dollars budgeted for our military, more than any other program. This funding should be used to not only protect the citizens of our country from outside danger, but to also protect the people of the Denver area from the health dangers at Rocky Flats that were side products of horrible environmental practices of past contractors under what is	The RFCA Parties have determined that the cleanup approach contained in the final modifications to RFCA Attachments meets all regulatory requirements, and will result in a protective cleanup and more risk reduction than would be achieved under the 1996 RSAL and RFCA accelerated action requirements.

	now the Department of Energy. I have heard time and time again that funding is not available to commence a proper cleanup, yet it is not being sought.	
40	Money may be hard to come by these days, but neither the DOE nor other Rocky Flats officials have bothered to even ask Congress for more funds. It is a sad situation when an official considers his or her bonus more important than the health of his or her children and community. To passively accept a set budget before a thorough characterization of the site was done is unacceptable. If a better clean-up can be done (and I believe that it can be), then it is unacceptable to do anything less. Money can always be come by, but it must first be asked for.	Please see response to Comment 15.a, Category H.
42	Do not skimp on cleaning up the earth, air and water at Rocky Flats. Use the full $7 billion, which has been appropriated, equally, for both closure activities and for cleanup of the environment. Seek additional funding from Congress, if necessary.	Please see response to Comment 15.a, Category H.
43	The full $7 Billion dollars needs to be applied to this site so that all surface and subsurface soil reads less than 5 picocuries per gram, allowing this site to be safe for all uses that may come up in the future. It should be cleaned up to the maximum extent possible. If the $7 Billion is not enough we need to allow the citizens to decide how much to spend; it is Our money and OUR PLANET!! This is not just about minimizing the cost of cleanup, this is about saving both future inhabitants and the planet	Please see response to Comment 15.a, Category H.

	itself.	
45.a	First, even though the position of the DOE seems to be that of genuine concern for the public health, in fact, the paramount issue. However, the DOE says that the site may be cleaned early, with a possible savings of $270 Million. I believe that that $270 million would be better used to assure a more thorough clean up of the site.	Please see response to Comments 1 and 15.a, Category H.
45.b	Ideally, it should be the job of every DOE worker with spare time to beg Congress for more money. Perhaps, as a former Pu trigger producing plant and an danger to the public health, the extent to which still isn't known, funding may be drawn from our homeland security or military funds. This is truly an internal threat to public safety.	Please see response to Comment 15.a, Category H.
48	The current plan calls for inadequate clean up, in order to save money and hasten our forgetting of the contamination resting there. I urge that the plan be changed to allow for the most thorough clean up technically possible at this time and that the planners lobby for the money and time needed to protect this present generation's health and that of countless future generations as well.	Please see response to Comment 15.a, Category H.

51	We do not feel reassured by a cleanup plan laden with half-measures toward providing protection for the residents of the Denver metro area against potential toxic radioactive exposure. We can do better than to leave our future generations with our legacy of increased cancer burden. More money than 7% of the total allocated funds for cleanup is required to accomplish an adequate cleanup of water and both surface and subsurface soil. In addition, we would like to see the DOE guarantee adequate funds to safeguard the site for the long term. Providing such assured funding should be a condition for accepting any cleanup plan, especially one like the present proposal.	Since the subject matter of this comment is similar to that of Comment 1, Category H, please also see that response. All funds allocated for Rocky Flats were and are being applied to cleanup and closure activities at the site. The goal of the project is not to assure that the anticipated budget for the closure project contract target cost is spent at Rocky Flats. The DOE is committed to find ways to perform work in a manner that possibly could reduce the cost of the closure project. Any budget that does not have to be devoted to Rocky Flats is available to reduce high priority risks at other DOE Sites. The current estimate for long-term stewardship activities that support the performance of the final remedy is approximately $7 million per year during the first 5 years. DOE must request these funds each year from Congress.
56	I call on the DOE to apply the full $7 billion dollars allocated for closure of Rocky Flats on cleanup and closure activities at the site. If the above cannot be accomplished with funds currently available, the government agencies should estimate the cost and seek public support to get the requisite funding from Congress.	Please see response to Comment 15.a.
58	The second problem is that the DOE does not have enough money to properly clean it, and is unwilling to spend what money is does have. The third problem is that the project absolutely has to be finished in three years. In conclusion, nobody really NEEDS Rocky Flats to be "finished" by 2006, and it is only fair to spend ALL of the money, originally allocated to the program on performing the best possible clean-up.	Since the subject matter of this comment is similar to that of Comment 1, Category H, please also see that response. All funds allocated for Rocky Flats were and are being applied to cleanup and closure activities at the site. The goal of the project is not to assure that the anticipated budget for the closure project contract target cost is spent at Rocky Flats. The DOE is committed to find ways to perform work in a manner that possibly could reduce the cost of the closure project. Any budget that does not have to be devoted to Rocky Flats is available to reduce high priority risks at other DOE Sites. Correspondence from Senator Allard and Congressman Udall to the RFCA Parties dated December 16, 2002, which emphasizes that there are very serious limitations on the federal budget.

60.a	2. All closure activities are being done for a fixed sum, with cleanup being approximately 7% of the total. Is this the best the DOE can offer? This is a particularly enraging part of the "dialogue" with decision makers. No money was ever spared in making the plutonium triggers that Rocky Flats manufactured day in and day out for some 40 years. No expense was spared to make the h[o]llow plutonium spheres that explode like Nagasaki bombs and precipitate an even bigger reaction. No expense was spared when Rockwell was busted by the feds for burning plutonium. Rockwell spared no expense with their wrists slapped and sent back to the plant site.	Since the subject matter of this comment is similar to that of Comment 1, Category H, please also see that response. All funds allocated for Rocky Flats were and are being applied to cleanup and closure activities at the site. The goal of the project is not to assure that the anticipated budget for the closure project contract target cost is spent at Rocky Flats. The DOE is committed to find ways to perform work in a manner that possibly could reduce the cost of the closure project. Any budget that does not have to be devoted to Rocky Flats is available to reduce high priority risks at other DOE Sites. Correspondence from Senator Allard and Congressman Udall to the RFCA Parties dated December 16, 2002, emphasizes that there are very serious limitations on the federal budget.
66	Regarding the budget and timetable – let's spend the money and take the time to clean up this mess to a more acceptable standard – don't short change us locals who have had to put up with this hazard for decades.	Since the subject matter of this comment is similar to that of Comment 1, Category H, please also see that response. All funds allocated for Rocky Flats were and are being applied to cleanup and closure activities at the site. The goal of the project is not to assure that the anticipated budget for the closure project contract target cost is spent at Rocky Flats. The DOE is committed to find ways to perform work in a manner that possibly could reduce the cost of the closure project. Any budget that does not have to be devoted to Rocky Flats is available to reduce high priority risks at other DOE Sites. Correspondence from Senator Allard and Congressman Udall to the RFCA Parties dated December 16, 2002, emphasizes that there are very serious limitations on the federal budget.
68	Given the amount of money that DOE has spent on developing nuclear technologies at Rocky Flats, the budget for clean-up seems trivial. I am surprised that a site of nuclear bomb testing, namely Bikini Atoll, has been cleaned up to a level hundreds of times less radioactive than the proposed level for Rocky Flats, a site situated a stones throw from Colorado's largest population center.	Cleanup levels are based upon site-specific modeling and exposure parameters, based on hypothetical future land uses, so no two sites will have the same calculated level. The document entitled, Task 5, *Results of the Interagency Review of Rocky Flats Radionuclide Soil Action Levels,* September 30, 2002, evaluated Pu-239/240 cleanup levels calculated for other sites. The new, lower Rocky Flats RSAL is at the lower end of the risk range as compared to calculated cleanup levels at other sites.

67.a	B. Funding: A decision was made to perform all closure activities, including cleanup, for the fixed sum of $7 billion. This sum covers removal of surplus special nuclear material, removal of waste accumulated during the production years, maintaining site security, demolishing buildings, and, finally, performing the actual cleanup activities of environmental remediation of contaminated soil and water. In the end the contractor budgeted only $470 million, or approximately 7 per cent of the $7 B total, for environmental remediation. a. The decision on how much to spend on ER at Rocky Flats appears to have been made as an afterthought, that is, by waiting to see how much of the anticipated $7 B would be left over when the *costs* of all the other closure activities had been calculated. b. The amount for ER was arrived at, again, without a thorough characterization of the site and thus without having a clear sense of what it would take to do a thorough cleanup. c. The local public rejected the cleanup levels adopted for Rocky Flats in the 1996 RFCA. In response DOE funded an independent review of the radionuclide soil action levels (RSALs), with awareness that out of this review could come a recommendation that the RSALs be made more protective than those adopted in 1996. Indeed, the review did result in such a recommendation. But because of the prior behind-the-scenes agreement to clean and close the site for a fixed sum, no additional funding would be sought. Cleanup would be limited to what could be accomplished with a sum pegged to the 1996 cleanup levels unacceptable to the public. DOE and the regulators evidently intend to provide the better cleanup the public said it wanted back in 1996 but without spending anything more to get it - a strange,	Since the subject matter of this comment is similar to that of Comment 1, Category H, please also see that response. The $7 billion referred to is the estimated total to complete cleanup and closure work in the scope of the 2000 closure project contract, and the preceding 1995 integrated management contract. All funds allocated for Rocky Flats were and are being applied to cleanup and closure activities at the site. The goal of the project is not to assure that the anticipated budget for the closure project contract target cost is spent at Rocky Flats. DOE is committed to find ways to perform work in a manner that possibly could reduce the cost of the closure project. Any budget that does not have to be devoted to Rocky Flats is available to reduce high priority risks at other DOE Sites.

	almost miraculous undertaking! d. Though $470 M is budgeted for ER activities, we understand the planned work may be done for less. Yet there is no plan to spend the full $470 M to achieve a better cleanup than is envisioned by the cleanup proposal. In the end something less than $470 M may be spent on the cleanup. e. A closely related but not identical issue is the likelihood that cleanup will be completed early and Rocky Flats will close ahead of time, perhaps as early as December 2005. According to DOE, the savings achieved from early closure will not be used to achieve a better cleanup of Rocky Flats but on DOE's side will be applied to ER work at other sites and on Kaiser-Hill's will be pocketed as profit. These arrangements are part of the deal made without input from the affected public. From the standpoint of public health and environmental integrity, they set a very bad precedent for other DOE sites. f. We understand that requests from time to time by various stakeholders that the government RFCA Parties seek additional funding to achieve a better cleanup at Rocky Flats were dismissed out of hand	
67.b	3. The designation of Rocky Flats as a wildlife refuge should not serve as a rationale for reducing cleanup expenditures at Rocky Flats.	The designation of the Site as a National Wildlife Refuge does not affect the amount of money spent on cleanup at Rocky Flats. Based on the *Results of the Interagency Review of Rocky Flats Radionuclide Soil Action Levels,* September 30, 2002, cleanup to the 1996 RSALs or the new, lower RSALs would result in risks within the CERCLA risk range for the reasonably anticipated future user, the wildlife refuge worker. The entire scope of the closure project contract, including packaging and transfer of special nuclear materials, decontamination and demolition of all buildings and management of all waste, and completion of environmental restoration work scope must be completed within the target cost. The estimated costs for conducting cleanup at Individual Hazardous Substance Sites do not

		form a basis for determining savings that are available to be applied to additional remediation. Savings can only be determined upon completion of all contract scope. DOE believes that if the closure project is completed for below the target cost, it is most appropriate to make funds available to reduce high priority risks at other DOE Sites.
67.c	5. DOE should work closely with local stakeholders to determine the cost of the best possible cleanup that can be achieved with available technology. a. DOE should spend the full $470 million currently budgeted for ER at Rocky Flats on cleanup projects at the site. b. The full $7 billion allocated for closure activities at Rocky Flats should be spent at the site. c. If currently available funds are not sufficient to cover the cleanup we recommend, DOE should work closely with local stakeholders to get the requisite funding from Congress.	Please see response to Comment 15.a, Category H.
77	I'm aware there are not unlimited dollars to do this cleanup, and it is unfortunate that money for cleanup was not escrowed so this cleanup could be done properly. Nevertheless, it is irresponsible that the allowable pollution levels at the site are not sufficient for your own family or mine to live there. Does anyone actually believe that the fence will be there more than 200 years, say?	The normal federal budget process and planning cycle is, and is expected to be, adequate to provide appropriate funding for the cleanup and closure of Rocky Flats. Based on the *Results of the Interagency Review of Rocky Flats Radionuclide Soil Action Levels*, September 30, 2002, cleanup to the 1996 RSALs or the new, lower RSALs would result in risks within the CERCLA risk range for a hypothetical rural resident. The annual dose to the hypothetical rural resident would also be only a few mrem/yr, well below the 25 mrem/yr limit promulgated in the US NRC "decommissioning rule", 10 CFR 20, subpart E, which may be considered a CERCLA relevant and appropriate requirement. Thus, the new, lower RSAL will also be protective, if Rocky Flats is not limited to the reasonably anticipated wildlife refuge land use.

83	The funding for this could exist, especially if the public was asked to support it. Also, we must consider that the money allotted for the clean-up effort is a very small fraction of the money spent to make the mess. Our future is worth it!	Please see response to Comment 15.a, Category H.
86.a	It is uncertain why the financial realities that apply everywhere else in life don't seem to apply at Rocky Flats? Why when cleanup-criteria changes the budget doesn't? For instance the soil action level for plutonium changed in this proposal from 651 pCi/g to 50 pCi/g, a large change to everything but the budget. Is it because the intention is to egregiously limit how much this number one contaminant of concern is sought during pending investigations? Why at a site infamous for cost overruns and bad decisions (e.g., building 371, pondcrete, the 903 pad, the original siting, etc.) is more financial caution and diligence not demonstrated? The concern is that once again the lack of due diligence will catch-up with reality resulting in dangerous shortcuts. Why are stakeholders not more involved in money issues, since it would seem that if this site is to ever get cleaned up, it is up to stakeholders to advance the cause to Congress?	Based on the *Results of the Interagency Review of Rocky Flats Radionuclide Soil Action Levels,* September 30, 2002, cleanup to the 1996 RSALs or the new, lower RSALs would result in risks within the CERCLA risk range for the reasonably anticipated future user, the wildlife refuge worker. The RFCA Parties believe that the final new RSALs and risk-based approach described in the modifications to RFCA Attachments will result in the removal of more surface or near-surface Pu-239/240 soil contamination than under the 1996 RSAL, which responds to a widely held community priority and can be implemented within the current projected closure project budget resources. Implementation of the final modifications to RFCA Attachments will also result in more risk reduction than would be achieved under the 1996 RSAL and RFCA accelerated action requirements.
86.b	It is uncertain why the Parties are considering an earlier completion date when just the remedial investigation and feasibility study (RI/FS) at far smaller and less complex superfund sites usually take considerably more time than that the time which is remaining in this new cleanup completion schedule? The RI/FS has barely been started here. Moreover, why will there be some $200 million dollars left over after a supposedly more aggressive cleanup (again the plutonium action levels) and a shorter time frame. Doing more usually costs more. Doing more and getting done quicker usually costs more. Please	The RFCA Parties do not know at this point whether any dollars will be "left over". The entire scope of the closure project contract, including packaging and transfer of special nuclear materials, decontamination and demolition of all buildings and management of all waste, and the completion of all environmental restoration work scope is anticipated to be completed within the target cost. The estimated costs for conducting soil removal or other accelerated actions at Individual Hazardous Substance Sites do not form a basis for determining savings that are certain to become available to be applied to additional remediation. Savings can only be determined upon completion of all contract scope. DOE believes that if the

	explain in detail this anomaly?	closure project is completed for below the target cost it is most appropriate to make funds available to reduce high priority risks at other DOE Sites. The confirmation sampling results of the accelerated actions at Rocky Flats will provide the characterization information to conduct the comprehensive risk assessment for the RFI/RI-CMS/FS. The RFCA Parties have determined that this approach expedites cleanup and provides a means to address and mitigate the risks of migration of soil and water contamination consistent with the anticipated comprehensive final remedy.
61	Recommendation 6: We call on DOE to apply the full $7 billion dollars allocated for closure of Rocky Flats on cleanup and closure activities at the site. Recommendation 7: Likewise, we recommend that t h e full $470 million budgeted for environmental remediation at Rocky Flats be used for this purpose. Recommendation 8: If the above cannot be accomplished with funds currently available, we call on the government RFCA Parties to estimate the cost and seek public support to get the requisite funding from Congress.	Please see response to Comment 15.a, Category H.
89	Schedule and funding seem only distantly related to the task at hand. They also seem to have been developed with inadequate, or at least ignored, public input. The Rocky Flats closure date of 2006 is arbitrary. The funding ceiling of $7 billion (with less than half a billion dollars going toward actual environmental remediation) was fixed before the extent of the cleanup required was known. Time and money—not protection of public health and the environment—have become the guides for cleanup goals. Though they are both arbitrary, they seem bureaucratically immutable. The "cheaper, faster" box also appears in the Idaho National Engineering and Environmental Laboratory's "Accelerated Cleanup" plan. In both cases,	Please see response to Comment 12, Category H.

	cleanup necessary to protect public health and the environment over the generations that abandoned waste will remain hazardous will not occur. In the case of Rocky Flats, time and money constraints dictate that very little subsurface cleanup occur. This is unacceptable.	
90	We call on DOE to apply the full $7 billion dollars allocated for closure of Rocky Flats on cleanup and closure activities at the site. If the above cannot be accomplished with funds currently available, the government RFCA Parties should estimate the cost and seek public support to get the requisite funding from Congress.	Please see response to Comment 15.a, Category H.
93	I completely understand the concept of fiscal responsibility. But I fail to see why this needs to be accomplished by placing the public health in jeopardy. I am sure that there are other areas in which the Department of Energy can save money as opposed to reducing the clean up levels at Rocky Flats. My main concern is the lack of knowledge concerning what is in the underground pipes. What if there is a tremor and a section leaks? As you know, that scenario will cause the contamination to eventually leak into the groundwater. Is that worth saving money? I applaud what has been done so far. But more can be done and should be. Especially since the money is there to accomplish it.	Based upon community concerns over uncertainties related to OPWLs and the subsurface, the RFCA Parties have decided not to remove the contents of the 4 Ash Pits, Trench 7 and the soil that was wrapped in geotextile and returned to Trench T-4 (the "burrito"), because they present low risk. This frees up approximately $16 million (according to the baseline) to provide additional characterization and soil removal.

RFCA Attachment Proposed Modifications

Response to Comments

Category: I. Surface Water Quality/Groundwater

Commenter No.	Comment(s)	Response
1	Protection of water quality has been and remains a priority for the Coalition. Post-closure, water leaving Rocky Flats as measured at the existing Points of Compliance (POC) at the Site boundary must continue to meet the 0.15 pCi/L standard measured over a 30-day average. The Coalition supports the RFCA parties' proposal to change the compliance period of the onsite standard of 0.15 pCi/L from a 30-day average to an annual average provided: a. Points of Evaluation (POE) are established upstream of the ponds; b. "Annual" means a 365-day calendar year regardless of flow; c. Sampling frequency and technique will remain the same post-closure as it currently exists in the Integrated Monitoring Plan; d. On-site POCs and the POEs are developed with the Coalition governments, and in particular the affected municipalities; and e. At the onsite POCs and POEs, in addition to circumstances when there are regulatory violations of the water quality standard, evaluations shall also be triggered when: i. Water at a POE or POC onsite is greater than 0.15	This comment accurately captures the main attributes of the final modifications to RFCA Attachments. The RFCA Parties are committed to continue to provide all surface water sampling and analysis results to affected municipalities, local communities and the public in a timely manner. We are also committed to work with local communities, affected municipalities and the public regarding the suggestions related to POEs, maintaining or retaining the existing pond systems and groundwater natural attenuation. The RFCA Parties have determined that no change to RFCA Attachment 5, related to these suggestions will be made at this time.

	pCi/L standard over a 30-day average; or ii. There are spikes in excess of 0.60 pCi/L. In addition, the RFCA parties must maintain and upgrade as necessary the existing pond systems in both the Woman Creek and Walnut Creek drainages, develop the water monitoring and reporting program in consultation with the Coalition governments (and in particular the affected municipalities), and include a mechanism to address major storm events. The RFCA parties must also prove natural attenuation of groundwater contamination is occurring and, should contaminant concentrations increase, reevaluate the groundwater strategy as necessary. We recognize we have not defined "major storm event". We hope to work with the RFCA parties to determine a suitable threshold and appropriate response action.	
4	The Coalition supports the draft RFCA surface water quality provisions including, but not limited to, the establishment of POCs at Indiana Street and at the outfall of the terminal ponds. One key issue left unresolved in the draft RFCA is the details of when an exceedance would trigger an evaluation at onsite POCs. Similarly, the draft RFCA does not identify locations of POEs and bases for when an evaluation at a POE would be triggered. The Coalition agrees with the RFCA parties' approach that these details can be developed and agreed to at a later date. Consistent with our support, and as stated in our September 9th letter, POEs must be "developed with the Coalition governments, and in particular the affected municipalities." However, the body of the RFCA only speaks to consulting with downstream users, and does	The RFCA Parties agreed to change the averaging period from one month to one year at the outfall of the terminal ponds points of compliance because the standard is based upon chronic exposure over an exposure period of 30 years. The RFCA Parties have determined that the type and frequency of surface water monitoring would be conducted in the same manner under either averaging period. Only the calculation changes. There will be no reduction in the vigilance of the evaluations. Before the final modifications can be implemented, the RFCA Parties will await the determination of the Colorado Water Quality Control Commission to adopt an annual averaging period for on-site surface water compliance measurement. The POCs at Indiana Street and terminal pond outfalls were established in RFCA in 1996. No changes to POC locations are contained in the modifications to RFCA Attachments. The protocol for notification of reportable values at POEs and POCs

	not include provisions for consulting with the other five Coalition governments. We request that the draft attachments clearly specify a role for these governments as well.	has not changed. The basis for triggering a source evaluation includes understanding the nature and extent of the event that generated the reportable value, data and conclusions from previous source evaluations, data and conclusions from other related studies, (e.g., CDPHE study entitled, *Reconnaissance Sampling Related to Source Location Investigation of Plutonium and Americium Action Level Exceedances at Point of Evaluation GS10*), the Historical Release Report, plus the results of any data from new sampling locations or characterization data.
5.A	In the case of the surface water regulations, even though the, at the site boundary, the sampling interval will still remain in 30 days' compliance, within the site, they're proposing changing the compliance period from 30 days to one year. If this happens, the board feels that we still ought to continue to measure on 30-day intervals, which is what they're going to be doing, but, more importantly, we want to make sure that the public is informed if there are exceedances on this 30-day standard. We want to be informed if there's an exceedance on the 30-day standard. If there are two consecutive 30-day exceedances, we want a field investigation done. Also, if any sample is greater than four times the standard, we want an immediate -- we want to immediately be informed of that and an immediate investigation started. We're also concerned that there be additional points of evaluation. Now, points of evaluation are different than points of compliance in that there is no regulatory requirement or no regulatory penalty if an exceedance is found on one of these points of evaluation. What we want to see is additional points of evaluation, and we also want to see them include a broad spectrum of possible	Please see response to Comment 1, Category I.

	contaminants. This would give the communities and the wildlife service advanced warning of any movement. As Joe indicated, plutonium is not believed to be mobile, but if it was to be mobile, we'd want to see that at the earliest possible time. More importantly, with the plutonium, though, there are a number of other possible contaminants out there. Some of these are potentially mobile, and so we feel it is very important that we have these additional points of evaluation set up on the site.	
5.B	Meeting the state's standard for plutonium in surface water, it turns out, did not become the driver for clean-up, as some thought it might, but the issue continues to be troubling because the problem of contaminated on-site surface water had not been solved. My comment on this is that some seem willing to leave some plutonium in the soil and to limit clean-up to what is required to protect a wildlife refuge worker because this would ensure open space at Rocky Flats, and everybody wants open space. A better clean-up, they fear, would result in free release and development of the site, but the fact of contaminated water at Rocky Flats means that there can be no free release of the site even if the plutonium in the soil is cleaned to a very stringent level. If the water issue doesn't drive clean-up, it does ensure open space.	In developing the proposed modifications to the RFCA Attachments, the RFCA Parties incorporated the advice and recommendations of the Actinide Migration Evaluation Panel, which conducted a scientific review of Pu-239/240 mobility. The Panel concluded that Pu-239/240 in soil is extremely insoluble and does not easily move in groundwater at Rocky Flats. Extensive groundwater sampling at Rocky Flats does not show the presence of Pu-239/240, which supports the scientific conclusions of the Panel. The RFCA Parties note that Pu-239/240 contamination in surface water at Rocky Flats is well below the surface water standard at the points of compliance even though removal of surface and near surface soil contamination above the RSALs remains to be done. The RFCA Parties understand that surface water protection is a high priority and that implementing the new lower RSALs is expected to provide the long term protection of surface water quality. The RFCA Parties have not proposed to change the standard, which would apply under any land use scenario, not just an open space scenario.
5.G	It's my understanding that this current proposal plans to reduce the water monitoring indicator and averaging time from one month to one year. Is this correct, and if it is correct, why?	The RFCA Parties agreed to change the averaging period from one month to one year at the outfall of the terminal ponds points of compliance because the standard is based upon chronic exposure over an exposure period of 30 years. The RFCA Parties have determined that the type and frequency of surface water monitoring

		would be conducted in the same manner under either averaging period. Only the calculation changes. There will be no reduction in the vigilance of the evaluations. Before the final modifications can be implemented, the RFCA Parties will await the determination of the Colorado Water Quality Control Commission to adopt an annual averaging period for on-site surface water compliance measurement. The RFCA Parties are not proposing any change to the averaging period for water leaving the site at this time, even though the same rationale holds true. We believe that this change for on-site monitoring is appropriate, given that DOE could request a change to the underlying standard based upon a change to the cancer slope factors that would change the standard to 0.35 pCi/L. Thus, the change to the annual averaging period is a reasonable approach to mitigate the possibility of short term exceedances that could lead to penalties being imposed.
7	The City supports the proposed 30-day rolling average for surface water at Points of Evaluation (POE's) and Points of Compliance (POCs) on site. Although it is premature to discuss the location details of POEs and POCs at this time, City staff expects to participate in all discussions related to the final determinations of locations and details of these points. The City supports the following: 1. DOE shall commit to maintain the surface water standard at 0.15pCi/L Pu post-closure at the POCs at Indiana Street. 2. For spikes greater than .60 pCi/L Pu at any POE for	1. The RFCA Parties have determined that the only changes needed at this time are to change the averaging period for plutonium and americium and deleting tritium as a COC. The RFCA Parties believe that this change for on-site monitoring is appropriate, given that DOE could request a change to the underlying standard based upon a change to the cancer slope factors that would change the standard to 0.35 pCi/L. Thus, the change to the annual averaging period is a reasonable approach to mitigate the possibility of short term exceedances that could lead to penalties being imposed.

	any 30-day period shall require DOE to complete a confirmation grab sample within seven days of the initial occurrence. If there is still an exceedance greater than .60 pCi/L Pu, DOE shall trigger an investigation of the source of the migration and shall take action to remedy the source of the migration. Local governments shall be notified of any exceedances of the standard.	2. The RFCA Parties have determined that no change to RFCA Attachment 5, related to these suggestions will be made at this time.
	3. DOE shall ensure local governments continue to be provided monthly reports (email, fax, etc.) and be notified per the current IMP process post-closure.	3. The RFCA Parties are committed to continue to provide all surface water sampling and analysis results to affected municipalities, local communities and the public in a timely manner.
	4. DOE shall ensure that the City is involved with the development of the post-closure sampling methodology for 30 day (annual) averaging of POE's on site.	4. The RFCA Parties are also committed to work with local communities, affected municipalities and the public regarding the suggestions related to POEs.
	5. DOE shall ensure language to RFCA to reflect that POEs will be determined once final remediation and final land configuration have been completed. POEs will be determined along with the sampling methodology and information management process in post-closure documents. The City shall also be involved in the development of the language in the post-closure documents.	5. The RFCA Parties acknowledge the possible utility of POEs post-closure, but agree that the specifics should be deferred to when requirements are established based upon the CAD/ROD. Thus, the RFCA Parties have determined that no change to RFCA Attachment 5, related to these suggestions will be made at this time.
	As a minimum, the COCs for the POC'shall be Pu, Am, U, and nitrates. DOE shall work with the City to determine the COCs during the development of the CAD/ROD.	No changes to the COCs for surface water monitoring purposes is being proposed at this time.
	Westminster recommends that there shall be a POE below the Old Landfill in the Woman Creek Drainage	The RFCA Parties acknowledge the possible utility of POEs or

	and that a POC must be established near the outfall from the Present Landfill Pond if it is discharged to the waters of the state. Westminster also recommends that it is necessary for the "A" and "B" terminal ponds in the Walnut Creek drainages and the "C" ponds in the Woman Creek drainage to remain intact because of storm events and spring runoff.	POCs post-closure, but agree that the specifics should be deferred to when requirements are established based upon the CAD/ROD. Thus, the RFCA Parties have determined that no change to RFCA Attachment 5, related to these suggestions will be made at this time.
30.a	Points of compliance (POCs) are the five locations where surface water monitoring is conducted to determine whether DOE is in compliance with applicable water quality standards. Under RFCA parties' end-state proposal, POCs would remain where they currently are, at the outfalls of the three terminal ponds (A-4, B-5 and C-2) and at the points where Walnut Creek and Woman Creek cross the site boundary at Indiana Street. For radionuclide contaminants in surface water onsite (as measured at the outfalls of the terminal ponds), the proposal would change the method for demonstrating compliance from a 30-day average to a 12-mo. averaging period. Water leaving the site will still be held to the more restrictive 30-day averaging period.	This comment accurately captures the main attributes of the final modifications to RFCA Attachments.
30.b	Compliance Method RFCAB supports the decision to retain a 30-day averaging period for water leaving the site to meet the regulatory standard for all contaminants of concern. However, RFCAB is concerned that the switch to annual averaging onsite may reduce DOE's incentive to be vigilant regarding evaluations which should trigger actions to ensure the standard of 0.15 pCi/L is maintained for plutonium and americium and the standards are met for all other contaminants of concern.	The RFCA Parties have determined that the type and frequency of surface water monitoring would be conducted in the same manner under either averaging period. Only the calculation changes. There will be no reduction in the vigilance of the evaluations.
30.c	• Recommendation 17: In order to alleviate this concern regarding onsite water, RFCAB recommends the following measures be taken to promote early identification of impacts to water	The RFCA Parties are committed to continue to provide all surface water sampling and analysis results to affected municipalities, local communities and the public in a timely manner. We are also committed to work with local communities, affected municipalities

	quality from a source area remaining onsite: • DOE should conduct a timely evaluation whenever the standard is exceeded over a 30-day average and notify the regulators and local governments monitoring surface water. • If the standard is violated for two consecutive 30-day periods, a field investigation should be triggered. • Elevated concentrations in excess of four times the standard in any 30-day period should be investigated, no matter how short the duration. • Following a major storm, it is expected DOE will conduct a physical inspection to check for significant erosion from areas with residual contamination. DOE should work with stakeholders to define what constitutes a major storm. • The proposed RFCA changes should recognize that new POCs might need to be added between now and closure. An example of this is at the present landfill pond, the removal of which would cause leachate from the landfill to be released directly into No Name Gulch. In that event and all similar events, RFCAB recommends DOE work with the regulators and stakeholders to determine the location of the new POC, as well as an appropriate sampling design based on the data quality objectives process.	and the public regarding the suggestions related to POEs and POCs. In particular, the comment regarding the present landfill is being considered in finalizing the Interim Measure/Interim Remedial Action for that response action. The RFCA Parties have determined that no change to RFCA Attachment 5, related to these suggestions will be made at this time.
30.d	Data Collection and Reporting • Recommendation 18: Should DOE adopt annual averaging as the compliance method for POCs onsite, RFCAB recommends: • Sampling method and frequency remain unchanged. • Data from all surface water monitoring should be readily available to stakeholders and local	The RFCA Parties are committed to continue to provide all surface water sampling and analysis results to affected municipalities, local communities and the public in a timely manner. We are also committed to work with local communities, affected municipalities and the public regarding the suggestions related to data reporting for short term fluctuations, providing information about the expected persistence or "life-cycle" of contaminants and contingency

	governments within a timely manner consistent with the Quarterly Data Exchange meetings, and should also include an online database. • Reports of data from all surface water monitoring should flag all short-term spikes in excess of the standard. • Data for onsite water should still be reported in terms of a 30-day average so that stakeholders are kept informed of short-term fluctuations in water quality. • DOE should also work with stakeholders to develop a mechanism to depict trends in water quality. • DOE should provide predicted life-cycles of COCs, based on modeling, to determine when concentrations of contaminants will start to diminish and are expected to no longer pose an impact to water quality. • DOE should identify a point person to be available to stakeholders for post-closure exchange regarding data reporting, trending, and source evaluations. • DOE should develop a Contingency Plan in the event the water quality standard is exceeded.	planning. A point person for post-closure exchange will be identified in a timely manner.
30.e	Points of Evaluation (POEs) The proposed RFCA language states that the need for POEs will be determined later in the Corrective Action Decision / Record of Decision (CAD/ROD). In contrast to performance monitoring locations, which are project-specific and geared toward assessing the effectiveness of water treatment systems, POEs would be sampled for a broader suite of contaminants and located upstream of the POCs to provide an early detection system to identify potential impacts to water quality.	The need for an early detection system for any specific contaminants of concern upstream of the POCs after all Individual Hazardous Substance Sites have been addressed through accelerated actions is properly reserved to the requirements established based upon the CAD/ROD.
30.f	Recommendation 19: RFCAB anticipates POEs and performance monitoring will be needed post-closure and understands the need to defer specifics of the program to	The RFCA Parties acknowledge the possible utility of POEs post-closure, but agree that the specifics should be deferred to when requirements are established based upon the CAD/ROD.

	the CAD/ROD. It is imperative to have POEs post-closure to be used as a tool to evaluate surface water quality onsite and prevent degradation of surface water quality offsite.	
30.g	Recommendation 20: RFCAB expects DOE to involve stakeholders in clearly defining the data quality objectives of the POE monitoring program, as well as the actions required of DOE if POE sampling were to reveal a deterioration of water quality.	The RFCA Parties are committed to work with local communities, affected municipalities and the public regarding the suggestions related to any potential POE monitoring program.
30.h	Recommendation 21: DOE should work with stakeholders to develop a surface water sampling plan (based on data quality objectives) that would include identification of possible new POEs for the purpose of periodic sampling of a broader suite of analytes that have a potential to be mobilized in the surface water.	The RFCA Parties are committed to work with local communities, affected municipalities and the public regarding the suggestions related to any potential POE monitoring program.
30.i	Contaminants of Concern Where Attachment 5, Section 2.3 Numeric [Surface Water] Levels After Active Remediation, pp. 5-10 and 5-11, refers to specific COCs, only plutonium and americium are mentioned.	The RFCA Parties have determined, based upon the potential for impacts to surface water quality posed by any remaining diffuse Pu-239/240 and Am-241 surface and near-surface contamination, that these analytes are appropriate. Other COCs are expected to be associated with groundwater contamination that will be addressed by source controls, such as passive barriers and treatment systems and will also be assessed through groundwater monitoring. Performance monitoring of systems installed to control groundwater impacts to surface water will provide adequate and timely information related to COCs as required by the response action for the contamination.
30.j	Recommendation 22: Due to their solubility and known contamination within groundwater, both uranium and nitrates should be identified as COCs. Tritium should also be identified as a potential COC to ensure water quality is maintained.	The RFCA Parties have determined, based upon years of groundwater and surface water monitoring data, that tritium is not a COC requiring specific monitoring to assess possible impacts to surface water quality. Also, the Maximum Concentration Limit (MCL) for tritium has been changed to 20,000 pCi/L by EPA and adopted by the Colorado Water Quality Control Commission. Consequently, the RFCA Parties have determined that since tritium is very infrequently present in samples and that the levels of tritium in groundwater are well below the MCL, that tritium should no

		longer be considered a COC requiring monitoring. With respect to uranium and nitrates, these contaminants in ground water are captured and treated and the discharge from the treatment system is monitored well upstream of the terminal ponds. Predischarge sampling from the terminal ponds is adequate to monitor for water quality impacts.
30.k	Recommendation 23: In the event CDPHE no longer performs monitoring for volatile organic compounds, metals and other analytes, sampling for these additional analytes would need to be performed by DOE.	The RFCA Parties will consider what, if any sampling and analysis will be performed by DOE.
30.l	Only a limited number of contaminants are sampled for at the POCs. Recommendation 24: Data quality objectives for POEs and performance monitoring should include a mechanism to trigger analysis of additional analytes at the POCs to ensure water quality is maintained.	The RFCA Parties will consider whether the data quality objectives should incorporate triggers to include additional analytes at the POCs when requirements are established based upon the CAD/ROD.
30.m	Future Considerations The proposed language of Attachment 5, Section 2.2 Numeric [Surface Water] Levels During Active Remediation, p. 5-9, seems to indicate that the surface water standards (at least for uranium and certain other contaminants) are subject to change. Recommendation 25: RFCAB believes the current surface water standards should not be relaxed in the future.	The RFCA Parties have no plan to relax the current surface water standards.
47.a	Page 5-6, Section 2.0. A method to address a major storm event is not described in the RFCA language. The maintenance and upgrading of the terminal ponds is not addressed.	The sediments in ponds are considered soils and accelerated action determinations will be made in accordance with the modifications to the final RFCA Attachments. The maintenance and upgrading of the terminal ponds will be done in accordance with best management practices and will consider major storm events. The RFCA Parties have not yet begun

	The remediation of soils in the "B" series ponds is not addressed.	consultation on the final pond configuration or the definition of an appropriate storm event, but we are committed to work with local communities, affected municipalities and the public in accordance with RFCA Paragraph 53 consultation requirements regarding key decisions.
47.b	Page 5-11, Sections 2.4.A and 2.4.B. Change the following, "within 30 days of gaining knowledge…" to "within 7 days…"	The RFCA Parties did not propose any change to this existing requirement and have determined that no change is required. However, please note that the RFCA Parties begin consultation on appropriate actions early within this timeframe (30 days) so that DOE may develop and submit a plan within the specified time.
34	Attachment 5, Page 5-6, 2.1 Basis for Standards and Action Levels – The Service recommends that surface water be of sufficient quality, on-site, to meet water use classification of aquatic life–warm 2, not just as it is leaving the site.	Agreed.
86	Do not go before the Colorado Water Quality Control Commission to change the averaging period for plutonium in surface water. This must stay as a monthly average. Increasing the averaging period minimizes the importance and meaning of monitoring spikes and serves to dilute the results. Dilution is not a solution and is a major precept of what is not an appropriate or "adequate remedy."	Please see response to 5.G, Category I.
61	SURFACE WATER STANDARD: p. 10: "The RFCA Parties . . . agreed that the new RSALs would not be designed based on RFCA surface water standards and would not guarantee the standards will be met." As indicated above, RMPJC recommends a Pu RSAL of 5 or less pCi/g. This would probably meet the state surface water standard . Question iv: Is it not the case that the RFCA parties intend to rely on some unspecified controls to deal with the water contamination problem? Won't these controls	Since it is not known with any certainty what level of diffuse Pu-239/240 surface or near-surface contamination might cause a short term exceedance, the RFCA Parties cannot predict that the new, lower RSAL and the removal of soil within 3 feet to achieve the RSAL, will always preclude an exceedance. However, we do know that based on surface water monitoring data collected since RFCA was signed in 1996, and without any significant removal of existing surface soil contamination, there have not been any exceedances at the POCs (although there was one

	be subject to failure over time, even if they work in the first place? Question vi: Because Pu-239 decays into U-235 and U-235 is known to be readily soluble, what effect does this have on the question of water safety both on and off t h e Rocky Flats site?	reported exceedance at GS-03, the results remain in question and the exceedance was not confirmed), and only short term exceedances at several POEs. Thus, we fully expect that the new lower RSAL will result in adequate protection of surface water quality. The decay of Pu-239 to U-235 has no effect, since the half-life of U-235 is 4 orders of magnitude greater than Pu-239, and thus the U-235 activity cannot be detected from pCi/g levels of Pu-239.
91.a	SURFACE WATER QUALITY Broomfield supports the proposed language in the draft RFCA surface water provisions. A crucial point we want to emphasize is that local municipalities (i.e., local municipalities that are impacted by surface water from the RFETS) continue to be involved and consulted in surface water decisions, including recommendations to the Colorado Water Quality Control Commission (WQCC). Broomfield addressed several concerns with the Site on their Surface Water Technical Memorandum, which identified the revised sampling methodology captured in the RFCA proposal. We recommended then and we recommend now that the details of the proposed new strategy are captured in the proposed draft language. If the details are not established in the draft RFCA language, a placeholder shall be identified in the draft document to distinguish the process to develop the details of the new strategy. Broomfield recommends an approach to develop the details of the sampling methodology by utilizing the current process to revise the Integrated Monitoring Plan (IMP). DOE should work with local municipalities impacted by surface water to develop the details of the revised Sampling Analysis Plan. Broomfield agrees to the proposed monitoring strategy with the understanding that the surface water standard for	The RFCA Parties are committed to work with local communities, affected municipalities and the public in accordance with RFCA Paragraph 53 consultation requirements regarding key decisions. Also, the comment regarding using the IMP updating process will be considered in developing the details of the proposed new strategy. The RFCA Parties have determined that no change to RFCA Attachment 5 related to these suggestions will be made at this time. The RFCA Parties acknowledge your support for the annual averaging and tritium modifications.

	plutonium will continue to be 0.15 pC/L and the standard for americium will continue to be 0.15 pCi/L. We agree with the proposed standard for tritium. Broomfield is concerned that tritium is not identified as a potential contaminant of concern (PCOC). Add tritium to the list of PCOCs.	The RFCA Parties have determined that the only changes needed at this time are to change the averaging period for plutonium and americium and deleting tritium as a COC. This does not preclude adding additional COCs to POCs or adding additional POEs or monitoring points in the future.
	The City and County of Broomfield is adamant that the terminal ponds remain post closure. Actinide Migration reports have identified the effectiveness of the ponds to remove actinides from surface waters. In addition, the terminal ponds serve as a last measure of defense to protect our community in the event of a major storm event. Broomfield expects to work with DOE and the regulators to define what is considered a "major storm event." We also recommend the current 48-hour pre-discharge notification process as outlined in the IMP for pond releases continue post-closure with Broomfield.	The RFCA Parties acknowledge the strong desire of affected municipalities that the terminal pond system be retained and the expressed rationale for keeping the ponds. The final configuration, maintenance and upgrading of the terminal ponds will be done in accordance with best management practices and will consider appropriate storm events. The RFCA Parties have not yet begun consultation on the final pond configuration or the definition of appropriate storm event, but we are committed to work with local communities, affected municipalities and the public in accordance with RFCA Paragraph 53 consultation requirements regarding key decisions.
	Further dialogue needs to continue to identify the contaminants of concern (COCs) at the Points of Compliance (POCs) and Points of Evaluation (POEs). Broomfield envisions the use of POEs to assess potential water quality impacts prior to degradation of water quality at the POCs.	The RFCA Parties have determined that the only changes needed at this time are to change the averaging period for plutonium and americium and deleting tritium as a COC. This does not preclude adding additional COCs to POCs or adding additional POEs or monitoring points in the future.
	Broomfield recommends we finalize the details of the sampling regime in the CAD/ROD or a post-IMP document. We cannot support the draft proposal to merely sample for plutonium and americium at the POCs. As a minimum, we recommend uranium and nitrates be added to the list of COCs at the POCs. COCs proposed for POCs will need further discussion to address how specific groundwater remedial actions	The RFCA Parties agree with your suggestion to finalize the details of the sampling regime to meet any requirements established based upon the CAD/ROD.

	adequately address COCs post-closure. Define the contingency plan if a groundwater remedial action fails and associated enforceability. Nitrates should also be discussed along with the enforceability of the standard post-closure. Benzene is also a COC at the Present Landfill that continues to maintain elevated concentrations. Clarify how these issues will be addressed. Broomfield foresees the Colorado Department of Pubic Health and the Environment (CDPH&E) and/or the Environmental Protection Agency (EPA) performing some type of oversight sampling such as split samples to ensure the quality of the program. This issue requires further discussion by the regulators and local governments.	The effectiveness of all accelerated actions including groundwater treatment will be evaluated in the RFI/RI-CMS/FS. The landfill seep will be addressed in a separate decision document. The roles of CDPHE and EPA in conducting independent sampling and monitoring will be determined at the time the post-closure agreements are established.
91.b	8. Page 5-4 Action Prioritization and Implementation Broomfield does not agree with the statement to not include groundwater in the action level framework (ALF). Broomfield would like clarification on the following statement: *Because ALF does not address the inherent value of ground water, any residual effects on ground water not addressed through this Framework will be addressed under a Natural Resources Damage Assessment (NRDA).*	Ground water action levels are included in the Action Level Framework, Section 3.0, and the proposed modification included several minor changes. However, no modification to the statement cited by the commenter was proposed. The RFCA Parties will be considering whether any modifications to the ground water section of ALF, including the cited statement, should be proposed in conjunction with the Ground Water Technical Memorandum task in the Remedial Investigation/Feasibility Study Work Plan. Preparation of this Technical Memorandum will begin later this year.
91.c	9. Page 5-6, ¶ 2, Surface Water Broomfield appreciates the draft language, which identifies the local municipalities that will be involved and consulted in surface water decisions. We hope to continue the current IMP process throughout closure to allow impacted municipalities the opportunity to draft final stewardship language for items associated with surface water. The current process has been very effective and productive.	The RFCA Parties intend to continue the current IMP process throughout cleanup and closure activities.

91.d	Page 5-7, #3, Numeric Levels During Active Remediation (Near-Term Site Condition) Revise the draft language to include a plan that will identify milestones and schedules to comply with the standards for the six organic compounds and other analytes with temporary modifications. Define the process for the temporary modifications for surface water standards through 2009 and how the criteria to ensure the water standard will be obtained post-closure. In addition, identify how the temporary standard for nitrates will be addressed in the CAD/ROD to ensure the treatment unit will meet the current standard post-closure.	The RFCA Parties have determined that there is no need at this time to provide the further specificity suggested. The final comprehensive remedy will establish requirements, as appropriate, consistent with the current scheduled expiration of the temporary modifications in 2009. Monitoring and treatment system performance data indicate that the decreasing trend in nitrate concentrations at the discharge gallery will continue. Nitrate concentrations in the terminal ponds are already within the current standard concentrations and the total amount of nitrates discharged annually does not present any significant water quality problem in downstream segments. Thus, the RFCA Parties believe that it would be more appropriate to address the post-closure requirements in the CAD/ROD, rather than to speculate on the best approach at this time.
91.e	Page 5-9, #2,POCs/Points of Evaluation (POEs) We agree with the language to identify POEs in the IMP at a later date after the final land configuration is known. We will continue to work with DOE to establish any additional POCs or POEs once the final land configuration study is complete and remediation is complete. Page 5-10, #4, POCs/Points of Evaluation (POEs) Revise the draft language to include uranium and nitrates to the list of COCs at the POCs. We agree with the proposed annual average period for the outfalls of the terminal ponds. We also agree the existing sampling regime for the POCs near where Indiana Street crosses Walnut and Woman Creek will remain the same. The POCs at Indiana will continue to use the 30-day moving average. Page 5-10, 5, POCs/Points of Evaluation (POEs) Broomfield disagrees that performance monitoring may	The RFCA Parties are committed to work with local communities, affected municipalities and the public regarding whether any additional POCs and POEs should be established. With respect to the POCS, the RFCA Parties have determined that the only changes needed at this time were to change the averaging period for plutonium and americium and deleting tritium as a COC. This does not preclude adding additional COCs to POCs or adding additional POEs or monitoring points in the future. The proposed language is not intended to obviate the development of performance monitoring requirements for inclusion in any

	be incorporated into the IMP after the response action is implemented. Prior to implementing the response action, the IMP group should identify the data quality objectives and sampling methodology for the response action. Revise the language to reflect our recommendation.	proposed action decision document. Rather, it specifies that monitoring requirements, including any changes that might be appropriate after a particular response action is completed, would be incorporated into the IMP.
	Page 5-10, 2-3 Numeric Levels After Active Remediation (Intermediate and Long-Term Site Conditions) Add nitrates and uranium to the list of COCs.	The RFCA Parties have determined that the only changes needed at this time are to change the averaging period for plutonium and americium and deleting tritium as a COC. This does not preclude adding additional COCs to POCs or adding additional POEs or monitoring points in the future.
	Page, 5-13, Ground Water We agree with the proposed language in the ground water section. We will continue to be involved in the IMP process and attend the Quarterly Data Exchange meetings. We do request that information provided at the meetings be more current than in the past process. Our concern is DOE has a full staff today, and we are receiving data from a significantly delayed sampling regime. Data received is from the previous past two or three quarters. We are not confident we will be receiving current data post-closure. It is imperative when the final information management section of the stewardship plan is drafted, the plan include a schedule for local governments to receive data.	The RFCA Parties agree that data exchange is important post-closure and will work with local communities, affected municipalities and the public regarding post-closure data exchange.

RFCA Attachment Proposed Modifications

Response to Comments

Category: J. RCRA Caps and Landfills

Commenter No.	Comment(s)	Response
1	Clearly, not all of the Coalition's end-state and related stewardship issues are presented in this letter. For instance, per the parameters outlined by the RFCA parties, we have not addressed the critical question of remediating the original landfill and the solar ponds, nor the need for mineral acquisition. We trust that we will continue to work with the RFCA parties on these issues.	The RFCA Parties are committed to work with local communities, affected municipalities and the public in accordance with RFCA Paragraph 53 consultation requirements regarding key decisions on cleanup and closure, including long-term stewardship. The issue of mineral acquisition is not part of the final modifications to RFCA Attachments.
33	DOCUMENT 4- RFCA Attachment 10 Proposed Modification This document specifies the original (i. e., 1996) requirements for closure of interim status units as defined by RCRA and CHWA and then proposes some modifications. The most important modification proposed in this document is to exempt several of the current interim status units from the interim status provisions of RCRA/CHWA and make them subject to Colorado Hazardous Waste Regulation (CHWR) 265.110 (d). This change would potentially involve the OPWL and tank system interim status units that may be impacted by other nearby units. Those nearby units may interact with the interim status units to complicate interpretation of monitoring data (i. e., both potentially contribute to ground water contaminant plumes).	The final modifications to RFCA Attachment 10 state that certain interim status units may qualify for closure in accordance with the alternative closure standards in 265.110(d). These alternative closure standards were promulgated in 1999, three years after RFCA was signed. Alternative closure standards do not exempt interim status units from RCRA closure. The RFCA Parties have determined that the option to close interim status units under alternative RCRA standards is protective of human health and the environment. This proposal does not impact OPWL (IHSS 121 and other IHSSs of former OU9). The Historical Release Report records that at least part of the OPWL was used after November 1980 and up until construction on the New Process Waste Lines (NPWL) was completed in the summer of 1984. A 1986 RCRA Compliance Order and CERCLA Agreement granted interim status to mixed waste units including the process waste lines that were in use at that time (NPWL) and did not include all OPWL. It is that agreement that is

	While the document doesn't state what the implications of this change are on closure of these waste units, I speculate that the modification means that these combined waste units will move directly to final closure and skip the interim corrective action phase. I also presume that the intent, after risk assessment and required contamination removal, is to cap these areas. This is all a guess on my part since it is not stated in Attachment 10 as to the implications of this modification. Therefore I acknowledge that my speculation may not reflect RFETS's intended closure action for these waste units. From a regulatory standpoint, my read of the CHWR 265.110 (d) says that this modification is allowed upon concurrence of CDHPE. Apparently, CDHPE is evaluating whether to grant this modification. Attachment 10 does not identify the impact of this modification on RFETS's intent for closure actions for these waste units. So the questions I would have are: 1. Do they intend to go directly to final closure, 2. Will they use a cap as the final closure technology, and 3. Will the post-closure requirements for long-term monitoring and evaluation be eliminated or will they still be operative? Should capping be used for closure of these waste units, then here are questions I would raise about the development and use of caps for closure. 1. What scientific method/s will be used to develop the cover closure system design? 2. How will RFETS quantify that the cover system is controlling subsurface transport of contaminants?	the reason that OPWL are not subject to interim status closure requirements. Remaining groundwater contaminant plumes will be addressed in an integrated manner through an Interim Measure/Interim Remedial Action (IM/IRA) decision document. The final modifications to Attachment 10 do not mean that closure of interim status units under the alternate requirements in 265.110(d) are final closure. The RFCA Parties do not presume that closure under the alternate closure requirements of 265.110(d) would result in a cap. All accelerated actions taken are considered interim actions and will be analyzed, including post-closure requirements for long-term monitoring, in the RCRA Facility Investigation/Remedial Investigation-Corrective Measures Study/Feasibility Study, the Proposed Plan, and final Corrective Action Decision/Record of Decision(s). The RFCA Parties anticipate that enforceable post-closure requirements will exist to ensure the protectiveness of the remedy in accordance with the CERCLA remedy selection process and the corrective action and closure process in RCRA/CHWA. The RFCA Parties will continue to use the consultative process to discuss the post-closure regulatory approach. Appropriate requirements will be contained in all final CAD/RODs and in any modified RFCA Agreement consistent with RFCA Paragraph 286. As of May 2003, DOE and CDPHE have not reached agreement as to whether a post-closure permit (or, alternatively, an enforceable document as defined in 6 CCR 1007-3, § 100.10(d)) will be required for Rocky Flats, and if so, whether that permit (or enforceable document) will also contain appropriate requirements for institutional controls and other long-term stewardship activities. The parties will endeavor to resolve this matter. Failing an agreed upon resolution, each party

	How will RFETS quantify cover surface degradation caused by plant and animal intrusion, catastrophic events like wildfire, wind and water erosion, and the effect of these on contaminant migration from the waste units?	reserves its rights as provided in RFCA Part 18. CDPHE agrees that tank system interim status units identified in Part II of Attachment 10 may qualify for closure under 265.110(d); however, CDPHE requires additional information to make such a determination for IHSS 101 and/or IHSS 114. Any accelerated action alternative that considers a cap, including applicable or relevant and appropriate regulatory requirements and remedial action objectives, will be evaluated by the RFCA Parties through the IM/IRA decision making process and final document.

RFCA Attachment Proposed Modifications

Response to Comments

Category: K. OPWLs

Commenter No.	Comment(s)	Response
1	Original Process Waste Lines The Coalition accepts the RFCA parties' proposal to remove all original process waste lines (OPWL) in the top three feet of soil. However, based on the aforementioned comments regarding uncertainty in the subsurface, we believe that should a decision be made to not remove lines below this depth, further investigation and discussion with the Coalition would be warranted. We do, however, support the characterization methodology proposed for these lines, including extensive characterization of known and suspected leaks and detailed sampling of three leaks to study actinide migration. We also support the Site's proposal to remove all valve vaults, and grout/foam OPWL that are not removed.	The entire premise of the final modifications to RFCA Attachments is a risk-based approach which results in conducting a more aggressive surface soil cleanup in return for leaving more subsurface contamination in place. The technical basis for this approach is founded on extensive evaluations and research indicating that plutonium moves in the environment by particulate transport as a result of surface soil erosion. Plutonium is extremely insoluble and does not easily move in the subsurface. Field data at Rocky Flats supports this conclusion. There is an extensive network of Industrial Area ground water monitoring wells and subsurface soil boreholes. Plutonium is not detected in ground water from these wells, nor was it found in the borehole cuttings. Although data on contamination associated with leaking original process waste lines (OPWLs) are limited, in the past 2 years, more subsurface soil contamination data have been collected beneath building slabs. Radionuclide contamination beneath these slabs has generally been less than expected. The RFCA Parties contend that insoluble plutonium and americium contamination in the deeper subsurface would not pose a risk to a wildlife refuge worker. Please also see response to Comment 30.a, Category F. There will also be required periodic reviews of the remedy to determine whether it is working. If at some future date it was discovered that plutonium was in fact moving in the subsurface, the

		ground water monitoring network would detect this movement before it became a surface water problem. Other more mobile subsurface contaminants, such as organics, have been detected in ground water in certain parts of the site and have and will be managed if they pose a risk to surface water quality. Many of the major process waste lines in the 700 Area (where the older plutonium buildings are located) are either above ground or in a tunnel between production buildings. These lines are being removed as part of building demolition, or they are directly underneath the buildings and will be characterized as part of the under building sampling. To date, process waste lines that have been removed at Rocky Flats, both in the 700 Area and in areas outside of the 700 Area, have exhibited low levels of contamination and have been disposed of as low level waste. There was also very little contamination found associated with original process waste lines under Building 771, one of the site's oldest plutonium buildings. The RFCA Parties do not consider removal of process waste lines that are associated with little or no contamination to be a wise use of taxpayer dollars. Nonetheless, the RFCA Parties recognize that there is strong community concern over the uncertainties surrounding the original process waste lines. In response to that concern, the final RFCA Attachment 14 requires an increase in the amount of characterization (number of samples and depth) required for original process waste lines. When an action is taken to remove plutonium contamination associated with original process waste lines at a depth of 3 to 6 feet, DOE will remove that contamination to levels that are less than 1 nCi/g.
3	I continue to support and recommend the following: • That all subsurface process waste lines be removed.	Many of the major process waste lines in the 700 Area (where the older plutonium buildings are located) are either above ground or in a tunnel between production buildings. These lines are being removed as part of building demolition, or they are directly underneath the buildings and will be characterized as part of the

		under building sampling. To date, process waste lines that have been removed at Rocky Flats, both in the 700 Area and in areas outside of the 700 Area, have exhibited low levels of contamination and have been disposed of as low level waste. There was also very little contamination found associated with original process waste lines under Building 771, one of the site's oldest plutonium buildings. The RFCA Parties do not consider removal of process waste lines that are associated with little or no contamination to be a wise use of taxpayer dollars. Nonetheless, the RFCA Parties recognize that there is strong community concern over the uncertainties surrounding the process waste lines. In response to that concern, the final RFCA Attachment 14 requires an increase in the amount of characterization (number of samples and depth) required for original process waste lines. When an action is taken to remove plutonium contamination associated with original process waste lines at a depth of 3 to 6 feet, DOE will remove that contamination to levels that are less than 1 nCi/g. The double-walled New Process Waste Lines (NPWLs), which have not leaked, are being flushed and grouted.
6	Please remove all process waste lines as well. We do not want accidents waiting to happen and potentially poisoning our groundwater and air.	Please see response to 3, Category K.
15	Also, I further recommend removal of all process waste lines in the subsurface environment.	Please see response to 3, Category K.
16	The cleanup must include removing all buried, contaminated lines and leakage plumes.	RFCA Attachment 14 will require removal of all original process waste lines to a depth of 3 feet. Plutonium contamination below 3 feet that is associated with original process waste lines will be removed if it exceeds action concentrations and volumes. Contaminants that are mobile in ground water and pose a risk to surface water must also be addressed. The double-walled New Process Waste Lines (NPWLs), which have not leaked, are being flushed and grouted.
17	Further, the pipes that were used to carry chemicals from one building to another should be excavated and removed. The soil surrounding the pipes should be tested	Please see response to Comment 15, Category K.

	for leakage, and then explored to the margins of contamination if a chemical is found that poses a substantial risk to the environment, to the water, to the air, to species.	
21	We further recommend removal of all process waste lines in the subsurface environment.	Please see response to Comment 15, Category K.
5.A	We'd like to see all process waste lines between the old plutonium buildings within the plutonium building area removed. We'd actually like to see all the waste lines removed, but if this is impossible, at least we'd like to see the lines within the plutonium buildings removed. This should particularly apply to areas where it's close to the old landslide surfaces or possible erosion. We feel it's very important that areas that are close to these erosion surfaces that will be exposed within the near future, the next several hundred years, be removed. The pipes that aren't removed -- we want them to be thoroughly characterized and grouted or plucked [plugged?]in some fashion.	Since the comment is similar to Comment 15, Category K, also please see that response. All original process waste lines will be removed to a depth of 3 feet, even if they are not contaminated. Landslide and erosion-prone areas (such as slopes) must also be addressed. RFCA Attachment 14 lays out the characterization process for OPWLs. All valve vaults will be removed to the extent practicable. All OPWLs that remain in place will be grouted to the extent practicable.
5.B	The third recommendation: Remove all process waste lines in the subsurface environment.	Please see response to Comment 15, Category K.
5.E	[Concerns reference Victor Holm, CAB comment regarding volatile organic compounds in pipes and in subsurface]. I'm a Broomfield resident. My question was just off of the Citizens Advisory Board comments: You make reference to other things other than – other substances than plutonium and the underground pipes, and I was just -- that would need monitoring. For me, that was a little vague. I don't know what those are, and I was just wondering if I could get a little more information on what else is in there.	There were other contaminants that were transported through the process waste lines, including organic chemicals. Groundwater monitoring data indicates the presence of organic contamination, which will be evaluated and subject to action determinations, as appropriate.
30.a	Recommendation 13: All old process waste lines should	Since the comment is similar to Comments 5A and 15, Category K,

	be removed. If this cannot be done, all lines associated with the plutonium buildings, as well as lines with known or suspected leaks, should be removed, regardless of depth. Valve vaults and sumps should also be removed. If a line is not removed, justification should be provided and the line needs to be thoroughly characterized, sealed, and fully documented.	please also see those responses. All process waste lines that are not removed and thelocations of all contamination not removed will be documented in the Administrative Record.
30.b	Recommendation 14: All pipes, whether old or new, and regardless of purpose, should be removed from areas subject to landslides or erosion.	All pipes which could pose an environmental threat will be evaluated and appropriate actions taken.
39.a	Please cleanup all the PU that you can find, as in the buried pipes.	Please see response to Comment 15, Category K.
39.b	Please remove all process waste lines, including those underground.	Please see response to Comment 15, Category K.
42	Remove all subsurface waste lines. We understand that in exchange for surface cleanup you intend less subsurface cleanup. This stance will not be satisfactory.	Please see responses to Comments 1 and 15, Category K.
45	The process waste lines should be removed now, instead of waiting for erosion, among other things, to force the public to deal with it later; most certainly needing more money than it would cost to add it to this project.	Since the comment is similar to Comments 1 and 15, Category K, please also see those responses. Contamination and process waste lines in erosion-prone areas must be addressed. As with many other sites in the nation with residual contamination, Rocky Flats will require appropriate long-term stewardship activities to ensure remedy effectiveness. As part of those activities, there will be periodic reviews to determine remedy effectiveness. In the event that a remedy is not working, action will be required to correct the remedy.
47	Paragraph I.A. Change >3nCi/g to >1 nCi/g. Paragraph I.D. Change >10 nCi/g to >3nCi/g. Change 3nCi/g to 1 nCi/g.	Paragraphs I.A. and I.D. of RFCA Attachment 14 have been modified to include tables showing plutonium concentration limits, areal extent limits and volume extent limits. Action will be taken when those limits are exceeded. Once an action is taken, cleanup will be to less than 1 nCi/g at a depth of 3 to 6 feet. Valve vaults will be removed and OPWLs that are not removed will

	Paragraph I.F. We support the complete removal of valve vaults. Paragraph I.F.2. We support the grouting/foaming of the entire length of the lines, to the extent possible, of all OPWL's that are not removed.	be grouted to the extent practicable.
33	3. DOCUMENT 2- Original Process Waste Line (OPWL) Subsurface Soil Approach (Public Draft-New Attachment) *Document 2 describes the subsurface soil sampling approach RFETS intends to use in characterizing the OPWL's to determine if leaks have occurred and to establish contaminant concentrations in potential leak areas. I did not have the IA-Sampling and Analysis Plan (IA-SAP) available for this review. Therefore, I acknowledge that the IA-SAP may contain sampling details that are not described in Document 2 and that these details may contradict my comments presented below.* *Given that caveat, Document 2 poorly describes the sampling methods that will be used to characterize the concentration of contaminants in subsurface soil surrounding the OPWL's. RFETS discusses a "stepped" sampling program but this could be interpreted to mean stepped in two dimensional space and not the three dimensional space that will characterize OPWL leak patterns. The contamination surrounding a leak will certainly be distributed in three dimensions and concentrations of radionuclides will be highly variable within that space depending on the chemical and physical factors associated with the pipe contents, the nature*	RFCA Attachment 14 provides a table to be used in determining what concentrations and volumes of plutonium contamination in the subsurface between 3 and 6 feet requires an action. The distances of step-out sample locations from the first sample location will be a function of the concentration of plutonium found at that first sample location. With respect to the concern expressed over uncertainties with the original process waste lines, the RFCA Parties have decided to perform more extensive characterization of OPWLs than was described in the proposed modifications to RFCA Attachments, dated November 2002. Based upon a review of Industrial Area maps showing the location of OPWLs and their respective depth, coupled with the locations of planned OPWL sample points, under building contamination surveys and characterization of other IHSSs, the RFCA Parties believe that they will have thorough documentation of contamination in the subsurface. Details for the sampling of the OPWLs will be described in a revision to the Industrial Area Sampling and Analysis Plan (IA SAP). This will include sampling to a depth of 8 feet for locations of reported and suspected leaks for OPWL sections between 3 and 6 feet depth. For each borehole, soil samples will be composited at approximately these intervals: 0-6 inches, 6-30 inches, 30-54 inches, 54-78 inches, and 78-96 inches. Therefore, these samples will provide volumetric contamination estimates. Prairie dogs den below the frost penetration depth, which is variable

	of the leak, and the characteristics of the surrounding soil. Because equation 2 uses only the area of subsurface soil contamination (A_{sc}), it is not clear that RFETS intends to inventory (i. e., three dimensional inventory) the contaminants at a leak site. The question then is how will characterization samples be taken, will they permit a complete inventory of contaminant distribution in the entire volume of contaminated soil, and how will these numbers be handled to define the average concentration that will be used for comparison with the derived subsurface concentration limit or to obtain an "average"? It seems to me that a leak pattern that occupies $10m^2$ over a depth of 0.25m is far different than one in which the $10\ m^2$ area is contaminated to a depth of 10 m. This same question applies to the concentration of contaminant in the surface mound. In developing equation 2, RFETS must have assumed that the entire mound soil had a uniform concentration of contaminant at the regulatory limit. That assumption would certainly not be true under actual intrusion of prairie dogs into the OPWL leak zone as the concentration in mound soil would be highly variable. Because mound soils may have a mass of several hundred kilograms (Whicker and Detling, 1988), be in a cone shaped configuration, be several meters in diameter, and have a height of 0.35 m (Carlson and White,1987), it is certain that leak contaminants in mound soils will be highly variable. The question here is also how, in practice, one would apply an average concentration of contaminant at the	but typically less than 4 feet in the Denver Metropolitan area and may burrow even deeper, up to 8 feet depending on soil consistency and occupation time, as stated in the Rocky Mountain Arsenal Biota Barriers for Cap and Cover Systems, September 1997. The Colorado Division of Wildlife Web page on Prairie dogs states that burrows are up to 7 feet deep and 16 feet long and the April 1998, National Geographic report on prairie dogs states that typical burrows are about 6 feet deep and about 30 feet long, but can be deeper and longer. Prairie dogs are only able to move/remove material from burrows up to 2 ½ inches in diameter (Hakonson et.al. 1982. *Disturbance of Low-Level Waste Burial Site Cover by Pocket Gophers*. Health Physics. 42, pp. 868-871. Hansen and Morris 1968. *Movement of Rocks by Northern Pocket Gophers*. Mammal 49, pp. 391-399); they generally avoid areas where their burrows encounter particles greater than 1 inch in diameter (Hansen and Morris 1968). Therefore, the Rocky Flats Aluvium would generally not be attractive to burrowing prairie dogs. Based on process knowledge, OPWLs were drained when they were taken out of service. Removals of OPWLs to date indicate low levels of contamination. Most OPWLs in the plutonium area are either under buildings or within 6 feet of the surface. In both cases, they will be characterized. OPWLs not removed will be grouted to the extent possible.

	regulatory limit to the mound "area"? I also do not understand the rationale of applying the methodology to OPWL's to a depth of only 6'. Are there OPWL's deeper than 6', how many such structures are there, and are any suspected of leaking? Therefore, what is the rationale for limiting the evaluation of OPWL's to 6' depths? Prairie dogs certainly can construct burrow systems deeper (i. e., to 15 as per Sheets et al., 1971) and ants to 20' (as per Cole, 1966; Cowan, et al., 1985; Cline et al., 1976). Finally, the list of OPWL's (attachment 14) with known or suspected leaks leads me to wonder how many potential leaks are unknown. The question then becomes one of what RFETS is doing to identify leaks that have not been documented? I would also like to see some estimate of the inventory of radionuclides and chemicals that are still present in the OPWL's, in other words, how much contamination will NOT be assessed with the Appendix B methodology and will be left in place with no characterization or analysis?	
56	All process waste lines in the subsurface environment should be removed.	Please see responses to Comments 1 and 15, Category K.
58	My proposal is to ensure that the area remains fenced off, and under guard, until a complete clean up can be performed – perhaps more cheaply. Meanwhile, use the money currently available from "resultant savings of 210 million" (rmpjc.org) to remove subsurface pathways, as it is impossible to contain the contaminants currently stored underneath Rocky Flats forever. In fact, some of them may have already leaked. Nobody knows because nobody has ever looked.	Please see responses to Comments 1 and 15, Category K.

77	I also understand that underground piping will be left undisturbed and unchecked for contaminates. I find that totally irresponsible and dangerous to future generations	All original process waste lines within 3 feet of the surface will be removed. All suspected and reported leaks associated with original process waste lines between a depth of 3 and 6 feet will be sampled. Plutonium contamination above action criteria at that depth will be removed, and other contaminants must be addressed if they fail the Subsurface Soil Risk Screen outlined in RFCA Attachment 5 that looks at potential for landslides, erosion, or contaminant mobility. As discussed in the response to Comment 5.A, Category K above, to date those process waste lines that have been removed or that have been characterized as part of an underbuilding characterization program have exhibited little or no contamination.
34	All discussions of removing soil due to contamination from original process waste lines is aimed at the radionuclides. The Service recommends for non-radionuclides (acids, solvents, etc.), above PRGs, a statement be added that remedial decisions will be based on the application of the risk-screen (Attachment 5, Figure 3 as modified by Service comments 8 and 9). The Service comments concerning the subsurface contamination in Attachment 5 also apply to this attachment (characterization at depth and wildlife radionuclide PRGs, see comment 5).	Characterization will include sitewide and IHSS-specific COCs and accelerated action determinations will be based on the results.
86	Remove all underground process lines.	Please see response to Comment 15, Category K.
90	We further recommend removal of all process waste lines in the subsurface environment.	Please see response to Comment 15, Category K.
91	41. III, RFCA Attachment 10 Proposed Modification *CDPHE and DOE agree that the OPWL system was abandoned and not used after November 19, 1980 and therefore is not subject to interim status closure requirements.* Several site documents identify transition from the OPWLs to the NPWLs at a much later date than November 19, 1980. Provide the rationale for the agreement between CDPHE and DOE to make this statement. Not only do documents identify use of OPWLs at a later date, but	41. The Historical Release Report records that at least part of the OPWL was used after November 1980 and up until construction on the New Process Waste Lines (NPWL) was completed in the summer of 1984. A 1986 RCRA Compliance Order and CERCLA Agreement granted interim status to mixed waste units including the process waste lines that were in use at that time (NPWL) and did not include all OPWL. It is that agreement that is the reason that OPWL are not subject to interim status closure requirements.

	workers can also verify the dates the OPWLs were used and the NPWLs were put into service.	
	42. IV, RFCA Attachment 10 Proposed Modification Broomfield does not agree with the proposed language to utilize Colorado Hazardous Waste Regulation, 265.110 (d) to close the tank system, IHSS 101 and/or IHSS 114. Provide Broomfield with the rationale for this decision. Broomfield has requested on several occasions the rationale as to why the F039 EPA waste code does not apply to the leachate at the Present Landfill. Include the rational or delisting process for the F039 EPA code.	42. CDPHE agrees that tank system interim status units identified in Part II of Attachment 10 may qualify for closure under 265.110(d); however, CDPHE requires additional information to make such a determination for IHSS 101 and/or IHSS 114. The Present Landfill will be addressed through a separate decision document.
	43. Page 1, Original Process Waste Lines (OPWLs) Subsurface Approach Revise the draft language to reflect our proposed action levels and "step-out" approach. We do not agree with the statement characterization of UBC, potential areas of contamination, other IHSSs, and areas between IHSSs that are not yet characterized that overlies OPWLs will provide adequate characterization of soils for all other OPWLs. Due to the uncertainties with OPWLs and different waste streams being introduced from individual buildings, it is not appropriate to assume soils can be characterized based on areas that overlay OPWLs. Strike any language that references areal extent of contamination to evaluate remediation.	43. The OPWL Subsurface Approach has been modified as discussed above.
	Strike the draft language pertaining to performing plutonium speciation in the soil contaminated by OPWL leaks. We understand there is insufficient	The RFCA Parties believe that, if possible, plutonium speciation

		information to perform the evaluation. Of key concern to Broomfield is the transport of actinides when high concentrations of volatile organics are present. VOCs can carry particulates through the soil due to the mobility of the organics. Broomfield believes further studies need to be performed to model actinide transport via volatile organic transport.	data could provide valuable information on plutonium mobility in the subsurface. The RFCA Parties have consulted with the AME Advisors concerning plutonium particulate mobility associated with VOC contamination. The approach in the Subsurface Soil Risk Screen is consistent with their advice.
		Valve vaults should be removed if the action levels are exceeded. Remaining valve vaults may act as a conduit for VOCs to mobilize in the future.	Valve vaults will be removed, where practical.
		It is imperative to include a list of all OPWLS and NPWLS in the proposed draft RFCA. The information provided is not useful when trying to discern the location and depths of the lines. Revise the attachment to include all process waste lines, both new and old, their proximity to buildings or valve vaults, depth, and if they transported waste streams from the cold side of the site or from plutonium buildings. Also revise the attachment to include all the valve vaults, depths, and locations.	Those details will be included in appropriate decision and planning documents. Consistent with this approach, the details for OPWLs have been removed from Attachment 14 and are being incorporated into the Industrial Area Sampling and Analysis Plan.

RFCA Attachment Proposed Modifications

Response to Comments

Category: L. Adequacy of environmental regulations

Commenter No.	Comment	Response
5.B	Another aspect of the proposed clean-up is the issue of regulatory compliance. A slogan often used regarding the proposed clean-up is that it will be safe and compliant. The latter term refers to the simple fact that the finished job will meet all applicable legal requirements. My comment on this is: One could spend much time criticizing the applicable laws for their inadequacy. CERCLA, or Superfund, for instance, has a risk -- this has already been pointed out to us tonight -- has a risk range so broad that a thousand trucks of good or bad intent could be driven through its vast reaches, and this is one of the best laws we have. Risk assessment, itself an internal ingredient of the various regulations, is typically based on the averages of bodily effects or of population groups, rather than on protecting the most sensitive organ or most vulnerable individual. Average people don't get sick and die so readily as vulnerable ones. It is the latter we need to protect. Being compliant is not necessarily a badge of honor. Legality and safety are not identical.	Certainly risk assessment is a key component of environmental regulation in this country. However, it is not accurate to suggest that risk assessments like the one recently conducted at Rocky Flats are designed to protect the average individual. EPA's *Risk Assessment Guidance* specify that actions at Superfund sites be based on the Reasonably Maximally Exposed (RME) individual. This is the person who receives the highest exposure that is reasonably expected to occur at a site. In a probabilistic risk assessment the risk distribution represents the range of exposures and risks which can occur across a population, however, the risk managers must choose the high end of the risk range (in selecting the RSALs the 95th percentile of possible exposures were employed) to identify the RME individual and develop their action levels. Since the RSALs are developed to be protective of these highly exposed individuals, we consider them to be protective for the population as a whole. An additional level of conservatism (most scientists say the *majority* of the conservatism) is contained in the toxicity values (cancer slope values). These values are based on the most sensitive effects (the effects which occur at the lowest doses) in the most susceptible members of the population. It's a subjective issue as to whether legality equals safety. The regulatory framework that is driving the cleanup at Rocky Flats will unquestionably result in a site condition that poses much less risk to human health and the environment than the existing condition.

		However, we realize that what is considered acceptable risk under Federal regulation will not necessarily be considered acceptable by every member of the public.

RFCA Attachment Proposed Modifications

Response to Comments

Category: M. Acceptability of Risk-Based Approach

Commenter No.	Comment(s)	Response
1.a	The Coalition generally supports the RFCA parties' risk-based approach, provided Congress provides sufficient funding for long-term stewardship. Our support is rooted in the understanding, based on information supplied by DOE and Kaiser-Hill that the greater current risk to human health and the environment from radionuclides, including impacts to water quality, is due to surface soil contamination. Nonetheless, the Coalition also agrees with the RFCA parties' approach that a minimally compliant cleanup or straight risk-based approach is insufficient for Rocky Flats. There are critical factors that necessitate conducting additional remediation beyond a straight risk-based approach. These additional remediation requirements must be written into the RFCA.	The factors considered in making accelerated action determinations are written into RFCA Attachment 5, Section 4.2 and 5.3. In addition, once an action is triggered, individual decision documents, such as the *Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation*, also provide for formal consideration of other factors, such as long term stewardship criteria, in relation to the proposed action. The RFCA Parties have determined that the completion of accelerated actions in accordance with the final modifications to the RFCA Attachments will result in significant reductions of soil contamination and other risks posed by environmental contamination that go well beyond a minimally compliant cleanup.
1.b	Furthermore, for the issues addressed in this letter, our guiding end-state principles are reducing risk to a future user, protecting water quality, addressing uncertainty, developing and implementing a strong and comprehensive post-closure monitoring regime, and developing mechanisms to become aware of and address problems as they arise.	The RFCA Parties considered these guiding end-state principles and believe they are incorporated into the final modifications to the RFCA Attachments.

1.c	Finally, this paper does not have the support of either Boulder County or the City of Boulder. While the County supports a number of issues, concerns, and positions expressed in this paper, they disagree on others and are withholding judgment on still others. Moreover, the County believes local governments should not be opining about issues where they do not know all of the facts nor have all of the necessary information, and the County lacks complete confidence in the facts and information they do have.	Comment noted.
5.C	We believe, as an organization, that these principles that I've just outlined are addressed in the proposed modifications, so, based on that, we do support, in broad parameters, and, in many instances, specific parameters, the proposed modifications, the proposal to switch to a risk-based approach for the clean-up, and to establish a new clean-up standard. The reason for our support is really based on the idea that the greater risk to human health and the environment from radionuclides, including impacts to water quality, is due to surface soil contamination, and that's key. The greater risk to users, on-site and off-site people, to water quality is due to surface soil contamination, and what's being proposed when we get with these proposals, these modifications to the clean-up, is a better and a smarter clean-up and one that addresses key concerns the community has raised for many years. We believe, as an organization, that the clean-up is much better in alignment with community expectations, community interests, and community concerns, and let me cite a few of those examples. No. 1 -- and this goes to an issue that LeRoy mentioned -- is that the water leaving the site, water moving off-	This comment accurately captures the main attributes of the final modifications to RFCA Attachments.

	stream, off-site, the plant site, will be protected to the most stringent standard. There is no more stringent standard for the water moving off the site, so that's the first thing where we believed our interests are being met. Second is that surface clean-up standards are dramatically reduced and they also correspond to the independently led community study, and I was looking around the room here. Victor, Joel, and LeRoy are three people -- and I don't think there's anybody else in the room from the community who was integrally involved in that process for reviewing the surface soil clean-up standards for Rocky Flats, and the surface clean-up standard for plutonium is in line with that community-led effort, and that's something that I think we need to keep in mind and part of the reason why the coalition is supporting the modifications that are being proposed. We'll also have mechanisms in place to know whether a problem arises in controls that have been put in place to manage residual contamination, and the fourth basis for our support is what I talked about a moment ago, of having the regulatory RFCA Parties have enforcement authority post-closure.	
67	A major consequence of the decisions made without public input is what the government RFCA Parties refer to as the ''tradeoff." The key question that emerged for them after the public's rejection of the 1996 RFCA was how to provide a publicly acceptable cleanup for the same sum of money. They hit on the idea of offering better surface cleanup in exchange for fewer cleanups in the subsurface environment. They would take a "risk-based approach" of tailoring cleanup to a legally acceptable risk level for the "reasonably * maximally exposed individual"	The RFCA Parties understand that some in the community do not accept a cleanup and closure that does not remove all contamination, while meeting all regulatory requirements. The final modifications to RFCA Attachments will result in a safe and environmentally compliant cleanup and can be implemented to meet a target completion date of 2006. The RFCA Parties believe that the final modifications to RFCA Attachments provide for a cleanup that is more comprehensive and conservatively protective than the former approach under the 1996 RFCA Attachment 5. Based on federal budget deficit projections, it is very important to complete the cleanup and closure of Rocky Flats in accordance

	(Superfund language), which, for Rocky Flats, of course, would be the wildlife refuge worker. Future use, the cleanup scenario, and fixed funding thus all came together. If the surface is cleaned to protect the refuge worker within the Superfund risk range and if it can be shown that the contaminants in the subsurface environment pose no appreciable risk to the refuge worker, we will have a cleanup package that complies with regulatory standards and can be paid for with the limited sum available. The clincher in selling this deal to the public is to insist on the absolute non-availability of more funds. To comment, for ANA, there is no way to avoid the conclusion that, though the projected cleanup will comply with applicable regulatory standards as it must, the primary driver for the plan is money, the fixed sum agreed to without public input.	with the target schedule and cost. This importance is reinforced by correspondence from Senator Allard and Congressman Udall to the RFCA Parties dated December 16, 2002, which emphasizes that there are very serious limitations on the federal budget. The goal of the Rocky Flats cleanup and closure project is to complete all work necessary to achieve a safe, fully compliant cleanup by the target date of December 15, 2006. While cleanup work is constrained by resources, if additional actions are necessary to adequately protect human health and the environment and to comply with legal obligations, the DOE will seek the appropriate funds needed to take these actions.
	A. According to the tradeoff, DOE and the regulators propose to clean the surface soil (defined as the top 3 feet) to a level for plutonium of 50 picocurie/gram of soil (pCi/g), much better than the 1996 level of 651 pCi/g. For the subsurface soil (below 3 feet) the RFCA Parties propose to leave plutonium at levels up to 3 nanocuries/gram (3,000 pCi/g).	A. The final modifications to RFCA Attachments do not minimize cleanup, instead they result in more risk reduction than would be achieved under the 1996 RSAL and RFCA accelerated action requirements. The RFCA Parties note that the action levels are used to trigger an accelerated action, and while the goal of an accelerated action is to remove soils (where the accelerated action decision is soil removal) to levels that will achieve at least a $1x10^{-5}$ risk, in many instances the removal process will result in more than just the minimum amount of contamination being removed.
	B. Cleaning of the subsurface environment will entail removal of portions of the roughly 7 miles of old process waste lines that once carried a brew of radioactive and toxic liquid wastes. The plan is to remove parts of the lines known to have ruptured and leaked. The lines, however, have not been completely characterized and will not be. We note	B. Based upon consideration of comments, the RFCA Parties have changed several aspects of the proposed modifications in the final modification. Once an accelerated action is triggered in the subsurface between 3 and 6 feet below the surface, the final modification requires removal of Pu-239/240 down to 1 nCi/g versus the proposed modification requiring removal

	that in a November 16, 2002, editorial the Denver Post questioned the plan not to remove all these old process waste lines.	to 3 nCi/g. Also, if on initial characterization Pu-239/240 contaminated soil above 7nCi/g between 3 and 6 feet below the surface is encountered, it will trigger an accelerated action versus the proposed modification trigger of 10 nCi/g.
	C. Contaminated groundwater will continue to pose a problem at Rocky Flats for the foreseeable future. Because of the geology of the site groundwater becomes surface water by percolating down to bedrock then moving laterally to seep from the slopes above the streams that bisect the site. Colorado has a state surface water standard for plutonium of 0.15 pCi/liter. This standard is enforced at the downstream site boundary by use of a 30-day rolling average of samples collected there. At closure the state standard will apply not only to water leaving the site but also to surface water on the site, though DOE and the State have agreed to a 365-day averaging period for onsite samples. A study done at Rocky Flats in 2000 concluded that the state surface water standard could not be met even if the action level for plutonium in surface soil was as low as 10 pCi/g. To try to comply with the state standard the government RFCA Parties expect to rely on engineered controls.	C. In developing the final modifications the RFCA Parties have considered the advice and recommendations of the Actinide Migration Evaluation Panel, which conducted a scientific review of Pu-239/240 mobility. The Panel concluded that Pu-239/240 in soil is extremely insoluble and does not easily move in groundwater at Rocky Flats. Extensive, long term groundwater sampling at Rocky Flats does not show the presence of Pu-239/240, which supports the scientific conclusions of the Panel. The RFCA Parties note that Pu-239/240 contamination in surface water at Rocky Flats is well below the surface water standard at the points of compliance even though removal of surface and near surface soil contamination above the RSALs remains to be done. The RFCA Parties understand that surface water protection is a high priority and that implementing the new lower RSALs is expected to enhance the long term protection of surface water quality. The RFCA Parties note that the three groundwater accelerated actions implemented to date that employ passive barriers and flow-through treatment cells to intercept and treat low levels of volatile organic and metals contamination are performing well and protecting surface water quality. It is expected that these treatment systems will provide long term effective treatment so that groundwater does not impact surface water quality. The majority of the contaminants being treated by these treatment systems have finite lifetimes in the environment, and they are expected to be removed from the environment at Rocky Flats in a matter of decades.

	D. Other features of the risk-based approach are assurance from the RFCA Parties that the site will remain under federal control and that contaminants left in the environment will be contained by a mix of institutional, physical, and engineered controls. Given the 24,400 year half-life of plutonium, this whole risk-based approach, in our view, is a recipe for disaster, since there is no way to guarantee that controls put in place will last even a reasonable fraction (say, 10%) of the half-life of plutonium, much less for the far longer period the material in particle form will pose a risk. The "risk-based concept, moreover, is misnamed since it fails to take into account all risks, especially the totally unknown risks to humans and other creatures that may inhabit and/or use the Rocky Flats site in the future when unpredictable human or natural actions may have radically altered conditions at the site.	D. The long half-life of Pu-239/240 has been considered by the RFCA Parties and we have determined that the final modifications to RFCA Attachments address the risks posed by any Pu-239/240 soil contamination remaining at the Site. Specific requirements for institutional controls will not be established until the comprehensive final remedy decision is made through a CAD/ROD for the Site. The RFCA Parties acknowledge that the Rocky Flats National Wildlife Refuge Act of 2002 requires that the Site remain in federal ownership and believe that federal ownership will likely facilitate the implementation of any necessary controls. These anticipated controls are further described in RFCA Attachment 5, section 1.2, but consist primarily of management controls that are not difficult to implement, e.g., no groundwater wells, no buildings in areas where contamination has not been removed, etc.
34	After attending stakeholder meetings and reading numerous documents about the radiological soil action levels, the risk-based approach, and end-state issues, and providing additional information to the RFCA Parties, the Service is, in general, supportive of the modifications.	Comment noted.

RFCA Attachment Proposed Modifications

Response to Comments

Category: N. Surface

Commenter No.	Comment(s)	Response
1	The Coalition supports the RFCA parties' proposal to establish a minimum surface cleanup level for plutonium of 50 pCi/g, and to define surface as 0 - 3 feet below current grade. The existing six-inch standard for defining surface is inadequate as it does not take into consideration differing rates of erosion across the Site nor challenges either DOE or U.S. Fish & Wildlife Service (USFWS) would have in enforcing access restrictions below such a shallow depth. As an example, Dean Rundle (USFWS) noted at the April 1, 2002 Coalition Board meeting that revegetation requires disturbance of the upper twelve inches of soil. In addition, given the substantial contamination in the B-series ponds and DOE's anticipation that little surface water will flow through these ponds post-closure, the sediments in the B-series ponds and associated ditches must be remediated as surface soils. Finally, while we support the above surface cleanup approach, we believe it may only address part of the surface soil problem. This approach may be inadequate in areas where volatile organic compounds (VOCs) were spilled or released, because a surface expression of contamination may not exist. A method needs to be in place to address potentially high concentrations of VOCs that may exist in soil down to three feet below grade, but may not have a surface expression.	Accelerated action determinations for soils apply to sediments. VOCs that may have been spilled on the surface may not have a surface expression because the contaminants close to the surface have volatilized. The Subsurface Soil Risk Screen method adequately considers the risks posed by VOCs in soil deeper than six inches. Each IHSS will be adequately characterized to determine the concentration of VOCs and other contaminants of concern in the soil below the surface for evaluation in accordance with the Subsurface Soil Risk Screen.

4	The Coalition supports the draft RFCA language establishing a surface cleanup level of plutonium of 50pCi/g and the commitment to define surface as zero to three feet below grade. We also support the action level for americium. The Coalition is concerned, however, about the following provision: "Where plutonium and/or americium soil contamination greater than the action level is present at a depth of less than 3 feet, but did not originate at the surface, soil contamination will be removed unless, after consultation with the Lead Regulatory Agency, it is decided that the concentration and aerial extent is such that removal is not warranted." The provision with the aforementioned caveat ("unless…it is decided…that removal is not warranted") may result in potentially high concentrations of radionuclides being left in soils that are easily accessible by a wildlife refuge worker. As the Coalition stated in its September 9th letter, we support removal of all radionuclides in soil zero to three feet deep, regardless of the presence or absence of a surface expression. The importance of this point cannot be understated, for one of the key principles to which the Coalition agreed in modifying existing cleanup standards was increasing surface cleanup in exchange for relief on subsurface cleanup. Any language that would modify this agreement must be stricken.	The RSAL for plutonium 239/240 or Am-241 applies within the top 3 feet of soil. The proposed modification to ALF Section 5.3.C provided that an accelerated action to remove soil would be triggered if the contamination above the RSAL originated on the surface. For contamination found within 3 feet of the surface, but not originating on the surface, an accelerated action determination in accordance with the Soil Risk Screen would be made. The final modification to Attachment 5 no longer makes this distinction, and the reference to contamination originating on the surface in section 5.3.C has been deleted.
5.A	On the surface RSAL, we think it should apply to the top three feet, regardless of the radionuclide level. In the current proposal, we'd like to see three feet for both uranium and plutonium. We'd also like to apply the ALARA principal, as low as reasonably achievable, or, in other words, apply the best management practice. In other words, if they're digging up surface contamination and they found that, at three feet, there's still contamination but they're taking one more shovelful of the backhoe to remove that contamination, we expect them to continue to remove the contamination until it's gone, and this is	The RSAL for plutonium 239/240 or Am-241 applies within the top 3 feet of soil. The proposed modification to ALF Section 5.3.C provided that an accelerated action to remove soil would be triggered if the contamination above the RSAL originated on the surface. For contamination found within 3 feet of the surface, but not originating on the surface, an accelerated action determination in accordance with the Soil Risk Screen would be made. The final modification to Attachment 5 no longer makes this distinction, and the reference to contamination originating on the surface in

	just best management practice. We also recommend that DOE carefully examine other technologies besides soil excavation. The current baseline proposal is based on removing the top six inches of the soil. Not only is this expensive, but it's also ecologically damaging. It would remove all of the topsoil, virtually. We'd like to see them look into other technologies, such as soil vacuuming, and there are some other possibilities. We'd also like to see that these demonstrations be open to the public so that we're better able to evaluate those. In the past, they have not been open to the public.	section 5.3.C has been deleted. Uranium contamination concentrations are considered in determining whether Pu-239/240 or Am-241 concentrations exceed the RSAL within the top 3 feet of soil based upon the sum of the ratios calculation. If the Pu-239/240 or Am-241 RSAL is exceeded and an action triggered the coexisting uranium would also be removed. However, if Pu-239/240 or Am-241 contamination is below the RSAL or is not present, uranium contamination below six inches from the surface would trigger an accelerated action based upon the results of the Subsurface Soil Risk Screen evaluation. The best management practices, consistent with ALARA principles, as suggested by the comment will be evaluated through field consultation and additional soil removal will be performed as practicable. We do not agree that the best management practice will always result in removal of all contamination. Implementable, cost-effective technologies such as soil vacuuming, will be examined and demonstrations of such technologies will be open to the public, as practicable.
7	1. Surface soils with a depth of zero to three feet shall be remediated to less than 50 pCi/g Pu.	The RSAL for plutonium 239/240 or Am-241 applies within the top 3 feet of soil. The proposed modification to ALF Section 5.3.C provided that an accelerated action to remove soil would be triggered if the contamination above the RSAL originated on the surface. For contamination found within 3 feet of the surface, but not originating on the surface, an

		accelerated action determination in accordance with the Soil Risk Screen would be made. The final modification to Attachment 5 no longer makes this distinction, and the reference to contamination originating on the surface in section 5.3.C has been deleted. Uranium contamination concentrations are considered in determining whether Pu-239/240 or Am-241 concentrations exceed the RSAL within the top 3 feet of soil based upon the sum of the ratios calculation. If the Pu-239/240 or Am-241 RSAL is exceeded and an action triggered the coexisting uranium would also be removed. However, if Pu-239/240 or Am-241 contamination is below the RSAL or is not present, uranium contamination below six inches from the surface would trigger an accelerated action based upon the results of the Subsurface Soil Risk Screen evaluation.
39	Iggy Litaor [sic] found that pu moves in saturated (wet) soil.	Previous studies related to actinide migration have been considered. No credible evidence has been found indicating Pu movement in the subsurface or solubility in ground water. This has been extensively evaluated by the Actinide Migration Panel.
47.a	Page 20, second paragraph, last sentence. We disagree that non-radionuclide contamination will only be remediated in the top six inches of soil and the Soil Risk Screen will be used for depths greater than six inches. Westminster supports the surface soil definition of three feet for both radionuclide and non-radionuclide contaminants.	The RFCA Parties understand the recommendation expressed by some commenters that the same accelerated action soil removal depth should apply to all contamination. However, the RFCA Parties believe that the significant lowering of the Pu-239/240 and Am-241 RSAL and removal of Pu-239/240 and Am-241 above the RSAL down to 3 feet below the surface addresses a paramount community concern over the perceived risks posed by these radionuclides and is appropriately balanced by application of the Subsurface Soil Risk Screen in evaluating appropriate actions below six inches from the surface for risks posed by other contaminants.
47.b	Page 5-2, Put-back levels. Justify the sentence, "DOE may, with LRA approval after appropriate consultation, replace excavated	The RFCA Parties believe that there may be limited situations where this flexibility would be appropriate. An

	soils with contaminant concentrations greater than the put-back levels."	example is where deeper subsurface contamination is characterized as an isolated data point and is overlain by large volumes of less contaminated soils. The less contaminated soils would have to be removed to access and remove the higher contamination. If the less contaminated soils could not be evaluated for put-back as a best management practice in the context of removal of the higher contaminated soils, it may result in a decision to not remove the deeper contamination. Note that the LRA must approve the put-back.
47.c	Page 5-17, Section 4.2.B. and C. We disagree that non-radionuclide contamination will only be remediated in the top six inches of soil and the Soil Risk Screen will be used for depths greater than six inches. Westminster supports the surface soil definition of three feet for both radionuclide and non-radionuclide contaminants. In addition, the Coalition supports, "A method needs to be in place to address potentially high concentrations of VOCs that may exist in soil down to three feet below grade, but may not have a surface expression." There is no clearly defined method described in the proposed changes to the RFCA.	See response to Comment 5.A, Category N.
34	Attachment 5, Page 5-2, Put-back levels – Please elaborate on what is meant by "appropriate consultation". Is the Lead Regulatory Agency the only entity that will have input into the decision? In reality, this decision will have to be made quickly, but the Service should be included in the consultation, whenever possible.	Although each situation may be different, it is not anticipated that the decision to allow put-back of soils above the action levels will have to be made so quickly that adequate time for consultation will not be allowed. In most instances the consultation is expected to occur as part of the Action Determination process. The appropriate consultation will include consideration of input from the Fish and Wildlife Service.

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91.a	SURFACE SOIL CONTAMINATION Broomfield agrees with the draft language establishing a surface cleanup level of 50 pCi/g for plutonium and identifying the surface as zero to three feet below grade. We also support the approach for americium.	
	Where characterization data show that plutonium and/or americium soil contamination originating at the surface exceeds the action level, DOE will remove sufficient radionuclide contamination to at least meet the action level within the three feet. If plutonium and/or americium soil contamination greater than the action level extends below three feet in depth, the Soil Risk Screen, Figure 3, will be used to evaluate the potential risk of exposure and the need for further action. Broomfield supports the removal of all radionuclides above the action levels in soil zero to three feet regardless of the presence or absence of a surface expression.	The final modification to Attachment 5 no longer makes this distinction, and the reference to contamination originating on the surface in section 5.3.C has been deleted.
	Where plutonium and/or americium soil contamination greater than the action level is present at a depth of less than three feet, but did not originate at the surface, soil contamination will be removed unless, after consultation with the Lead Regulatory Agency, it is decided that the concentration and aerial extent is such that removal is not warranted. This caveat is not in agreement with our proposal of increased surface removal and would allow for levels greater than the action level to remain in an area with a high potential to be accessed by wildlife or a wildlife worker. The potential for erosion is also much higher within the surface area and the risk to impact surface water would be unacceptable to Broomfield. Remove any language that may result in potentially high concentrations of contaminants remaining within the zero to three foot depth and clarify the details of the plan for depths greater than three feet.	The Subsurface Soil Risk Screen methodology provides for appropriate evaluation of pathways of exposure and resulting risk to a Wildlife Refuge Worker from soils below the surface that are contaminated with non-radioactive materials or uranium (due to its chemical toxicity). Removing Pu-239/240 or Am-241 above the RSAL down to 3 feet before applying the Subsurface Soil Risk Screen is based upon the RFCA Parties' consideration of public concerns over plutonium and americium through an approach that preferentially removes these contaminants.
	Where soil contamination is identified below six inches in depth, the Soil Risk Screen, Figure 3, will be used to evaluate the	

	potential risk of exposure and the need for further action. Broomfield does not agree with the definition of surface soil being defined as six inches for the removal of non-radionuclide contaminants. Any non-radionuclide contaminant above the action level within the zero to three foot depth should be excavated. Modify the language to reflect our principle to increase surface cleanup to allow for relief in the subsurface cleanup. Remove any language that may result in potentially high concentrations of contaminants remaining within the zero to three foot depth. *Where soil contamination exceeds the ecological action levels in Table 3, Soil Action Levels, DOE will consider the target species and the exposure unit for that species, and the location, areal extent, and concentration of contamination in evaluating and determining appropriate accelerated actions necessary to protect ecological resources. Accelerated actions to protect ecological resources may include the use of biota barriers, soil removal or target species management actions.* Strike any language that conflicts with our revenue neutral approach. Broomfield is concerned the site is suggesting the use of biota barriers to reduce risk to ecological resources may allow residual contamination to remain that has a potential to impact ecological resources at a future point in time. Physical controls will fail and the draft language does not identify the process to maintain biota barriers. Stewardship lifecycle costs should also be evaluated based on the life of the contaminant. The use of target species management actions as an accelerated action needs to be defined along with the data quality objectives of the proposed plan. The details of proposed accelerated actions other than excavation should be included in the draft language. Remove any language that may result in potentially high concentrations of contaminants remaining within the zero to three foot depth and clarify the details of the plan for depths greater than three feet.	The RFCA Parties do not agree biota barriers or target species management actions should be removed from consideration. The application of various ecological resource protection methods will be evaluated and described in relevant decision documents.

91.b	PUT-BACK LEVELS Strike any language that would allow any soils to be put back that are at the action level or exceed the action levels for surface soils. Such material shall be dispositioned as waste and not used as backfill at the site. Strike any language that may allow approval of soil with contaminant concentrations greater than the put-back levels. 10. Page 5-2, ¶ 4, Put-back levels *DOE may, with LRA approval after appropriate consultation, replace excavated soils with contaminant concentrations greater than the put-back levels.* Strike any proposed language that would allow soils to be put back if the concentrations are at or greater than the action level in Table 3. Any soils that are at or exceed put back levels identified in Table 3 shall be treated as waste and dispositioned accordingly per the waste acceptance criteria.	Please see responses to Comments 34 and 47.b, Category N.
91.c	32. Page 5-21, A, Action Determinations We support the removal of all radionuclides in soil zero to three feet deep regardless of surface expression. Delete any language that references surface expression as criteria to remove americium and/or plutonium in the zero to three foot depth. 33. Page 5-21, B, Action Determinations Revise the language to reflect that DOE will remove uranium that exceeds or meets the action level in the zero to three foot depths. Any language that does not reflect our agreement to increase surface soil cleanup in exchange for relief on subsurface soil cleanup should be deleted.	32. The final modification to Attachment 5 no longer makes this distinction, and the reference to contamination originating on the surface in section 5.3.C has been deleted. 33. The RFCA Parties have determined that the final modification, which preferentially removes more plutonium and americium from the surface and near surface, adequately address uranium through the application of the Subsurface Soil Risk Screen methodology. It should be noted that any uranium contamination that is collocated with plutonium or americium must be considered in calculating the sum of ratios in determining whether an action level for any

	34. Page 5-21, C, Action Determinations Strike the caveat to allow consultation with the Lead Regulatory Agency to allow contamination to remain that is greater than the action level at a depth of less than three feet. Any language that does not reflect our agreement to increase surface soil cleanup in exchange for relief on subsurface soil cleanup should be deleted.	radionuclide is exceeded. It should also be noted that the proposed new lower action levels for uranium isotopes will trigger more soil removal than the previous RSALs for uranium. 34. The RFCA Parties do not believe the characterization of the proposed modification provides "relief" from any existing requirements that response actions must be protective of human health and the environment. Rather, the modifications to RFCA Attachments implement an approach that applies resources to surface and near-surface contamination rather than to subsurface contamination that has only remote, indirect or incomplete pathways to exposure.

RFCA Attachment Proposed Modifications

Response to Comments

Category: O. Adequacy of Cleanup

Commenter No.	Comment(s)	Response
18	I am a resident of Boulder, and would like to express my concern about the level of clean-up at Rocky Flats that the DOE is proposing. The Rocky Flats area is so close to a couple million people, one would think that the commitment to cleaning up the site to truly safe levels would be a #1 priority. While the expenses of such a clean-up are high, we should be allocating funds for things like that as opposed to military build-ups. The fact that many people are unaware of the dangers inherent in an incomplete clean-up should not be used as a justification for that inadequate clean-up. We live here, and we are American citizens. Part of "homeland security" is the knowledge that we are doing what we can as a society to assure a safe environment for a major metropolitan area. Therefore, put me on a record as a concerned citizen who wants the remaining plutonium levels (which we shall live with for tens of thousands of years) at the Rocky Flats site to be no more than 5 picocuries per gram, who wants you to not restrict clean-up efforts to an arbitrary ending time (but to go on as long as is required) or to a budgetary figure that may not be enough, and who wants you to thoroughly clean all remaining buildings, waste pipelines, and toxic soils--all of these considerations to bring about an adequate and safe clean-	The risk-based approach embodied in the final modifications to RFCA Attachments was developed with significant input from members of the public and local officials, and will result in a cleanup that poses insignificant risk to surrounding communities and very little risk to future users of the site itself.

	up of an area so close within metropolitan Denver.	
3	I continue to support and recommend the following: • That Rocky Flats be cleaned to protect the family of a resident subsistence farmer. • That plutonium in surface soil be cleaned to 5 or less picocuries per gram, with cleanup depth determined by the depth of contamination.	Please see General Response.
6	Please propose and implement a full clean up of Rocky Flats. My mother always told me to clean up after myself. I would hate for us to leave a mess for our children. Let's be responsible adults, put our money where our mouth is and leave a legacy of responsibility.	Please see General Response.
9	AS a physics PhD I have often found that scientific findings contain considerable uncertainty. The cleanup of Rocky Flats bears public health implications for 1000s of years. Therefore your office should thoroughly characterize and clean the site to the maximum extent possible (with additional federal funding if necessary), i.e., not (as planned currently) only to the limited extent to provide a wildlife refuge, and not by an arbitrary date, with an arbitrary sum spent. Public health demands the maximum safety margin. And it's the governments moral obligation, after so much spent on weapons.	Please see General Response.
11	I object to the unwillingness to go below the surface layers for cleanup of RF. We were willing to spend unlimited $$ and time in the false name of national defense (Read post cold war analysis by General Lee Butler) to pollute the site. It should be cleaned up fully to subsistence farmer levels and not the current showcase wild life refuge in the name of cost-effective timely cleanup that is really a coverup.	Please see General Response.
14	Do you know what the land under your office or your home was being used for 50 years ago? How about 200 years ago?	The modifications to RFCA Attachments will result in very low levels of residual contamination at Rocky Flats. The risk associated with these levels will pose an excess lifetime cancer risk of less than

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	500 years ago? How much do human patterns of settlement change in a single century? What will the Rocky Flats area be used for 100 years from now? 500 years? 2,000 years? Since we can't answer these questions, we need to assume that people COULD be living there, drawing water from local sources, and eating agricultural products grown in that soil as a major part of their diet. No fences, no warnings can be guaranteed to survive for as long as the region would need to be kept free of settlement under your current proposal. Could you read a warning written in the middle English of Chaucer (only a few hundred years old), let alone the cautionary inscriptions on a Pharaoh's tomb?	one in 100,000 to the refuge workers at the site, and a much smaller risk to members of the public who visit the refuge. After closure the risk posed to the public that surround Rocky Flats will be insignificant. In the hundred-year history of the refuge system a refuge designation has not been lost inadvertently. Nevertheless, even in the event of a loss of use as refuge, for the unlikely rural residence scenario the value of 50 pCi/g represents an excess life time cancer risk of less than one in 10,000; a value well within the CERCLA risk range.
19	It is imperative that Rocky Flats is thoroughly cleaned to the maximum extent possible to insure the health and well being of the people of the Boulder-Denver area. I want to be able to birth a child here and not worry whether she will develop cancer because of the plutonium in the environment. I urge you to do whatever it takes to clean this weapons site.	Please see General Response.
24	I'm saddened and shocked to hear that the clean up process at Rocky Flats may not be thorough. What a waste of time and money the past few years have been! Any amount of plutonium left at the site is TOO MUCH! I am a yoga teacher. I've taught employees at the Rocky Flats site. This is my motto, and it applies to all areas of life, but especially to our individual and collective conscience: Renewal must be of the whole being – body,	Please see General Response.

	mind, and soul – or the neglected parts will become larger than life. Please don't settle, nor ask us to settle, for less than complete renewal of this area.	
10	My wife and I urge you to push for really adequate clean clean-up standards for Rocky Flats. We have a chance now. We will not have a chance later. The Future is Now! We do not have to do i[t] now. We can extend the project beyond 2006, but we connote, in good conscience leave plutonium pollution for future generations to discover on their own. Since there is no way to assure that they will know it is there we must clean it up ourselves. When we started this during World War II it was victory at any cost. Now it is time to "pay the piper", not to let unsuspecting discover for themselves the invisible, poisonous radioactivity in the soil. My grandchildren know it is there. My great grandchildren probably will not, unless we do it right, right now.	The removal of all contamination at Rocky Flats is not possible for both technological and financial reasons, nor is it required from a regulatory standpoint. The final modifications to RFCA Attachments recognize these constraints and outlines a cleanup that will result in very little risk to future site users and makes commitments for long-term care and maintenance of the site to ensure that the remedy remains protective.
22	I am writing to urge the government to follow through on its commitment to thoroughly clean the rocky flats site. The consequences of not doing so will have negative environmental and human health consequences for years to come. We mothers have been trying to get you boys to clean up after yourselves forever. Please grow up! Other people will trip on the stuff you leave lying around.	Please see General Response.
15	1. The Rocky Flats should be cleaned to protect the family of a resident subsistence farmer. This would ensure the cleanup is safer for any future use at the site.	DOE, EPA and CDPHE do not think it is likely that the site would be used for subsistence farming in the foreseeable future. There is little water available on site and the soils are extremely rocky. The risk-based approach will result in a site condition that would be protective of a wildlife refuge worker and rural resident in the

		unlikely event that residential use were allowed on site.
16.a	• The final plan for the cleanup of Rocky Flats is inadequate. • A thorough cleanup is imperative. • The poor cleanup standards adopted in 1996 stand as a formidable roadblock to a thorough cleanup. • Neglecting cleanup on the basis of protecting the environment is ludicrous. • All of the contaminated environment at Rocky Flats, the Buffer Zone, and beyond needs to be cleaned up, whether it be the tall grass prairie or the Preble's Meadow Jumping Mouse's habitat. • The extent of the cleanup and protection plans for the Rocky Flats site will directly affect future generations; cleanup to levels that are of the same order-of-magnitude as the background must be accomplished as part of the plan.	The amount of contamination that would remain at Rocky Flats after the implementation of the accelerated actions would result in a lifetime excess cancer risk of less than one in 100,000 to a wildlife refuge worker. This level of risk is clearly within the range of acceptable risk as defined by Federal and State environmental law. There is no regulatory mandate for cleaning up to levels approaching background.
16.b	• The RFCA guide lines contain vague phrases including those such as "ALARA", "Best Management Practices", "appropriate consultation", "sharp concentration gradient", "...action will be taken as warranted", "...source evaluation", and "consultive process". • All vague phrases, definitions, and actions need to be clearly defined or removed from the guide lines. • Human activity at the site must be eliminated from the plans.	It is true that concepts such as "As Low As Reasonably Achievable (ALARA)", "Best Management Practices" and "action taken as warranted", are subjective and therefore leave some uncertainty surrounding the action that will taken. However the cleanup of Rocky Flats is a complex proposition and it is important to leave room for some discretion in the conduct of operations. There will almost certainly be situations where it makes sense for DOE to employ ALARA or Best Management Practices to scoop up contaminated material even though the level of contamination is below the action levels. Conversely, one can anticipate instances where the effort to chase small amounts of contamination would pose undue risk to worker safety of sensitive habitats relative to any public health or environmental benefit .
17	I want to express my view that the cleanup of Rocky Flats as now proposed is inadequate. This site has been contaminated with many incredibly toxic substances, from Pu to TCE, and this contamination has been transported into the soil at some depth. To have a cleanup	The RFCA Parties believe there is good justification for generally not chasing contamination below a depth of 6 feet. Given the anticipated future use of the property, a National Wildlife Refuge, it is extremely unlikely that contamination at that depth would be disturbed by human or animal activity. Refuge workers on the site

	that goes no deeper than the frost line is a mistake, and leaves [h]umans and other creatures at risk for a very long time. In particular, the dumping of volatile organic compounds has put them into the soil at depths where they are migrating both horizontally and vertically. These VOC's need to be mapped, and then cleanup up.	would rarely have cause to excavate deeper than the frost line and burrowing animals rarely venture that deep. It is especially difficult for animals to burrow that deep on a rocky pediment such as Rocky Flats. The extent of VOC contamination has been monitored and mapped at Rocky Flats. While there has been some horizontal migration of these contaminants, tight, clay-rich layers of rock have prevented significant vertical migration. Ground water treatment systems have been installed to address the problem of horizontal migration. The RFCA Parties anticipate that at least one additional treatment system may be installed.
8	It has come to my attention that the government no longer wishes to honor its contract with the people to thoroughly and completely clean up the radioactive wastes and imbedded plutonium particles in the soils of Rocky Flats. In response to that, I want to tell you that in any terms, that is that NOT OKAY with me. You and/or the government do not have my agreement. Your attempt to downplay the hazards that have been created there and the reluctance to take responsibility for the implications upon the health of the people and the impact upon the land and nature is irresponsible and reckless behavior. Clean up the mess that you created!	There is no attempt to downplay the hazards presented by contamination not removed from Rocky Flats in the modifications to RFCA Attachments or in the risk assessment (Task 3 Report and Appendices, *Calculation of Surface RSALs for Plutonium, Americium and Uranium*) that forms the basis for those modifications. Years of data collection have been combined with a very comprehensive effort to assess the risk posed by the contamination at Rocky Flats. The risk assessment was developed in a very open process with considerable input from local governments and members of the public. This assessment employed the most current information about the health effects of the contaminants at Rocky Flats and was thoroughly peer reviewed.
20	Recently a decision was made by the Department of Energy which committed us to a plan of cleaning up the pollution at the former Rocky Flats weapons plant to a level that is below the maximum extent now possible. I believe that this is quite dangerous both to the people and to the environment of the surrounding area. Every effort should be made to prevent the dangerous contaminants such as plutonium from lingering in the soil, water and	The modifications to RFCA Attachments will result in low levels of residual contamination that have exposure pathways at Rocky Flats. The risk associated with these levels will pose an excess lifetime cancer risk of less than one in 100,000 to the refuge workers at the site, and a much smaller risk to members of the public who visit the refuge. The risk posed to the public that surround Rocky Flats is insignificant.

	air near Rocky Flats. These harmful substances could easily enter the tissues of animals and plants in the area, causing severe damage to the ecosystem and any plan which does not address this problem to the best of our ability is, in my view, inadequate.	
12	Plutonium is one of the most toxic if not THE most toxic contaminants on our planet and time and time again it has been shown that Rocky Flats land is inundated with it. Corporations have, with the help of OUR Federal Government Departments been allowed for decades to treat this toxic waste site as though it were a garbage dump. Rocky Flats needs to be cleaned up with the thought in mind that every time someone walks on this land and disturbs the subsurface soil and plants, radioactive particles are released into the air where just one particle imbedded in the human or animal body can cause cancer, and any number of other diseases. This stuff has a half-life of 24,400 Years for Gods' sake!	A large body of information exists about the toxic effect of radioactive material such as plutonium. This information was employed in the risk assessment (Task 3 Report and Appendices, *Calculation of Surface RSALs for Plutonium, Americium and Uranium*) that was used as the basis for the modifications to RFCA Attachments. Also, please see General Response.
23	I have heard that the government RFCA Parties say they will not clean Rocky Flats to the maximum extent now possible. Because of the long-lived nature of some of the contaminants, especially plutonium, the pollution left in the environment at the site will affect the health of people and the environment in the Denver area forever. Please do everything in your power to protect the viability of our environment, our health and that of our children's children.	Please see General Response.
21.a	As a resident of Boulder, Colorado which is so near Rocky Flats I need to send a note of disappointment about the inadequate proposal to clean up Rocky Flats. At this point scientists predict that plutonium has a half-life of 24,400 years, plutonium remains dangerously radioactive for a quarter-of-a-million years. That's a lot	Please see General Response.

	longer than we've been on the planet and I expect over time we'll know even more about the effects of plutonium than we do today. The current proposal will not entirely clean up the plutonium and we're going to be left to live with it. The idea of turning the area into a wildlife preserve seems absurd even if all the plutonium was to be removed. An alpha emitter, it can be harmful in very tiny amounts if inhaled, ingested, or taken into the body through an open wound. Once lodged in the body, it constantly bombards surrounding cells with radiation, potentially damaging cells hit directly as well as nearby "bystander" cells. The result can be cancer, immune system damage, or genetic aberrations that get passed on to future generations. Any quantity of plutonium left in the environment thus constitutes an essentially permanent danger. (On cellular damage that may be caused by a single plutonium particle, see Hei et al, Proceedings of the National Academy of Sciences, vol. 94, Ap. 1997; Kadhim et al, Nature, vol. 355, 20 Feb. 1992; and Edwards, New Scientist, vol. 11, Oct. 1997). Please throw this e-mail in with the other votes against the current proposal. I agree with the Rocky MountainPeace and Justice Center: We recommend that Rocky Flats be cleaned to protect the family of a resident subsistence farmer (on this topic see IEER, Science for Democratic Action, vol. 10, no. 3, pp. 1-6, 8-9).	
21.b	They [the government] also have no intention of cleaning the site to the maximum extent possible. They plan to leave some plutonium and other toxins in the	Please see General Response.

	environment.	
5.A.1	First, I'd like to say that the board considers that the clean-up proposal put to us does meet all of the regulatory and legal requirements, but the board desires that Rocky Flats grow far beyond the legal requirements, and we'd like to -- or tonight I'm going to go over some of the ways in which we'd like to see the DOE reach for some of these goals that we feel the community would like to see happen.	The modifications to RFCA Attachments meet the requirements of Federal and State environmental law and regulation. Furthermore, the planned cleanup for Rocky Flats reflects many of the priorities expressed by local governments and members of the public.
5.A.2	We also feel that all remediation decisions by management are based on the current grade, so that simply backfilling in additional fill and bearing contamination doesn't count as clean-up. As a matter of principle, when DOE is making remediation decisions, source removal should be the preferred method. This is particularly the case with the -- what's called volatile organic compounds out there. In many cases, these are very diffuse plumes and the only way to remediate them is by some sort of groundwater treatment system, but, if at all possible, in other cases where there's a concentrated amount of product, we'd like to see the product removed, as opposed to relying on groundwater treatment later on.	Decisions for accelerated actions will be made based on the existing grade of the site. Source removal will be the chosen method in most instances for cleanup decisions involving radionuclides. Source removal will also be the preferred method for nonradiological contamination in instances where the source is concentrated to a degree that removal will be the most effective remedy. Where nonradiological contamination has been mobilized in groundwater, groundwater interception and treatment may be the most practical remedy.
5.B.1	You are looking at a photograph of plutonium in the tissue of an ape. The black star in the middle of this photograph shows the alpha tracks made, the tracks made by the alpha rays emitted over a period of about 48 hours. This photograph was made at Lawrence Radiation Laboratory in Berkeley several years ago. The alpha rays don't travel very far. The actual photograph that's enlarged on the screen here is about six inches by four inches and that photograph is magnified 500 times, so you can imagine that what you're looking at on the screen	Please see response to Comment 12, Category O. It is true that the effects on wildlife of radiation exposure are less understood than the effects of such exposure on humans. It is generally assumed that humans will be more sensitive to the effects of radiation because our significantly longer life spans allow more time for radiation-induced carcinogenicity to manifest itself. However, if future scientific research proves this assumption to be incorrect, the RFCA Parties and the U.S. Fish and Wildlife Service may need to revisit the issue and perform additional cleanup work at

	is magnified a whole lot more than that. The rays don't travel very far, but, once inside the body, they can penetrate more than 10,000 cells within their range over a period of time. A few things about plutonium: It has a half-life, I think you know, of 24,000 years, remains dangerous for a quarter of a million years. The alpha radiation that plutonium admits can't penetrate skin, but tiny particles taken into the body by breathing through a wound or by ingestion with food or water can eventually cause cancer, genetic defects, harm to the immune system. Columbia University scientists found that a single plutonium particle, as small an amount of plutonium that can be taken into the body I can produce mutations in the cells of mammals. While some portions of the Rocky Flats site are far more contaminated than others, the whole of the Rocky Flats site is contaminated with plutonium to some extent. Particles left in the environment can be re-suspended in respirable size and transported by wind or water or by plant, animal, or human actions. Genetic harm to wildlife has too little known about it and it may not be apparent for the passage of several generations. Plutonium in the environment poses an essentially permanent danger. After the 1969 fire at Rocky Flats, Ed Martell of the National Center for Environmental -- for Atmospheric Research found plutonium up to hundreds of times' background at various locations off the Rocky Flats site. This is how the Colorado State Government learned for the first time about plutonium release, from major	Rocky Flats. DOE, EPA and CDPHE have responded in many public forums to the recommendation by the independent consultant, Risk Assessment Corporation (RAC) that the action level for plutonium be set at 35 picocuries/gram. In those forums we acknowledged the comprehensive approach employed and their inclusion of the effects of a prairie wildfire. However, we did express concern about their gross over-calculation of the amount of dust that would be generated by a wildfire and the choice of a subsistence farmer as a likely future land user. Despite those concerns, the RFCA Attachments have been modified to include a soil action level of 50 picocuries/gram for plutonium in the top three feet. This value of 50 pCi/g is consistent with the value recommended by RAC and well within the range of 20 to 80 that RAC said would be acceptable.

	accidents at Rocky Flats, and the public learned as well. A life-long student of radiation, Martell emphasized that humans evolved in symbiotic relations with natural radiation, which itself could be harmful, even fatal, but, due to global fall-out since 1945, we no longer live in an environment of natural background radiation. We are now more exposed to more radiation than evolution ever prepared us for. In Martell's view, incalculable harm is the more likely effect. Thus, where we have a choice, we should not add to the burden of risk we have already created. Andre[i] Sokorov [Sakharov], the Soviet bomb designer who became his country's best-known dissident, believed that global fallout from bomb tests would result in millions of premature deaths. He bemoaned the fact that those harmed by what we now call "background" would not understand the source of their ailment and that perpetrators of this evil, and himself included, would not be brought to justice. There's a public history about Rocky Flats clean-up. The public has repeatedly said it wants the best clean-up possible at Rocky Flats. In 1995, the Future Site Use Working Group, a broadly represented body, and other bodies at that time, said that the ultimate goal should be clean-up to average background levels, which plutonium from fall-out in this area is 0.04 picocuries per gram. In 1996, the original Rocky Flats Clean-Up Act set the active level for plutonium at 651. Because the 651 level was rejected by the public, DOE funded an independent review, out of which came a recommendation in early 2001 of 35 picocuries per gram. The RFCA Parties never made a formal response to this recommendation. In June 2000, the RFCA Parties convened the Rocky Flats Clean-Up Agreement Focus Group, the RFCA Focus Group, a nonadvisory body that, over the next 22 months, until	

	April 2002, served as the principal body for public participation on clean-up issues. Meanwhile, the migration study of June 2000 said that a plutonium action level as low as 10 picocuries per gram would not guarantee the ability to meet the state standard of plutonium in surface water, and there it is printed on the slide you're looking at, . 15 picocuries per liter. This led to speculation that meeting the water standard would become the real driver for Rocky Flats clean-up.	
5.B.2	Second, clean up Rocky Flats to protect the family of a resident subsistence farmer, a scenario that is both conservative and not improbable, and there's more information on that, I think, in all of your packets. The resultant clean-up level for plutonium in surface and subsurface soil would be five or less picocuries per gram, with subsurface clean-up depth determined by the depth of contamination. Clean-up to this level will make the site safer for all other uses, not only for the wildlife refuge worker, but for all other uses at the site, including those that we can't imagine sitting in this room tonight because we really don't know.	The RFCA Parties believe it is highly improbable that Rocky Flats would ever be used for subsistence farming. In the hundred-year history of the refuge system a refuge designation has not been lost inadvertently. Nevertheless, even in the event of a loss of use as refuge, for the unlikely rural residence scenario the value of 50 pCi/g represents an excess life time cancer risk of less than one in 10,000; a value well within the CERCLA risk range.
5.D	How will any clean-up deal with, quote, hot particles, unquote, if present?	The limits of current technology will almost certainly mean that some "hot particles" will not be found. However, any sampled soils containing "hot particles" that exceed the RSAL will be subject to the Subsurface Soil Risk Screen and /or an action determination.
5.F	What's the state of the mud at the bottom of the reservoirs to the east of Rocky Flats? I understand, a few years ago, that dangerous materials from Rocky Flats were found in the mud at the bottom of the reservoirs just east of there and, at one time, I thought the decision was made to just let it lie. In the time of a potential for increasing drought, I wonder if that's being addressed.	Radioactive contamination at levels slightly greater than background does exist in sediments in both Standley Lake and Great Western reservoirs. However, the concentrations are so low that they pose insignificant risk to human health and the environment.
5.I	To start with, I'm awfully pleased that the 14 tons of plutonium are finally off the site, but, with the best of intentions, I don't think this site will ever be clean and	Comment noted.

	safe, and the scientific data that we have that LeRoy has talked about shows that plutonium is lethal in very small amounts. Rocky Flats is contaminated. Its air, water, soil, and subsoil contain plutonium, along with other radionuclides. As a recognition of this in the RFCA plan, when you look at the map, it shows a huge area of about 1500 acres plus which are not going to be part of the refuge, and this is really my concern. 8 The site is about one-fourth of the 6,500-acre site, and there is really no discussion, even though Joe mentioned that later on we'll talk about it, about how this work is separated from the wildlife refuge physically and legally. The transfer will happen after the site is considered clean, according to the EPA.	
5.L.1	I look at 600 picocuries instead of background, and I think "My God, and we're going to do this for how long, 24,000 years, 200,000 years?" That's enough time for radical changes to happen on that land. That's enough time -- and who can assure us that that place 200,000 years from now will still be a wildlife refuge? Who can assure us, 200,000 years from now, that that place is even going to be part of something we call the United States of America? That's enough time for an ice age to arise and for glaciers to move down and move all the soil that's there to the ocean. That's enough time for volcanos to arise. That's enough time for almost anything you can imagine to happen, and it is irresponsible to leave that place poisoned at all. We need to clean it up and we need to clean it up all the way to background, and nothing less will please me.	Cleanup to background is not being considered for reasons that include: - technological limits on capability to find all contamination above background; - Federal environmental laws which state that contaminated sites should be cleaned so that they don't pose an excess lifetime cancer risk of greater than one in 10,000 risk to a future user; - The laws do not require cleanup to background; - Cleanup to background would require destruction of perhaps thousands of acres of habitat for minimal risk reduction; - Cost effectiveness.
5.L.2	I don't claim to know much about nuclear stuff, but I do know about the land. I consider myself an environmentalist, and I know that cleaning it up all the way is destructive, but I also know a lot about restoration now. I know we can go out there and we can have teams	Please see General Response.

	of biologists go out there and track the critters and save them in a zoo-like environment and restore the land over time. I know this is possible, and I don't think this is just pie in the sky, and I am just tired about hearing about settling for something so poisoning and so dangerous and so long-term, so I urge you to make a new plan and I urge you to make a plan that involves total clean-up.	
5.M	First of all, the City of Arvada does generally support the modification the parties have agreed to, and we also support the statements you heard tonight from David Abelson and the Rocky Flats Coalition of Local Governments and also those positions as they're stated in the September 9th letter that was sent to all the RFCA parties. The City believes that the clean-up, as proposed, gives a safe and effective clean-up within the bounds and constraints of the political and fiscal reality that we have to face.	Comment Noted.
5.O.1	If we don't know what the risk is, we should assume that it might be large. As we study it, storms will cause more erosion.	Characterization is required and will be completed to assure that the final remedy is protective of human health and the environment on and off the site.
5.O.2	I know maybe you're doing the best you can, but the idea of benefiting a quick clean-up is not fair to human health. Also, you're going to have to replace that dam that's above the water reservoir people drink out of. I mean, you have to get the silt out of it after dams fill up, and what's going to happen in a few hundred years or in 30 years when this happens? Basically I just think there's a lot more work. You can't just say, "Let's take money and go use it for something else that is more profitable."	The RFCA Parties have determined that implementing these modifications will be protective of human health and the environment, as well as protect surface water standards.
5.G	Mr. Schmitt, in your Sunday editorial, you said that current funding and technology do not exist to erase every particle of contamination in the environment created by 50 years of site operations, and I	The accelerated actions triggered by the new lower RSALs and the risk-based approach can be implemented within the current target cost and schedule.

	wholeheartedly agree with that. We're not insisting upon the impossible to be accomplished. We are asking for the best possible job that technology can do and the maximum amount of funding currently available and I add to the comments of the citizens that said we need more funding to adequately clean up this job to safe levels, not only for our lifetime, but the lifetime of countless generations after us.	If additional actions are necessary to adequately protect human health and the environment and to comply with legal obligations, the DOE will seek the appropriate funds needed to take the actions. We have determined that additional funding is not necessary to implement an RSAL that is 13 times lower than the 1996 RSAL. We expect accelerated actions to remove sufficient soil contamination to result in a lifetime excess cancer risk to either a hypothetical rural resident or to a wildlife refuge worker well within the CERCLA required risk range.
5.P	I echo the idea of the precautionary principle: Please, let's err on the side of caution and not have this partial clean-up, and, if this is the fix, God forbid, I wish that we could keep it closed for a hundred years and continue all the tests possible, test all of the animals, test the grasses, see if there's an uptake into the plants, for a hundred years. That's a drop in the barrel of the amount of time that it's going to be dangerous out there, so let's hear it for the resident rancher and the hundred-year closure and the precautionary principle and remembering the whole humanist idea that everyone born is just as important as anybody else born.	Please see General Response.
5.Q	My overall goal for the RFCA for the ROD is that the public health is, in fact, protected, that the natural environment is, in fact, safeguarded, and that we aren't just merely reducing risk but, in fact, we're actually accomplishing those two things.	Comment noted.
25	Rocky Flats should be remediated to where it would be reasonably safe for a subsistence farmer. Development is nearby and this level of use is quite possible at some time in the future, beyond the time when any of us can predict but while plutonium still presents a danger. Please do not ignore the wishes and strong feelings of those of us who live nearby or have relatives who live nearby, or the future generations not able to speak for themselves right now.	Please see General Response.

26	Rocky Flats/DOE put the contaminants into the soil and they have a responsibility to remove them as completely as possible. I say no to the proposal for final cleanup at Rocky Flats. There is no guarantee that the site will be a wildlife refuge forever, or to containing plutonium contaminants at the site.	Please see General Response.
27	How much plutonium and other nuclear and heavy metal waste can be left in the Rocky Flats environment when the site of the former nuclear weapons plant becomes a National Wildlife Refuge? As little as possible. As plutonium is very dangerous, the preferred result is that all plutonium be removed. Other nuclear materials should be removed to less than twice base level nuclear in any environment. The same is true for any heavy metal contamination there. To me clean up means clean up.	Please see General Response.
28	It is my opinion and that of my community that Rocky Flats should adopt a clean-up program devised to protect the subsistence farmer as developed by scientific advisory boards ("Setting Cleanup Standards to Protect Future Generations", Science for Democratic Action, VOL 10, NO. 3). We are prepared to support such an effort over the long-term. Let Rocky Flats be an example of progressive policies that help protect our citizens today and far into the future. Let the DOE be remembered for a cleanup that was unprecedented in its removal of plutonium not in the levels of plutonium being left in the site.	Please see General Response.
29	Cleaning up the site to a short term goal level that would protect a wildlife refuge worker is unrealistic, considering the 240,000 year life of the plutonium on site. The short term goal approach is not protective of humanity in the long term.	Please see General Response.
30.a	To begin addressing this proposal, the Board offers its reflections on two questions. First, do we support the notion that surface soil contamination represents a	Comment noted.

	greater risk than subsurface contamination at the present time? Second, in a conceptual exercise where the site is facing limited cleanup resources, does the Board support greater risk reduction in the near term by removing more surface contamination at the expense of less subsurface soil cleanup? The answer to both questions is yes as long as we clarify the importance of using the words "at the present time" and "near term," and as long as we stress our response to the second question is based on a conceptual exercise only.	
30.b	To elaborate further on our answer to the first question, the Board does not deny that the exposure pathways for surface soil contamination do represent a greater risk than do those for subsurface contamination at the present time. Subsurface contamination, however, does not lose its potential for someday becoming a risk concern. For that reason, long-term stewardship controls will be necessary for any areas where residual contamination above background levels is left behind. Although no exposure pathways may currently exist, given the long life of the contaminants and the inevitable likelihood that controls will ultimately fail, there is certainty that risk pathways will someday exist for any residual contamination left behind at the site.	The final modifications to RFCA Attachments provide the framework for the conduct of accelerated actions that are protective of human health and the environment, notwithstanding the fact that all contamination may not be removed by these actions. DOE recognizes that since decisions regarding long-term stewardship activities have yet to be made there will continue to be some concerns in the community related to contamination that is not removed based upon the risk-based approach. However, DOE is committed to maintain post-cleanup controls. There will be appropriate performance monitoring of the remedy as part of post-closure activities.
30.c	Data for Recom[mendation]s 3 & 4 - The Board offers the following framework establishing its preferences for cleanup decision-making at Rocky Flats. RFCAB acknowledges the current RFCA modifications proposal document, as well as our response to that document, mainly focuses on Radionuclide Soil Action Levels (RSALs). However, RFCAB believes the same attention should be afforded to the remediation of non-radionuclide contaminants of concern (COCs) as they pertain to groundwater, soil, ingestion by animals, and ingestion by the human population. We look forward to	The RFCA Parties will continue to work with the community as we plan and conduct accelerated actions.

	assisting DOE with the future recommendation process for the remediation of non-radionuclides at the Rocky Flats Environmental Technology Site.	
30.d	Recommendation 3: As it has stated on numerous occasions, the Board believes cleanup to background should be the ultimate goal for the site. Current technological and budget constraints may prevent reaching this goal now, but the possibility may exist in the future. Achieving this goal will eliminate the need for continued funding to provide controls and will help reduce the risks to future generations due to the likelihood that any controls will ultimately fail. The Board therefore urges DOE and the regulators to assess each individual cleanup project to see if cleanup to background can be achieved. We believe there is value in reducing the footprint of contaminated areas and future stewardship obligations.	We believe that in the effort to cleanup in accordance with the modifications to RFCA Attachments, a number of contaminated areas will be cleaned to background. However, given the certainty that the lands east of the 903 pad and most of the Industrial Area subsurface will not be cleaned to background levels, the RFCA Parties don't believe that performing the types of evaluations you suggest would lead to a decision to significantly reduce the contaminated footprint or future stewardship obligations.
30.e	Recommendation 4: In keeping with the Radionuclide Soil Action Level Recommendation the Board made in October 2001, the next level of cleanup analysis should assess the feasibility of cleanup to a 10^{-6} level. In the event this level is not recognized as obtainable, a documented justification should be provided.	The integrated risk-based approach is based upon using action levels calculated to result in a $1x10^{-5}$ lifetime excess cancer risk and a Subsurface Soil Risk Screen that evaluates pathways of exposure that could result in $1x10^{-5}$ risk to the reasonably anticipated future user, a wildlife refuge worker. A final remedy must meet the CERCLA threshold criteria of a lifetime excess cancer risk to the reasonably maximally exposed individual (wildlife refuge worker) of between $1x10^{-4}$ and $1x10^{-6}$ and be compliant with Applicable or Relevant and Appropriate Requirements (ARARs). CERCLA's implementing regulations provide that the lower end of the allowable risk range serves as a point of departure in developing remedial objectives for a final comprehensive remedy if compliance with ARARs does not provide protection within the acceptable risk range. The accelerated actions being conducted at Rocky Flats are designed to meet surface water standards at the Site boundary that equate to an excess lifetime cancer risk of $1x10^{-6}$. However, a cleanup to $1x10^{-6}$ will not be pursued for the entire Site for the following reasons:

		1) The cost to achieve the $1x10^{-6}$ is very large relative to the amount of risk reduction achievable; 2) Achieving the $1x10^{-6}$ level would require the destruction of hundreds, perhaps thousands of acres of habitat; 3) The current state of field measurement technology would make it very difficult to prove that this level of cleanup had been attained. For example, the cost to remove the plutonium soil contamination in the eastern buffer zone below 50 pCi/g to between 1and 5 pCi/g to lower the risk from approximately $5x10^{-6}$ to approximately $1x10^{-6}$ is estimated to be more than $500 million and could be more than $1 billion. This is based on the removal of between 450 and 1,000 acres of surface soil in the eastern buffer zone. The RFCA Parties determined that implementing the new, lower RSALs complies with the "decommissioning rule" dose-based standards, which may be relevant and appropriate to the cleanup and closure of the Site. For plutonium-239/240, the RSAL is calculated to achieve a risk of approximately $5x10^{-6}$ for the wildlife refuge worker land use scenario and $3x10^{-5}$ for the hypothetical rural residential use scenario. Also, the application of the new, lower RSALs for plutonium-239/240 and americium-241 to 3 feet below the surface addresses the strong community preference that plutonium/americium contaminated surface soil be removed. While there is some non-radioactive material surface contamination at the Site, it is not widespread like the plutonium and americium contamination and it is not migrating at the surface due to wind and water erosion. The primary concern for non-radionuclides and uranium is in the subsurface, where migration of contaminants into the subsurface has resulted in shallow groundwater contamination forming several fairly large plumes that could impact surface water quality. However, because of its low mobility in subsurface soils, groundwater monitoring data to date demonstrate that plutonium and

		americium do not contribute to shallow ground water contamination at the site. Contaminated groundwater plumes are slow moving and do not migrate off site, but daylights at surface seeps that may contribute to surface water. Accelerated actions implemented to treat ground water are taken to protect surface water quality. Other pathways for subsurface soil contamination are evaluated using the Subsurface Soil Risk Screen. Surface water standards and action levels for the Site are protective at $1x10^{-6}$ lifetime excess cancer risk. While surface soil action levels are based upon a $1x10^{-5}$ risk, RFCA also requires that potential impacts to surface water quality be evaluated in making accelerated action determinations. Based upon these considerations, the RFCA Parties determined that the applying the integrated risk-based approach based upon a $1x10^{-5}$ risk criteria to Individual Hazardous Substances Sites will expedite the cleanup process, reduce risk and contribute to the efficient performance of the anticipated final remedy. The RFCA Parties will analyze cleanup to 10^{-6} levels in decision documents, as appropriate, including in the proposed modifications to the Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation (ER RSOP).
30.f	Recommendation 15: All remediation decisions dependent on depth of contamination should be based on present grade. Utilizing the present grade will eliminate the possibility that re-contouring of the industrial area might result in grade change and thus in lesser remediation.	Please see response to Comment 5.A.2, Category O.
30.g	Recommendation 16: As a matter of principle, when DOE is making remedial decisions, source removal should be the preferred remedial action. Not only does source removal accomplish permanent risk reduction, but it may also be more cost effective in the long run. In the case of organic solvents, source removal of discrete spills	Please see response to Comment 5.A.2, Category O.

	would reduce continued reliance on passive treatment systems. In the case of radionuclide contamination, any anomalously high water samples (such as at GS10) should be assumed to originate from a discrete source, which should be aggressively sought out. The Board believes that in many cases source removal is cost effective since it would present savings during stewardship.	
31	Please be sure you do all you can to see that Rocky Flats is cleaned to the greatest extent now scientifically possible. Anything less is an insult and injustice to all living beings that will ever occupy that area.	Please see General Response. Also, the RFCA Parties understand that some in the community do not accept a cleanup and closure that does not remove all contamination, but meets all regulatory requirements. The final modifications to RFCA Attachments will result in a safe and environmentally compliant cleanup and can be implemented to meet a target completion date of 2006.
36	The plutonium and VOC contamination that is proposed to be left on the site is astronomical with numbers entering the nanocurie range. This is unacceptable. I believe that it is the US government's responsibility to ensure that the health and safety of the people of the US is protected, especially regarding the aftermath of its own actions. The type of cleanup proposed at Rocky Flats is not conducive to the health and safety of citizens now and for future generations who may reside [on]Rocky Flats.	Please see General Response. Also, the RFCA Parties understand that some in the community do not accept a cleanup and closure that does not remove all contamination, but meets all regulatory requirements. The final modifications to RFCA Attachments will result in a safe and environmentally compliant cleanup and can be implemented to meet a target completion date of 2006.
43	Rocky Flats needs to be cleaned up with the thought in mind that every time someone walks on this land and disturbs the subsurface soil and plants, radioactive particles are released into the air where just one particle imbedded in the human or animal body can cause cancer, and any number of other diseases. This stuff has a half-life of 24,400 Years for Gods' sake!	Please see General Response. Also, the RFCA Parties understand that some in the community do not accept a cleanup and closure that does not remove all contamination, but meets all regulatory requirements. The final modifications to RFCA Attachments will result in a safe and environmentally compliant cleanup and can be implemented to meet a target completion date of 2006.
45	Once the site has been fully characterized, it should be cleaned to a level safe enough for a subsistence farmer (someone that over the next 240,000 years may be exposed for longer than the 40 hrs -20 indoors, 20	The RFCA Parties believe it is highly improbable that Rocky Flats would ever be used for subsistence farming. If the land use protection created by Congress via the designation of a National Wildlife Refuge were to be lost inadvertently, something that has

	outdoors- that a refuge worker would be exposed to) or at least for children playing in, and sometimes eating, the dirt.	never happened in the 100 year history of the wildlife refuge system, we believe the most likely use of Rocky Flats would be that of suburban residential. The value of 50 pCi/g represents an excess lifetime cancer risk of less than one in 10,000, a value well within the CERCLA risk range. This residential scenario considers that a child may be one of the residents and that the child may eat some dirt.
46	I'm urging you to reconsider the residue levels which will be left @ Rocky Flats. The cleanup needs to be as pristine as possible. I know that public memory is short – and in the future children may be bussed for a field trip to the new Wildlife Reserve, formerly Rocky Flats – Please think of the future use that R.F. will be put to – many generations may visit out there, forgetting the history of contamination that resided, & still would reside, there. Don't sell out the future generations for a quick fix today.	Please see General Response. Also, the RFCA Parties understand that some in the community do not accept a cleanup and closure that does not remove all contamination, but meets all regulatory requirements. The final modifications to RFCA Attachments will result in a safe and environmentally compliant cleanup and can be implemented to meet a target completion date of 2006.
48	I am writing to urge a more thorough clean-up of Rocky Flats than the one being proposed by DOE and Colorado Department of Public Health. The plutonium left in that environment by an incomplete clean up will continue to pose a health danger for 240,000 years. It is unimaginable that Rocky Flats will be a Wildlife Refuge all that time—whatever contamination is left will be long forgotten. In fact, the high winds in that area make erosion a real danger. So it's likely that the plutonium not thoroughly cleaned up from the surface, as well as that left in the subsurface, will be blown far and wide in our lifetime, much less hundreds of years hence, if it is not cleaned up. The current plan calls for inadequate clean up, in order to save money and hasten our forgetting of the contamination resting there. I urge that the plan be changed to allow for the most thorough clean up	Please see General Response.

	technically possible at this time and that the planners lobby for the money and time needed to protect this present generation's health and that of countless future generations as well.	
50	I am writing to oppose the current proposal for the cleanup. I believe that we must put public health concerns over economic concerns. To base the cleanup on the idea that Rocky Flats will always remain a nature preserve seems dangerous to me. To leave under ground waste lines on site is very risky. To ignore the possible contamination of water sources is foolhardy. In situations of uncertainty, we should follow the precautionary principle which says we act conservatively and put the publics health over purely economic considerations. I do applaud the dramatic reduction in plutonium soil levels, but even these reduced levels are not low enough. To ignore the sub-soil plutonium levels certainly reduces the effectiveness of the proposed cleanup. We must act now to provide a real cleanup that will protect current and future generations. Otherwise, we have waste the money that has already been spent and that is scheduled to be spent by 2006.	Please see General Response. Also, the RFCA Parties understand that some in the community do not accept a cleanup and closure that does not remove all contamination, but meets all regulatory requirements. The final modifications to RFCA Attachments will result in a safe and environmentally compliant cleanup and can be implemented to meet a target completion date of 2006.
51	2. Acceptance of unsafe levels of surface and subsurface contamination The Rocky Flats current cleanup proposal's trade off of lower surface radioactivity levels for greater subsurface radioactivity levels simply creates a tomb bomb. From a precautionary standpoint of protecting the most vulnerable persons in society, it is an imprudent decision to leave up to 50 pCi/g in the topsoil. The winds around Rocky Flats are among some of the fiercest recorded in the US. and will, even in the short term, cause significant	Please see General Response. Also, the RFCA Parties understand that some in the community do not accept a cleanup and closure that does not remove all contamination, but meets all regulatory requirements. The final modifications to RFCA Attachments will result in a safe and environmentally compliant cleanup and can be implemented to meet a target completion date of 2006.

	redistribution of this contaminated surface soil. Recent drought resulting in decreased soil-adhering vegetation only increases the susceptibility of fragile topsoil to additional erosion by both wind and water. Plutonium is one of the most lethal carcinogens known to mankind. An inhaled single microgram of plutonium, less than a grain of pollen, constitutes a mutagenic and potentially lethal dose. In the long-term, leaving very large quantities of Plutonium in the subsurface environment poses an even greater potential public health risk. At some unspecified future time a quantity of highly contaminated material will more likely than not make its way to the surface by human or non-human action, whether from burrowing animals or geological or topographical changes. Once finding its way to the surface by whatever means, this highly radioactive material becomes subject to Colorado's Front Range winds. And with Plutonioum's half-life of over 24,000 years, that's a lot of time for these forces at play to continue to expose this toxic layer of subsoil. The DOE and EPA want to rely on institutional and engineered controls and on the permanent presence of the federal government. But in time controls will fail and, if human history is any guide, even the US government will fade away long before residual Plutonium ceases to be dangerous.	
52	I am writing to comment on the cleanup proposal in the Rocky Flats Cleanup Agreement. I urge you to cleanup up [sic] the Rocky Flats facility to the maximum extent now possible – please do not sirk your responsibilities to future generations who may use this area in ways not thought of or considered today. Where nuclear materials	Please see General Response. Also, the RFCA Parties understand that some in the community do not accept a cleanup and closure that does not remove all contamination, but meets all regulatory requirements. The final modifications to RFCA Attachments will result in a safe and environmentally compliant cleanup and can be implemented to meet a target completion date of 2006.

	are concerned, we have to think in the very long term as you well know – may generations from now – not just the immediate long-term.	
53	The decision to clean only the surface level of the land, while ignoring the incredible pollution underground is irresponsible. Any quantity of plutonium left in the environment constitutes an essentially permanent danger. This decision will surely affect citizens of the Denver area for many years to come. It sets a terrible precedent for clean up that may affect other contaminated sites as well. The citizens of Denver and the surrounding areas deserve better than they have received for decades regarding Rocky Flats. LeRoy Moore, of the Rocky Mountain Peace and Justice Center says that, "No one really knows how contaminated Rocky Flats is. Neither areas under buildings nor along the 7 miles of buried (and sometimes ruptured) process waste lines that carried toxic and radioactive waste have been fully "characterized" to determine the actual extent of contamination. They say contamination left underground poses little problem because it can't readily reach people on the surface. But the controls they put in place to contain the contaminants eventually will almost certainly fail. Why should the public accept this tradeoff when we had no part in the key decisions that produced it?" In my opinion, the standard for the cleanup of Rocky Flats should be to average background levels from global fallout. The current plan of cleaning the site only to the short-term goal of protecting a wildlife refuge worker is not nearly enough. Rocky Flats will cease being a wildlife refuge long before plutonium ceases being dangerous. What about the wild life worker? What	Please see General Response. Also, the RFCA Parties understand that some in the community do not accept a cleanup and closure that does not remove all contamination, but meets all regulatory requirements. The final modifications to RFCA Attachments will result in a safe and environmentally compliant cleanup and can be implemented to meet a target completion date of 2006.

	about the animals? How can you guarantee their safety with out a complete and total effort at cleanup. How can you guarantee that the land will indefinitely be used for a wild life refuge? Why not do the responsible thing and solve the problem now, so that all people and animals will not be threatened by radioactive waste for the next 240,000 years? Anything less than the best possible cleanup is irresponsible. Please help to influence the powers [that] be that the citizens of Denver, Colorado, and the World deserve nothing less than the best possible effort at clean up.	
54	The decision to clean only the surface level of the land, while ignoring the incredible pollution underground is irresponsible. Any quantity of plutonium left in the environment constitutes an essentially permanent danger. This decision will surely affect citizens of the Denver area for many years to come. It sets a terrible precedent for clean up that may affect other contaminated sites as well. The citizens of Denver and the surrounding areas deserve better than they have received for decades regarding Rocky Flats. LeRoy Moore, of the Rocky Mountain Peace and Justice Center says that, "No one really knows how contaminated Rocky Flats is. Neither areas under buildings nor along the 7 miles of buried (and sometimes ruptured) process waste lines that carried toxic and radioactive waste have been fully "characterized" to determine the actual extent of contamination. They say contamination left underground poses little problem because it can't readily reach people on the surface. But the controls they put in place to contain the contaminants eventually will almost certainly fail. Why should the	Please see General Response. Also, the RFCA Parties understand that some in the community do not accept a cleanup and closure that does not remove all contamination, but meets all regulatory requirements. The final modifications to RFCA Attachments will result in a safe and environmentally compliant cleanup and can be implemented to meet a target completion date of 2006.

	public accept this tradeoff when we had no part in the key decisions that produced it?" In my opinion, the standard for the cleanup of Rocky Flats should be to average background levels from global fallout. The current plan of cleaning the site only to the short-term goal of protecting a wildlife refuge worker is not nearly enough. Rocky Flats will cease being a wildlife refuge long before plutonium ceases being dangerous. What about the wild life worker? What about the animals? How can you guarantee their safety with out a complete and total effort at cleanup. How can you guarantee that the land will indefinitely be used for a wild life refuge? Why not do the responsible thing and solve the problem now, so that all people and animals will not be threatened by radioactive waste for the next 240,000 years? Anything less than the best possible cleanup is irresponsible. Please help to influence the powers [that] be that the citizens of Denver, Colorado, and the World deserve nothing less than the best possible effort at clean up.	
56	Please exercise common sense in the cleanup of Rocky Flats. This is a situation where a cleanup that is too lenient will have severe and terrible repercussions. Rocky Flats needs to be cleaned to a level that would protect the family of a subsistence farmer that may someday live on the Rocky Flats site (on this topic see IEER, *Science for Democratic Action*, vol. 10, no. 3, pp.1-6, 8-9). The resultant cleanup level for plutonium in surface and subsurface soil would be 5 or less picocuries per gram, with subsurface cleanup depth determined by the depth of contamination. Cleanup to	Please see General Response. Also, the RFCA Parties understand that some in the community do not accept a cleanup and closure that does not remove all contamination, but meets all regulatory requirements. The final modifications to RFCA Attachments will result in a safe and environmentally compliant cleanup and can be implemented to meet a target completion date of 2006. With respect to the IEER report, please see response to Comment 61.a, Category B.

	this level will make the site safer for all other uses.	
57	I'm writing on behalf of Jews Of The Earth. We are a faith-based environmental group based in Boulder County, Colorado. We are seriously concerned that the level of cleanup at Rocky Flats will be inadequate to protect future generations. As Jews, who have passed our heritage down (despite tremendous adversity) for the last thirty-five centuries, we understand the importance of leaving a legacy. It disgusts us to think that our legacy will be plutonium in the soil and water for the duration of human existence. Please make an effort to better characterize the contamination on the site and clean it to a higher level of safety. In particular, we are concerned about the risk of a wildfire on the property, which would lift much of the soil airborne in the convection and high winds. The summer of 2000, when a wildfire spread dangerously close to the Los Alamos National Lab confirms that this fear is not baseless. It seems senseless to leave such a high level of radioactive contamination in the soil in the face of the likelihood of this risk.	Please see General Response. Also, the RFCA Parties understand that some in the community do not accept a cleanup and closure that does not remove all contamination, but meets all regulatory requirements. The final modifications to RFCA Attachments will result in a safe and environmentally compliant cleanup and can be implemented to meet a target completion date of 2006. DOE, EPA and CDPHE have responded in many public forums to the recommendation by the independent consultant, Risk Assessment Corporation (RAC) that the action level for plutonium be set at 35 picocuries/gram. In those forums we acknowledged the comprehensive approach employed and their inclusion of the effects of a prairie wildfire. However, we did express concern about their gross over-calculation of the amount of dust that would be generated by a wildfire and the choice of a subsistence farmer as a likely future land user. Despite those concerns, the RFCA Attachments have been modified to include a soil action level of 50 picocuries/gram for plutonium in the top three feet. This value of 50 pCi/g is consistent with the value recommended by RAC and well within the range of 20 to 80 that RAC said would be acceptable.
58	The Rocky Flats Cleanup Proposal which seems to reconcile these factors wants to use the currently available funds to do a superficial clean up and turn the area into a wildlife refuge so nobody would spend enough time there to be harmed. This plan has some obvious and serious flaws. In the current political climate Rocky Flats would be unlikely to remain a wildlife refuge forever. Even if it takes centuries before people	Please see General Response. Also, the RFCA Parties understand that some in the community do not accept a cleanup and closure that does not remove all contamination, but meets all regulatory requirements. The final modifications to RFCA Attachments will result in a safe and environmentally compliant cleanup and can be implemented to meet a target completion date of 2006.

	forget the history of the place, and Government opens Rocky Flats for development, radiation levels would still be just as high as after the "clean up" (50 picocuries/gram) and inhabitants would soon start suffering serious health defects. There are other problems. Even a cleanup to a level of 10 picocuries/gram could not guarantee the Colorado standard for plutonium in surface water! In addition, the suggested radiation levels could have severe long-term effect on wildlife in the area, as well as on people who are living near the region now. And, the area can not be considered "cleaned" until it is actually safe enough for a family to live there without fear. Other areas, which ironically were farther away from population centers than Rocky Flats, have been cleaned to less than 5 picocuries per gram. Rocky Flats should be cleaned every bit as well, especially since the money has already been allocated and is just waiting to be used.	
59	Cleanup is limited to the short-term goal of protecting a wildlife refuge worker, however, this is simply not looking far enough ahead. Plutonium is dangerous for 240,000 years. Various groups have recommended that Rocky Flats be cleaned up to the maximum extent possible, however, the DOE does not intend to do this. The purpose of this comment[a]ry is not to downplay the cleanup measures that already have been made. The DOE, the Environmental [P]rotection [A]gency (EPA), and the Colorado Department of [Public] Health and Environment (CDPHE) propose a surface soil cleanup for Rocky Flats that will leave behind up to 50 picocuries of plutonium per gram of soil. This is a 93% reduction from the 651 picocuries level these same agencies	Please see General Response. Also, the RFCA Parties understand that some in the community do not accept a cleanup and closure that does not remove all contamination, but meets all regulatory requirements. The final modifications to RFCA Attachments will result in a safe and environmentally compliant cleanup and can be implemented to meet a target completion date of 2006.

	adopted in 1996 despite strong public opposition. A surface soil cleanup level of 50 picocuries signifies a major victory for those have sought a better Rocky Flats cleanup. However, this is simply not good enough. Rocky Flats should not be made a National Wildlife Refuge until resultant cleanup levels for plutonium in surface and subsurface soil is 10 or less picocuries per gram, with subsurface cleanup depth determined by depth of contamination. Cleanup to this level will make the site safer for all other uses.	
60	1. Cleanup is geared to an arbitrary closure date of December 2006. How are we to trust the DOE to predict the activity of forgotten plutonium on Colorado's front range for the unimaginatively vast amount of time, --- 250,000 years, its hazardous life. This same group of non-poets tells us that the high level nuclear waste buried at Yucca Mountain will be safe for 10,000 years, a fraction of the dangerous lifetime of certain radioactivity the mountain is meant to contain. Who can predict the future? Who can predict time, anywhere? 3. DOE, with the consent of EPA and CDPHE, does not intend to clean Rocky Flats to the maximum extent possible, though various groups have repeatedly recommended this. In the end, no one really seems to know how dangerous and contaminated Rocky Flats really is. And with clean-up being on such a tight budget and schedule we in this generation might never know. But the future will.	Please see General Response. Also, the RFCA Parties understand that some in the community do not accept a cleanup and closure that does not remove all contamination, but meets all regulatory requirements. The final modifications to RFCA Attachments will result in a safe and environmentally compliant cleanup and can be implemented to meet a target completion date of 2006. The removal of all contamination at Rocky Flats is not possible for both technological and financial reasons, nor is it required from a regulatory standpoint. The final modifications to RFCA Attachments recognize these constraints and outline a cleanup that will result in very little risk to future site users and makes commitments for long-term care and maintenance of the site to ensure that the remedy remains protective.
63	I would like to voice my opposition to having open	Please see General Response. Also, the RFCA Parties understand

	access to the former Rocky Flats Nuclear Weapons area without complete decontamination occurring first. I don't think it is safe to make it into a wildlife refuge and allow access to this land until it is safely cleaned up. If it is impossible to totally decontaminate this land, then I believe it should be kept off limits to humans and animals as much as is possible.	that some in the community do not accept a cleanup and closure that does not remove all contamination, but meets all regulatory requirements. The final modifications to RFCA Attachments will result in a safe and environmentally compliant cleanup and can be implemented to meet a target completion date of 2006. Access to the Rocky Flats National Wildlife Refuge will be determined by the U.S. Fish and Wildlife Service through their Comprehensive Conservation Plan, which is a public planning process that considers public input.
64	I am writing with regards to the clean up that is to be done at Rocky Flats. As a long time citizen of Colorado I strongly encourage you to do more cleanup than has been decided on. The contamination that has been created by years of flagrant disregard for the environment by Rockwell necessitates a much more vigorous cleanup than will be done it Rocky Flats becomes a wildlife refuge. Someone needs to take responsibility for the disaster that has become Rocky Flats. I urge you to rethink the decisions that have been made about this location. No one should be allowed on that property, ever. The idea that Rocky Flats could ever support a healthy wildlife area is a joke. I am sure you know that for many years, plutonium waste was dumped, sprayed and released through fires and various mishaps on the property that the DOE so proudly states will be become [sic] a wildlife refuge. I, and many others know that this is just an excuse to allow a lesser level of cleanup to occur. Again, please reconsider the actions that you and you[r] department take today, because they will affect you and your offspring from many, many generations.	Please see General Response. Also, the RFCA Parties understand that some in the community do not accept a cleanup and closure that does not remove all contamination, but meets all regulatory requirements. The final modifications to RFCA Attachments will result in a safe and environmentally compliant cleanup and can be implemented to meet a target completion date of 2006.

65	It has been brought to my attention that the future site of what was once the Rocky Flats Nuclear Weapons Facility, will potentially be opened for public access. I am aware that radiation levels on the site far exceed natural background levels, as a result of an expedient, and ill-advised cleanup. I am highly concerned about the safety of persons, unaware of these concerns, entering this site with their friends and children. Ultimately I would like to see the public kept out of what will become the wildlife refuge. I feel that to let these unknowing persons in would be an enormous injustice to public safety. Please consider acknowledging what could ultimately be a human catastrophe. It is your duty as a Rocky Flats official and as a human to prohibit causing immense suffering on innocent people. Please do the right thing and prohibit public access at Rocky Flats Wildlife Refuge.	Please see General Response. Also, the RFCA Parties understand that some in the community do not accept a cleanup and closure that does not remove all contamination, but meets all regulatory requirements. The final modifications to RFCA Attachments will result in a safe and environmentally compliant cleanup and can be implemented to meet a target completion date of 2006. Access to the Rocky Flats National Wildlife Refuge will be determined by the U.S. Fish and Wildlife Service through their Comprehensive Conservation Plan, which is a public planning process that considers public input.
66	In regard to proposed cleanup levels I would offer the comment that they (the levels proposed) are not stringent enough and are short term in their limited scope. Contaminant levels should be reduced to "background levels (average)" as recommended all along by advisory and public interest groups comprised of concerned citizens. Als I recommend consideration of other uses than wildlife refuge when determining these levels, i.e. use of the land by a subsistence farmer.	Please see General Response. Also, the RFCA Parties understand that some in the community do not accept a cleanup and closure that does not remove all contamination, but meets all regulatory requirements. The final modifications to RFCA Attachments will result in a safe and environmentally compliant cleanup and can be implemented to meet a target completion date of 2006.
68	I am concerned that the proposed levels of clean-up are not suit[a]ble for long-term use of this land. The designated level of 50 picocuries per gram of soil will not make this land suit[a]ble for human use. This site could and should be cleaned up to a level of 1-10 [pCi/g], as suggested by Dr Arjun Makhijani of IEER.	Please see General Response.
67.a	C. Future use: A third key decision was to clean the site only to the level required to protect a wildlife refuge worker.	

	a. Despite the fact that the act of Congress designating Rocky Flats as a national wildlife refuge specified that this designation should not be used to determine the level of cleanup of the s[it]e, DOE and the regulators propose to do exactly *this*. Using the wildlife refuge designation as a rationale for a less expensive, less thorough cleanup sets a very bad precedent for cleanup of other DOE sites.	a. Subtitle F – Rocky Flats National Wildlife Refuge says nothing in this subtitle shall reduce the level of cleanup and closure at Rocky Flats required under the RFCA of any Federal or State law. The modifications to RFCA Attachments contain RSALs that are more stringent than those previously in RFCA and meet the requirements of Federal and State law.
	b. An ANA member group, the Rocky Mountain Peace and Justice Center (RMPJC), recommended in October 2001 that Rocky Flats be cleaned to the far more stringent level required to protect a resident subsistence firmer. They supported this recommendation with a detailed technical report prepared for them by a second ANA member organization, the Institute for Energy and Environmental Research (IEER). Entitled "Setting Cleanup Standards to Protect Future Generations: The Scientific Basis of the Subsistence Farmer Scenario and Its Application in the Estimation of Radionuclide Soil Actions for Rocky Flats" (dec. 2001), this report is available in full at www.ieer.or&euortslrockv/toc.html. The report was summarized in the IEER newsletter, Science for Democratic Action, vol. 10, no. 3 (May 2002), available on line at www.ieer.org. RMPJC and IEER emphasized that cleaning Rocky Flats to protect a subsistence farmer would better protect all other users of the site, including the wildlife refuge worker.	b. Please see response to Comment 5.B.2, Category O.
	c. RMPJC informs us that on June 15,2001, after they were told unequivocally that a decision to use the wildlife refuge worker scenario to calculate the cleanup levels had already been made, they filed a Freedom of Information Act request asking for	c. The decision to analyze the wildlife refuge worker scenario, as well as the rural resident scenario, was made at the Project Coordinator level, at the suggestion of the RFCA Parties' Radionuclide Soil Action Level Working Group. The meetings of this workgroup were open to the public and representatives, the

	"written correspondence, meeting minutes, or records of verbal or electronic communication" that would show when and by whom this decision was made. They wanted stakeholders to know the identity of actual decision-makers so they would know to whom to address their concerns. Some time later, in response to their request, they received only irrelevant documents already in their possession. In their ongoing efforts to get the information sought, they were recently told that their request is regarded as new, which drops it to the bottom of the pile of current requests, and that a fee will be imposed on them for time spent on the search. RMPJC's complaint about this treatment in an October 25,2002, letter to the DOE manager at Rocky Flats has met with no response. Because ANA believes in the democratic principle that the affected public is entitled to know, we now ask when and by whom was the decision made to use the wildlife refuge worker scenario to calculate the cleanup levels for Rocky Flats.	Citizens Advisory Board and the RF Coalition of Local Governments often attended.
67.b	2. ANA supports the RMPJC and IEER recommendation that the Rocky Flats site be cleaned to protect a resident subsistence farmer. This would result, as IEER has pointed out, in a soil action level for plutonium of between 1 and 10 pCi/g. In applying this number, no distinction should be made between surface and subsurface environments, since subsurface contamination may at some future time become surface contamination.	Please see General Response.
67.c	4. Likewise, to repeat a recommendation already made by IEER, the designation of Rocky Flats as a wildlife refuge should not serve as the precedent for other sites or for reducing cleanup expenditures at other major DOE nuclear weapons sites.	The DOE Rocky Flats Field Office, EPA Region 8 and the Colorado Department of Health will probably not have a direct impact on decisions regarding the future use at other major DOE sites.

70	I hope that you hear our voices and carry the word that anything less than a complete and thorough cleanup is unacceptable.	Please see General Response.
72	My simple statement is this. Clean up must be to the level that is absolutely the best possible protection of human health and the environment, irrespective of any theoretical future stewardship. Human intervention and politics are far too unpredictable in the face of hundreds of thousands of years of plutonium toxicity. Closure must be to the level of safety for the very possible residential use scenario. I do not agree with the "Wildlife Refuge" use scenario levels of clean up. This is precedent-setting for closures throughout the Department of Energy complex. Now is the time to set standards that have integrity and reflect the values of the communities that surround the site. Now is not the time for decisions based on expediency and artificially imposed deadlines.	Please see General Response.
73	I have heard that the government RFCA Parties have decided not to clean Rocky Flats to the maximum standard. This greatly saddens me, for it is a decision that will affect not only those alive now, but those yet to be born. I am a health practitioner and have found high levels of uranium in hair samples of people who lived in the Denver area for an extended period. These people suffer from a complex myriad of health problems that appear to elude many doctors and alternative health care practitioners. There are already so many environmental stresses bombarding those in urban areas, from air pollution and chemical and heavy metal contamination of city water, to electromagnetic radiation. The additional contamination of the soil with radioactive waste is tantamount to shortening the life spans and well-being of thousands of unsuspecting citizens. In making this decision it is really impossible to calculate the cost in quality of health for those living in this area.	There are no data to suggest that operations at Rocky Flats resulted in doses of uranium to people off of the Rocky Flats boundary. If this effect is real, it is almost certainly attributable to the high background levels of uranium along the Front Range. The modifications to RFCA Attachments will result in very low levels of contamination at Rocky Flats. The risk associated with these levels will pose an excess lifetime cancer risk of less than one in 100,000 to the refuge workers at the site, and a much smaller risk to members of the public who visit the refuge. The risk posed to the public that surround Rocky Flats is insignificant.

	I implore you to take action for this very worthy cause. It is vitally important that people are educated about this terrible health hazard, and made aware of the consequences. There ARE solutions. The United States government is currently funding millions of dollars into war, a situation that could quickly escalate into billions. Meanwhile, we turn a blind eye to local issues that threaten the lives and wellbeing of arguably more people than terrorism could ever claim (although clearly of a less visibly violent nature). Please reconsider this decision. I myself will be moving to another area, and encouraging my family and friends to do so as well, should this issue not be resolved.	
74	I am a concerned citizen, member of the Sierra club and local high school science teacher and I am writing to you today to express my concerns about the final plan to clean up rocky flats and how I believe this plan is inadequate. Of all the information I have read related to the subject, I have not seen any hard scientific evidence proving that the clean up level you are proposing is satisfactory. Having the public believe the area is clean and safe is a dangerous proposition. What happens decades from now what the area is still contaminated but people have forgotten and decided to build homes or businesses or schools out there? A thorough clean up of this area is imperative as plutonium left at the site will effect people and the environment for millions of years, essentially forever. We have the ability to clean up the area thoroughly and this is what should be proposed.	Please see General Response. The modifications to RFCA Attachments will result in very low levels of contamination at Rocky Flats. The risk associated with these levels will pose an excess lifetime cancer risk of less than one in 100,000 to the refuge workers at the site, and a much smaller risk to members of the public who visit the refuge. The risk posed to the public that surround Rocky Flats is insignificant.
75	This is our opportunity to act in the most responsible, ethical manner possible to insure the welfare and well	The action levels in the modifications to RFCA Attachments are based on a very thorough assessment of the risks posed by levels of

	being of all humans and wildlife and plant species that come in contact with the radioactive contamination at the former nuclear weapons plant, for the next 240,000 years. To do anything but a thorough and complete clean up is unthinkably irresponsible. The legacy of Rocky Flats is on our shoulders. The legacy I want to leave is a site that will not be responsible for ill health and mutations from Plutonium, essentially forever. I do not believe enough research has been done on the effects the plutonium residue and the subsurface plutonium will have on humans and wildlife. I do not think enough is known about the ability of plutonium to move through the soil, get into ground water, and end up in drinking water supplies. I do not think enough is known about what effect drinking the water and eating plants and grasses that may be contaminated will have on the wildlife at the prospective refuge. In addition, to count on the fact that Rocky Flats will always remain a wildlife preserve seems irresponsible and dangerous to me. There is a great deal of uncertainty and many unknowns in this situation. The site has never been thoroughly characterized. No one knows what fate this site will encounter through the centuries. In situations of uncertainty such as this, we should follow the precautionary principle which says we act conservatively and put the public's health over purely economic considerations. I am grateful for the dramatic reduction in plutonium soil levels, but even these reduced levels are not low enough. And, to set the lower soil action levels without obtaining the funds necessary to thoroughly clean up the ENTIRE site to that level, is irresponsible and totally inadequate. To say there will be a "trade off" and that	plutonium in soil. The current plan for the cleanup of Rocky Flats also incorporates a great deal of research that has been conducted on ability of radionuclides such as plutonium to move in soil and in ground water. We believe that our determination that the current plan is protective of both human health and the environment is based on the best science available. However, Rocky Flats will be monitored and maintained for the foreseeable future and if future research indicates that the assumptions we made in 2003 were wrong, the remedy will be revisited and additional action may be necessary in accordance with applicable state and federal laws. The modifications to RFCA Attachments do not ignore the subsurface contamination. However, in modifying the Attachments, the RFCA Parties did take into account that contamination in the subsurface poses a much lower risk than the contamination at the surface.

	you will have to just ignore the subsurface plutonium levels totally negates the effectiveness of the proposed cleanup. We must act now to provide a real cleanup that will protect current and future generations. Otherwise, we have wasted the money that has already been spent and that is scheduled to be spent by 2006, and will leave a harmful and shameful legacy to the multitudes of coming generations. And, lastly, I ask that you exercise your authority, scrap this plan, go back to the drawing board and redo this proposed clean up plan, using a lower soil action level, based on there resident rancher scenario, and use citizen power to go to Congress to obtain the funding necessary to do a real and thorough clean up of this totally contaminated facility. Please don't settle for less.	
76	It has come to my attention that the proposal for the cleanup at Rocky Flats is not adequate at all. Even if there were not a huge population near by, it would behoove us to see that a complete clean up is done. With the large population near by and the longevity of the waste, it is imperative that it be done correctly. We expect our children to learn to clean up their messes; we send out garbage men to clean up our trash and we don't expect them to leave some of it on the street each week. If they did, only disease and od[o]r would be the result. This is a far greater mess and it needs to be done completely. We ought not be making messes we don't clean up; if we don't know how, we shouldn't make them to begin with!	Please see General Response.
77	It is my understanding that cleanup at Rocky Flats is to be completed by December, 2006, and that the currently planned maximum level of plutonium contamination in	Please see General Response.

	the soil is to be 50 Pico curies per gram. I also understand that that level of cleanup is inadequate to protect the health of humans and animals over the course of its half-life. Given that we currently living won't be around to monitor the site more than a few years from now, I strongly urge you to restructure the cleanup to provide the maximum cleanup possible (not the maximum possible with available funding), to a minimum of 5 Pico curies per gram.	
78	I am writing in response to an email I received about the intended cleanup of Rocky Flats. It is [unacceptable] that the full capabilities of the possible clean up are not being administered. The proposed clean up strategies simply are not adequate. It is imperative that maximum clean up efforts be implemented for the health and safety of surrounding populations and future populations to reside in the area as well. Please reconsider your proposed cleanup plan for many people's health and safety depends on these actions.	Please see General Response.
80	I am writing this simple e-mail to urge that the US government goes much farther in clean up standards than the current proposal. I would like for the subsurface pipes to be dug up and any and all soil contamination because of those underground pipes to be removed from site. My viewpoint is that the surface and subsurface cleanup level should be 5 or less picocuries per gram, and the depth to which this should be done determined by the level of contamination once those pipes are assessed and removed. If more money is needed, so be it. Go back to Congress and get the extra money. Extend the deadline if necessary. Let's not forget that plutonium lasts a long, long time. It also causes cancer.	Please see General Response.
32	The more I learn about Rocky Flats the more frightened I become. What scares me the most is that little is being done to fix this catastrophe that has been created by	Please see General Response. In addition, it appears the commenter is unaware of the progress that

	humans. We are the only ones in the position to rectify this wrongdoing. It appal[l]s me that so many can just push this aside. I am not a specialist in all that is going on. I am merely a person that greatly cares about the environment, the creatures that live there, and around the area, and for people to be born in the next 240,000 years and forever. I urge you to take more action, or else another huge fallacy on the part of human nature will be committed.	has been made in the last few years at the site. Much has been done to address the risks at Rocky Flats.
42	In the cleanup process, allow yourselves enough time to accomplish the formidable task as well as humanly possible. December 2006 may be too soon a deadline for the extent of deep cleaning needed. In closing, we ask that you do not compromise public health and environmental integrity to fulfill a set budget and an arbitrary deadline. The costs to our descendents will be too high. We also ask that you continue to ask for and pay close attention to i[n]put from the affected public, past, present, and future. Stop, look, and listen to our recommendations for a LONGSTANDING cleanup plan. Together we must do our very best to protect the safety of human, animal, and plant life at the Rocky Flats former nuclear weapons site - not just for the immediate future, but for the 240,000 years to come!	DOE is obligated to meet the regulatory requirements regardless of how long it takes. However, at this point in time, a 2006 completion of cleanup and closure is considered achievable.
81	I understand from several sources that The Department of Energy's final plan for cleanup of the Rocky Flats nuclear weapons site is inadequate. A thorough cleanup is imperative; this site is in the middle of a major urban area, and there is some history already of the effect of the contaminants on the Greater Denver population. Remember Dr. Helen Caldicott? I understand certain government RFCA Parties say they will not clean Rocky Flats to the maximum extent now	Please see General Response.

	possible. Because of the long-lived nature of some of the contaminants, especially plutonium, the pollution left in the environment at the site will affect the health of people and the environment in the Denver area. If we are going to build nuclear triggers, we have to take responsibility for what we do - to the land, to the people living on or near the land. Clean it up. Find a way to clean it if you don't know how to clean it now.	
41	As both a concerned student and a neighbor to the Rocky Flats facilities, I feel it is both my responsibility and right to comment on the proposed cleanup of the Rocky Flats facilities. I feel rather strongly that the proposed level of cleanup to accom[m]odate only a wildlife refuge and its workers is once again allowing countless responsible governmental and corporate figures to avoid embracing their full responsibility for all of the horrendous mistakes and deceits that have occurred throughout the history of the plant. Not only have improper operations created a toxic waste dump out of pris[ti]ne lands, but the operations and abuse of public trust has caused what many believe, regardless of denial on behalf of the DOE and Rockwell, etc., to have caused severe health problems in humans and animals surrounding the compound. Who would say that the sight of six legged frogs breeding implies good health? Plutonium has a half-life of over 24,000 years. This means that only partially cleaning up Rocky Flats would leave vulnerable all future inhabitants to the radioactive and toxic wastes allowed to remain in the soil, exposing them to elevated risks of cancer, genetic and reproductive damage, etc. Unless you can personally tell me that someone or some document will be provided to all of these future inhabitants, over tens of thousands of years, to forewarn of the problems associated with exposure to	Please see responses to Comments 8 and 45, Category O.

	hazardous and radioactive wastes, describe to them HONESTLY of the past dumpings, burials, fires, and other horrors of the conduct that occurred at Rocky Flats, AS WELL AS tell them exactly why they are allowed to live there after only partially cleaning up these mistakes, I feel there is no excuse for not cleaning up the sight to the fullest of abilities and the highest of technologies available today. This is what is owed to the citizens of Colorado, as well as all of its future inhabitants. Any economist or real estate developer will tell you, it is only a matter of time before this property, with views of the flat irons and Denver, developed. As we have witnessed from past operations dealing with Rocky Flats, there is no foundation for trust of government nor corporation to protect people from this development. Corners have been cut routinely and secrets swept under the mat too many times. It is time for honesty, responsibility and action. People have a right to a clean, safe environment, and Rocky Flats is not this.	
35	Please do not do a partial job of cleaning up Rocky Flats. The DOE and the US Government owe it to the people of Colorado to clean up the mess there so that it isn't adversely impacting not only this generation, but the ones that follow.	Please see General Response.
37	I am strongly opposed to the lesser clean up. The site needs to be cleaned up- regardless of time or cost. The DOE has said that water won't be drinking water, but if the site is to be a wildlife refuge... don't animals drink? And graze? Someday humans will hunt animals that eat off the land and drink the water. The clean up needs to envision the future and instead it is very short term... very narrow minded. If only we had some of the money used to bomb Iraq for cleaning up the bomb materials in this country.....I hope you will ensure the long term and complete clean up of this site, but I am in the majority... I	Please see General Response.

	am very doubtful that the job will be done well.	
84	The government RFCA Parties say they will not clean Rocky Flats to the maximum extent now possible. Because of the long-lived nature of some of the contaminants, especially plutonium, the pollution left in the environment at the site will affect the health of people and the environment in the Denver area forever. The current DOE plan for clean-up is therefore inadequate. Please amend the current clean-up plan so that the legacy of Rocky Flats is one of true progress, and not of disaster.	Please see General Response.
86.a	Ever since 1951 when it was announced that Rocky Flats would become the site of a nuclear weapons plant, an unsuspecting public and future work force had no idea the amount of danger that would present. The proposed modifications to the Rocky Flats Cleanup Agreement (RFCA) do not provide adequate assurance that the danger will end any time soon. Further the RFCA assures that the danger will remain for a period of time equal to forty times the length of all recorded history.	Please see General Response.
86.b	It is uncertain how remedial choices will stand the test of time. For instance, will asphalt and concrete really prove to be an effective barrier for 240,000 years? 20 years? 50 years? Is 3 feet or 6 feet down a reasonable depth for remediation of subsurface soils if considered within the framework of 240,000 years of erosion and disruption? No, it all needs to be cleaned to background levels.	Please see General Response.
86.c	Will radionuclide soil be remediated in a negative pressure enclosure? Include in the RFCA language that all soils remediation will be done in an enclosure under negative pressure and continually monitored. Include in the RFCA that all soil excavation will be	Current soil excavation work at the 903 pad is being conducted in a negative pressure enclosure. However, for the area where the soil contamination is at much lower levels, we don't anticipate using enclosures. Planning for these other soil removal jobs has not been completed, but a variety of measures designed to minimize spread of contamination will be employed: - conducting work when wind is calm - use of standard dust suppression measure

	monitored for VOCs and SVOCs, as well as particulate over 1 part per million and all other contaminants of concern in the remediation site. A health monitoring and action plan needs to be developed in conjunction with affected communities members of the public on establishing monitoring-standards , baseline studies, health resources, cleanup shut down levels, visitor levels, community notifications, emergency planning and reporting.	- minimizing the area that is disturbed at any one time - application of soil fixatives. - controlling storm water In addition, DOE is considering using soil vacuum technology for soil removal. VOCs, SVOCs and particulates will be routinely monitored during soil removal projects. The decision document for the soil contamination east of the 903 Pad will be made available for public review and comment.
61	Recommendation 5 : Due to the long period over which plutonium will remain dangerous (240,000 years), and since DOE and the regulatory RFCA Parties have not demonstrated a funded commitment to or developed a coherent plans for long-term stewardship (LTS) or a manner for addressing changes in site use over 240,000 years, and since it is plausible that in this time-frame people may live on and farm the site and that climate or geological changes may provide for very different conditions at the site, Pu in the soil at the site should be cleaned to 5 or less picocuries per gram (pcilg), with subsurface cleanup depth determined by the depth of contamination. Cleanup to this level will make the site safer for all other uses.	Please see General Response.
87	I am a concerned parent and citizen of Boulder County. I am writing to let the DOE know that Rocky Flats must be cleaned up to the maximum extent now technically possible. I am not satisfied with the proposed level of clean up. We have the ability to clean the site beyond that level. Anything less is a betrayal of future generations. If a more complete clean up requires more funding, the public should be asked to press Congress to provide it.	Please see General Response.
88	The primary problem, of course, is plutonium and actinide contamination. These will be around for 10 half	The movement of plutonium in the environment has been studied quite extensively at Rocky Flats and elsewhere. The data show

	lives and still be extremely dangerous. Long-term migration into the current location of the Denver metropolitan area is inevitable unless thorough clean up is done in the next few years and after the next few years. This plume could easily spread way beyond the current Metro Region over 250,000 years or more. Migration pathways now and in the future have been inadequately accounted. Additional pressures that expand migrational pathways will undoubtedly occur over centuries and millennium has radioactive material heats a stew of toxins. Many other hazardous and toxic waste materials also exist in the soil, pipes, underground buildings, and other locations. Merely relegating the ornerism[?] to actinides is still sweeping the problem under the rug. Complete cleanup needs to be accomplished for all contaminants. Pipelines used to carry non-actinide chemical streams need to be removed and decontaminated or neutralized in an appropriate manner. Proposals to leave them in place show a concern for taxpayers and general public by the DOE that is less than Enron, Halliburton, and Harkin had for their own pollution belching stockholders, much less the victims. All underground buildings need to be removed. Contamination of building materials from underground facilities must not be merely buried or swept under the rug. There is good reason to believe that there exist extensive underground facilities that have not been divulged to the public. Merely sweeping away the top 3 or 7 feet of soil will not adequately address long-term problems of non-actinide or actinide migration. Hot spots are another problem that	conclusively that plutonium is highly immobile in the subsurface. Under the provisions of the modifications to RFCA Attachments, considerably more surface soils will be removed at Rocky Flats, thus further decreasing the potential for contaminant migration. Many of the issues raised by this commenter are addressed in the modifications to RFCA Attachments, such as the characterization of OPWLs and groundwater contamination.

	has not been dealt with adequately. DOE will never find all the hot spots out there. Hot spots are consistently found with depths greater than 3 or 7 feet. Previous attempts to ignore solvents such as CCl4 deep beneath the surface contamination exasperates the long and ongoing public distrust for the intentions, purposes, and actions at Rocky Flats. Deep subsurface pools of contamination and their plumes must not be left for future generations to contend with at a hugely increased expense. Clean up should not be considered a done deal after 2006 just because the administration wants to play partisanship between big wealthy polluting multinational corporations such as US military contractors and working families that have to bear the brunt of those burdens. It seems that DOE is pushing a self proclaimed political reality that funding will not be available after 2006 and using that self fulfilling prophesy to simply walk away from the problem and sweep it under the rug. DOE has countlessly stated that they would not just walk away from the problem, but the weapons industry and users feel that they are above environmental law. DOE has stated many times that they feel they are above the law because they are the law, especially when the issue was incineration of mixed waste. Cleanup should be done as soon as possible, but not rushed to the extent of shoddiness. If evidence of more advanced, thorough, and cheaper technologies exists, the cleanup should be done when possible.	
21	At this point scientists predict that plutonium has a half-life of 24,400 years, plutonium remains dangerously radioactive for a quarter-of-a-million years. That's a lot	Please see General Response.

	longer than we've been on the planet and I expect over time we'll know even more about the effects of plutonium than we do today. The current proposal will not entirely clean up the plutonium and we're going to be left to live with it. The idea of turning the area into a wildlife preserve seems absurd even if all the plutonium was to be removed. An alpha emitter, it can be harmful in very tiny amounts if inhaled, ingested, or taken into the body through an open wound. Once lodged in the body, it constantly bombards surrounding cells with radiation, potentially damaging cells hit directly as well as nearby "bystander" cells. The result can be cancer, immune system damage, or genetic aberrations that get passed on to future generations. Any quantity of plutonium left in the environment thus constitutes an essentially permanent danger. (On cellular damage that may be caused by a single plutonium particle, see Hei et al, Proceedings of the National Academy of Sciences, vol. 94, Ap. 1997; Kadhim et al, Nature, vol. 355, 20 Feb. 1992; and Edwards, New Scientist, vol. 11, Oct. 1997).	
92	I am disappointed to discover that the reduced standards for cleanup of Rocky Flats which were adopted in 1996 have been accepted by the government RFCA Parties involved. I live within a few miles of Rocky Flats. This means to me that nothing will be done about the residual plutonium until long after so much damage has been wrecked on human health that symptoms, disease, and death are undeniable. Are we condemned to repeat the past? The dangers of living with radioactive substances were first made public in the United States in 1921, when the numbers and	Please see General Response.

	hands on watch dials were being painted with radium-paint. Since this paint was merely one part radium in 30,000 the Radium Corporation of America denied there could possibly be any danger - even as the women workers were dying of cancer. It was only after repeated deaths that the dangers were finally admitted. The dangers posed by contaminants at Rocky Flats are much more diffuse and so it will take much longer for a cohesive set of symptoms to emerge, yet these contaminants affect a much larger population of at least over a hundred thousand people. Our founding fathers declared the unalienable right to "life, liberty, and the pursuit of happiness." I take that "life" word very seriously.	
94	This is a quick letter requesting that a proper clean up of the Rocky Flats contaminated area is executed. It is vitally imp[or]tant for America's future generations to have a safe uncontaminated place to live and grow.	Please see General Response.

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RFCA Attachment Proposed Modifications

Responsiveness Summary

Category: P. General Comments

Commenter No.	Comment(s)	Response
34.a	Attachment 5, Page 5-17, 4.1. – 4.1.C. is redundant of 4.1.B.1.a. Eliminate 4.1.C. unless otherwise needed.	Section 4.1.C has been eliminated in the final modification to Attachment 5.
34.b	Throughout the document it states that the United States Environmental Protection Agency (EPA) and the Colorado Department of Public Health and Environment (CDPHE) will be notified when there are exceedances of standards and action levels, and that quarterly and annual reports will be distributed to them. The United States Fish and Wildlife Service (Service) would like to be notified when EPA and CDPHE are notified, and the Service would also like to receive a copy of the quarterly and annual reports.	The DOE will notify the U.S. Fish and Wildlife Service (Service) when EPA and CDPHE are notified of reportable values of standards and action levels. Additionally, the Service will be provided copies of the quarterly and annual reports.
34.c	Attachment 5, Page 5-23, 5.3.H.4. – Add the word significantly to the sentence so it reads, "...implemented without significantly damaging other ecological resources."	This change has been made.

RFCA Attachment Proposed Modifications

Response to Comments

Category: Q. Technical Basis Document

Commenter No.	Comment(s)	Response
47	Page 20, second paragraph, last sentence. We disagree that non-radionuclide contamination will only be remediated in the top six inches of soil and the Soil Risk Screen will be used for depths greater than six inches. Westminster supports the surface soil definition of three feet for both radionuclide and non-radionuclide contaminants. Page 21, last paragraph. Westminster does not agree with the 3nCi/gm and 10 nCi/gm numbers. Change the first sentence to read, "If contamination above 1nCi/gm is located at the initial…" Change the fourth sentence to read, "If contamination above 3 nCi/gm is located…" Following paragraphs in Section 3.6.3 should reflect these changes. However, as stated in our previous letter, "as site characterization progresses, the City will consider a threshold limit of 1–3nCi/gm based upon being consulted on the results of the characterization." Page 22, second paragraph. The proposed 80 square meters trigger derived from Appendix B appears to have been "dry-labbed." In other words, it appears that the formulas had numbers assigned that would arrive at a desired outcome. Informal surveys of prairie dog	Please refer to responses in Categories E and N.

	burrows surrounding Rocky Flats show a population density much greater than 6.2 burrows per 1000 square meters. Page 23, second paragraph. Remove, we do not support the hot spot methodology as stated previously, "The hot spot methodology shall not be applied per the Industrial Area Sampling and Analysis Plan (IASAP). This methodology allows up to three times the soil action level and is unacceptable." Page 24, Section 3.7. We (the Coalition and Westminster), "ask that RFCA milestones be established for the development of the long-term stewardship strategy and plan. We are concerned that stewardship is being relegated at this point to a document (the Site's long-term stewardship strategy) that currently is not legally enforceable by EPA and CDPHE and is subject to changing policy direction and commitment by DOE. Thus we request that a RFCA milestone be crafted that both holds DOE accountable to a timeline for developing the long-term stewardship plan and, more importantly, establishes a common set of criteria between the RFCA parties as to the scope and content of the stewardship plan."	
67	PUBLIC PARTICIPATION PROCESS: Appendix A of the Technical Basis Document lists dozens of meetings regarding Rocky Flats cleanup held since August 2000 by the RFCA Stakeholder Focus Group, the Rocky Flats Citizens Advisory Board, and the Rocky Flats Coalition of Local Governments. A crucial reality, however, is that regardless of the number of meetings held to deal with aspects of the cleanup, the public was not given the opportunity to participate in any discussion of the decisions that actually defined the parameters of the proposed cleanup at Rocky Flats. Key decisions were	These comments are similar to those submitted by this commenter for the proposed modifications. These comments are addressed in the General Response and responses to Categories A, F, H, I and K.

	made in the following three areas without input from the affected public: A. Closure date: A decision was made to clean and close the site by the arbitrary date of 2006. We, with others, applaud DOE's intent to expedite cleanup, but the decision to close Rocky Flats by the end of 2006 was made without having first determined what would be required for a real cleanup. The site, for example, had not been thoroughly characterized to determine the full extent of contamination. Indeed, to date there has been no comprehensive characterization of the sit. There is no plan for such, and the regulators are not requiring it. B. Funding: A decision was made to perform all closure activities, including cleanup, for the fixed sum of $7 billion. This sum covers removal of surplus special nuclear material, removal of waste accumulated during the production years, maintaining site security, demolishing buildings, and, finally, performing the actual cleanup activities of environmental remediation of contaminated soil and water. In the end the contractor budgeted only $470 million, or approximately 7 per cent of the $7 B total, for environmental remediation. a. The decision on how much to spend on ER at Rocky Flats appears to have been made as an afterthought, that is, by waiting to see how much of the anticipated $7 B would be left over when the costs of all the other closure activities had been calculated. b. The amount for ER was arrived at, again, without a thorough characterization of the site and thus without having a clear sense of what it would take to do a thorough cleanup. c. The local public rejected the cleanup levels	

	adopted for Rocky Flats in the 1996 RFCA. In response DOE funded an independent review of the radionuclide soil action levels (RSALs), with awareness that out of this review could come a recommendation that the RSALs be made more protective than those adopted in 1996. Indeed, the review did result in such a recommendation. But because of the prior behind-the-scenes agreement to clean and close the site for a fixed sum, no additional funding would be sought. Cleanup would be limited to what could be accomplished with a sum pegged to the 1996 cleanup levels unacceptable to the public. DOE and the regulators evidently intend to provide the better cleanup the public said it wanted back in 1996 but without spending anything more to get it - a strange, almost miraculous undertaking! d. Though $470 M is budgeted for ER activities, we understand the planned work may be done for less. Yet there is no plan to spend the full $470 M to achieve a better cleanup than is envisioned by the cleanup proposal. In the end something less than $470 M may be spent on the cleanup. e. A closely related but not identical issue is the likelihood that cleanup will be completed early and Rocky Flats will close ahead of time, perhaps as early as December 2005. According to DOE, the savings achieved from early closure will not be used to achieve a better cleanup of Rocky Flats but on DOE's side will be applied to ER work at other sites and on Kaiser-Hill's will be pocketed as profit. These arrangements are part of the deal made without input from the affected public. From the standpoint of public health and environmental integrity, they set a very bad precedent for other	

	DOE sites. f. We understand that requests from time to time by various stakeholders that the government RFCA Parties seek additional funding to achieve a better cleanup at Rocky Flats were dismissed out of hand. C. Future use: A third key decision was to clean the site only to the level required to protect a wildlife refuge worker. a. Despite the fact that the act of Congress designating Rocky Flats as a national wildlife refuge specified that this designation should not be used to determine the level of cleanup of the site, DOE and the regulators propose to do exactly this. Using the wildlife refuge designation as a rationale for a less expensive, less thorough cleanup sets a very bad precedent for cleanup of other DOE sites. b. An ANA member group, the Rocky Mountain Peace and Justice Center (RMPJC), recommended in October 2001 that Rocky Flats be cleaned to the far more stringent level required to protect a resident subsistence firmer. They supported this recommendation with a detailed technical report prepared for them by a second ANA member organization, the Institute for Energy and Environmental Research (IEER). Entitled "Setting Cleanup Standards to Protect Future Generations: The Scientific Basis of the Subsistence Farmer c. Scenario and Its Application in the Estimation of Radionuclide Soil Actions for Rocky Flats" (Dec. 2001), this report is available in full at www.ieer.or&euortslrockv/toc.html. The report was summarized in the IEER newsletter, Science for Democratic Action, vol. 10, no. 3 (May 2002), available on line at www.ieer.org. RMPJC and	

	IEER emphasized that cleaning Rocky Flats to protect a subsistence farmer would better protect all other users of the site, including the wildlife refuge worker. d. RMPJC informs us that on June 15, 2001, after they were told unequivocally that a decision to use the wildlife refuge worker scenario to calculate the cleanup levels had already been made, they filed a Freedom of Information Act request asking for "written correspondence, meeting minutes, or records of verbal or electronic communication" that would show when and by whom this decision was made. They wanted stakeholders to know the identity of actual decision-makers so they would know to whom to address their concerns. Some time later, in response to their request, they received only irrelevant documents already in their possession. In their ongoing efforts to get the information sought, they were recently told that their request is regarded as new, which drops it to the bottom of the pile of current requests, and that a fee will be imposed on them for time spent on the search. RMPJC's complaint about this treatment in an October 25, 2002, letter to the DOE manager at Rocky Flats has met with no response. Because ANA believes in the democratic principle that the affected public is entitled to know, we now ask when and by whom was the decision made to use the wildlife refuge worker scenario to calculate the cleanup levels for Rocky Flats. We conclude from the foregoing review of decisions made without public participation that the DOE in deciding the cleanup levels that are now being proposed for Rocky Flats used a grossly non-democratic process. Insofar as the regulators	

	accept the parameters established by this process they too are engaged in a non-democratic process. We find it disturbing that the claim is now sometimes made that the cleanup proposal is the product of public participation when in truth the public was systematically excluded from consideration of the defining features of the cleanup plan. Eventually a very time-consuming public participation process involving dozens of people was put in place. But participants in this process were reduced to rearranging details within the constricting framework of a scheme developed by others. We do not question that they exercised some influence within this limited context, but it would not be true to assert that the engaged public determined the cleanup levels for Rocky Flats. In effect, all stakeholders, whatever their affiliation, were working within time and money traps. THE TRADEOFF AND THE RISK-BASED APPROACH: A major consequence of the decisions made without public input is what the government RFCA Parties refer to as the ''tradeoff.'' The key question that emerged for them after the public's rejection of the 1996 RFCA was how to provide a publicly acceptable cleanup for the same sum of money. They hit on the idea of offering better surface cleanup in exchange for fewer cleanups in the subsurface environment. They would take a "risk-based approach" of tailoring cleanup to a legally acceptable risk level for the "reasonably maximally exposed individual" (Superfund language), which, for Rocky Flats, of course, would be the wildlife refuge worker. Future use, the cleanup scenario, and fixed funding thus all came together. If the surface is cleaned to protect the refuge worker within the Superfund risk	

	range and if it can be shown that the contaminants in the subsurface environment pose no appreciable risk to the refuge worker, we will have a cleanup package that complies with regulatory standards and can be paid for with the limited sum available. The clincher in selling this deal to the public is to insist on the absolute non-availability of more funds. To comment, for ANA, there is no way to avoid the conclusion that, though the projected cleanup will comply with applicable regulatory standards as it must, the primary driver for the plan is money, the fixed sum agreed to without public input. A. According to the tradeoff, DOE and the regulators propose to clean the surface soil (defined as the top 3 feet) to a level for plutonium of 50 picocuries/gram of soil (pCi/g), much better than the 1996 level of 651 pCi/g. For the subsurface soil (below 3 feet) the RFCA Parties propose to leave plutonium at levels up to 3 nanocuries/gram (3,000 pCi/g). B. Cleaning of the subsurface environment will entail removal of portions of the roughly 7 miles of old process waste lines that once carried a brew of radioactive and toxic liquid wastes. The plan is to remove parts of the lines known to have ruptured and leaked. The lines, however, have not been completely characterized and will not be. We note that in a November 16, 2002, editorial the Denver Post questioned the plan not to remove all these old process waste lines. C. Contaminated groundwater will continue to pose a problem at Rocky Flats for the foreseeable future. Because of the geology of the site groundwater becomes surface water by percolating down to bedrock then moving laterally to seep from the slopes above the streams that bisect the site. Colorado has a state surface water standard for plutonium of 0.15	

	pCi/liter. This standard is enforced at the downstream site boundary by use of a 30-day rolling average of samples collected there. At closure the state standard will apply not only to water leaving the site but also to suffice water on the site, though DOE and the State have agreed to a 365-day averaging period for onsite samples. A study done at Rocky Flats in 2000 concluded that the state surface water standard could not be met even if the action level for plutonium in surface soil was as low as 10 pCi/g. To try to comply with the state standard the government RFCA Parties expect to rely on engineered controls. D. Other features of the risk-based approach are assurance from the RFCA Parties that the site will remain under federal control and that contaminants left in the environment will be contained by a mix of institutional, physical, and engineered controls. Given the 24,400 year half-life of plutonium, this whole risk-based approach, in our view, is a recipe for disaster, since there is no way to guarantee that controls put in place will last even a reasonable fraction (say, 10%) of the half-life of plutonium, much less for the far longer period the material in particle form will pose a risk. The "risk-based concept, moreover, is misnamed since it fails to take into account all risks, especially the totally unknown risks to humans and other creatures that may inhabit and/or use the Rocky Flats site in the future when unpredictable human or natural actions may have radically altered conditions at the site. LONG-TERM STEWARDSHIP: We understand that over the years various bodies have recommended that Rocky Flats be cleaned to the maximum extent possible with today's technology. We know too that in 1995 the broadly representative Rocky Flats Future Site Use	

	Working Group, the Citizens Advisory Board, and other entities recommended that the ultimate goal for cleanup of Rocky Flats be to average background levels. Cleaning the site today to the maximum extent possible with current technology would move toward this ultimate goal. Clearly, the DOE and the regulators have rejected this approach in favor of providing the cleanup that can be paid for with the limited sum available. There's a self-reinforcing logic in which the RFCA Parties reinforce past decisions, which reinforce their present positions. The cleanup they intend to provide is woefully inadequate, especially for the long term. It is the sort of cleanup that makes long-term stewardship an absolute necessity. Yet the RFCA includes no provisions for LTS. It refers to postclosure institutional and engineered controls, environmental monitoring, information management and the like, but it makes no provision for how these items will be managed or paid for. In the view of ANA, without legally enforceable provisions for a good LTS program the RFCA is deficient. The only way Rocky Flats can be a model for cleanup is for it to be a model as well for LTS. A legally enforceable program of LTS therefore should be written into the RFCA as an integral part of the cleanup plan and indeed as a condition for implementation of the plan. Without such, RFCA assurances about postclosure measures to protect the public health and environmental integrity become a packet of hollow promises. 'Below we will specify some items that we believe need to be included in a legally enforceable LTS program. ANA RECOMMENDATIONS: 1. The site should be thoroughly characterized to determine the full extent of contamination in the environment, and the characterization should be	

	reviewed by a competent, neutral external party. 2. ANA supports the RMPJC and IEER recommendation that the Rocky Flats site be cleaned to protect a resident subsistence farmer. This would result, as IEER has pointed out, in a soil action level for plutonium of between 1 and 10 pCi/g. In applying this number, no distinction should be made between surface and subsurface environments, since subsurface contamination may at some future time become surface contamination. 3. The designation of Rocky Flats as a wildlife refuge should not serve as a rationale for reducing cleanup expenditures at Rocky Flats. 4. Likewise, to repeat a recommendation already made by IEER, the designation of Rocky Flats as a wildlife refuge should not serve as the precedent for other sites or for reducing cleanup expenditures at other major DOE nuclear weapons sites. 5. DOE should work closely with local stakeholders to determine the cost of the best possible cleanup that can be achieved with available technology. a. DOE should spend the full $470 million currently budgeted for ER at Rocky Flats on cleanup projects at the site. b. The full $7 billion allocated for closure activities at Rocky Flats should be spent at the site. c. If currently available funds are not sufficient to cover the cleanup we recommend, DOE should work closely with local stakeholders to get the requisite funding from Congress. 6. The RFCA should be revised to incorporate provision for a legally enforceable long-term stewardship program that includes the following: • Assured funding. • Public participation and oversight.	

	• Information management systems. • Surveillance and maintenance of all controls, whether institutional, physical, or engineered. • Methods to inform and educate the public. • Environment monitoring for all media (soil, air, groundwater and surface water). • Periodic performance review and assessment of program activities. • Ongoing scientific research into better cleanup technologies that may be applied at the site to • achieve better cleanup. • Ongoing scientific research regarding effects of residual contamination on human, plant, and • animal life.	
91	1. Page 9, ¶ 4, Proposed New RSALs An ALARA evaluation is required per the Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation (ER RSOP) to determine if additional excavation is required. Provide the objectives for this determination and identify how the objectives are measured.	1. ALARA is applied through field consultation taking into consideration the circumstances presented by specific volumes, anticipated concentration gradients of radionuclides and the accessibility for removal using the equipment already deployed. The RFCA Parties believe that in a typical excavation action, in most instances the practical result of this process will be to remove an additional scoop of soil. We do not believe that a complicated or time consuming process should be applied, but that under ALARA an action should not be planned and implemented to just remove the small volume of soil if appropriate equipment and personnel are already mobilized for an action.
	2. Page 15, ¶ 1, Ecological Preliminary Remediation Goals If ecological preliminary remediation goals (PRGs) do not establish cleanup goals that are warranted, identify the trigger to warrant a consultative process	2. The RFCA Parties will involve the U.S. Fish and Wildlife Service in the consultative process to determine what actions might be warranted in the event an ecological action level is exceeded. The communities will be kept informed through routine information exchanges, such as the ER/D&D status meetings.

	to evaluate the accelerated action. Does the consultative process include the Fish and Wildlife Service? Broomfield would like to be informed when a trigger is initiated. The closeout report should also include the rational for the decision making process.	
	3. Page 15, ¶ 2, Site-Wide Contaminants of Concern Broomfield does not agree with the list of identified contaminants of concern. Nor do we agree with the main objective of identifying the Site-wide COCs to conduct the RFI/RI-CM/FS. Broomfield wants to ensure the list of COCs is comprehensive to ensure residual contamination is not migrating post-closure. As previously stated, the final list of COCs should be identified in the CAD/ROD or some other enforceable post-RFCA document.	3. The list of COCs is comprehensive. The intent of designating sitewide COCs is to ensure that all soil sample analyses include these analytes, at a minimum. Additional IHSS-specific COCs will be determined based on process knowledge and/or the results of prior characterization.
	4. Page 17, 1st bullet, Integrated Risk-Based Approach Considerations The subsurface risk-based approach is based on the assumption that subsurface soil plutonium and americium contamination at the Rocky Flats Environmental Site (RFETS) is insoluble in ground water and has not been detected as moving in ground water. With the discoveries of plutonium and/or americium at depths greater than expected at Building 663 and the 903 pad, the risk-based approach has not evaluated migration of actinides with high concentrations of volatile organics such as carbon tetrachloride. The risk-based approach alone should not be used to validate the assumptions about subsurface contamination. Therefore, Broomfield does not agree with solely using the risk-based approach to evaluate accelerated actions in the	4. The Subsurface Soil Risk Screen will evaluate all aspects of contaminant mobility, including whether certain contaminants can become more mobile in the presence of other contaminants.

	subsurface.	
	5. Page 17, ¶2, 2nd bullet, Integrated Risk-Based Approach Considerations Broomfield does not agree with the proposed language to only remove soils containing plutonium or americium above the action levels in the zero to three foot depths. All contaminants above the action levels within the zero to three foot depths shall be removed. Revise the language to reflect our remediation strategy of more remediation in the surface to allow for remediation relief in the subsurface.	5. The RFCA Parties have determined that the Subsurface Soil Risk Screen approach is appropriate for the accelerated action determinations. We do not believe the characterization of the proposed modification provides "relief" from any existing requirements that response actions must be protective of human health and the environment. Rather, the modifications to RFCA Attachments implement an approach that applies resources to surface and near surface contamination rather than to subsurface contamination that has only remote, indirect or incomplete pathways to exposure.
	6. Page 18, ¶ 2, Integrated Risk-Based Approach Considerations Strike any language pertaining to the original process waste lines and the proposed upper concentration or areal limits.	6. The RFCA Parties have determined that the areal extent and concentration should be considered in making accelerated action determinations.
	7. Page 20, ¶ 2, Soil Removal Depths for Radionuclides and Non-Radionuclides In accordance with our agreement to increase surface cleanup in exchange for relief in the subsurface, revise the six inches identified as surface for non-radionuclide contamination to reflect zero to three feet as being surface depth. The proposed language does not reflect an appropriate balancing of community interest in reducing posed risk. Strike any language that states the soil risk screen will be used for non-radionuclides at a depth of zero to three feet.	7. See response to Comment 5, Category Q.
	8. Page 21, ¶ 2, Section 3.6.3 New RFCA Attachment 14, Original Process Waste Lines (OPWLs) Subsurface Soil Approach Strike any language to base actions solely on risk-based criteria to determine remediation of OPWLS.	8. The RFCA Parties have determined that action determinations will be based on areal extent and concentration of contaminants and the application of the Subsurface Soil Risk Screen.

	Broomfield does agree with the bias sampling approach for known OPWLS with suspected leaks.	
	9. Page 21, ¶ 3, Section 3.6.3 New RFCA Attachment 14, Original Process Waste Lines (OPWLs) Subsurface Soil Approach Clarify the process to characterize IHSSs based on OPWLs characterization of soil contamination below six feet.	9. The final Attachment 14 extends subsurface sampling for OPWLs to 8 feet below the surface.
	10. Page 21, ¶ 4, Section 3.6.3 New RFCA Attachment 14, Original Process Waste Lines (OPWLs) Subsurface Soil Approach Broomfield does not agree with the "stepped-out" approach as proposed. Revise the approach to include 10 meters in both directions along the pipe and 1 meter in both directions perpendicular to the pipe. If contamination is encountered, the "step-out" approach should continue with the 10-meter and 1-meter approach.	10. The final Attachment 14 relates the "step-out" sampling points to the plutonium-239/240 concentrations found at the initial sampling point. As the contaminant concentration in the initial sample increases, the area circumscribed by the "step-out" points decreases.
	11. Page 22, ¶ 1, Section 3.6.3 New RFCA Attachment 14, Original Process Waste Lines (OPWLs) Subsurface Soil Approach Action levels between 50 pCi/g and < 1 nCi/g should trigger consultation between the RFCA parties. Strike the statement that soils below 1 nCi/g will not trigger an accelerated action.	11. The RFCA Parties have determined that below 3 feet, 1 nCi/g plutonium-239/240 would not trigger an accelerated action unless it fails the Subsurface Soil Risk Screen. However, once an action has been triggered, soils between 3 and 6 feet will be removed to less than 1 nCi/g and ALARA will be applied through field consultation.
	12. Page 22, ¶ 2, Section 3.6.3 New RFCA Attachment 14, Original Process Waste Lines (OPWLs) Subsurface Soil Approach Strike any language pertaining to areal extent and an evaluation for soils between 3 nCi/g and 10 nCi/g at the 3-6 depth. Revise the language to state: An evaluation will be triggered for soils between 1 nCi/g and 3 nCi/g and an accelerated action determination will be made based upon consultation	12. The RFCA Parties have not fully adopted the suggested changes, however, the final modifications include the following: • The upper limit of 10 nCi/g has been reduced to 7 nCi/g; • "Step-out" sampling has been clarified. As the contaminant concentration in the initial sample increases, the area circumscribed by the "step-out" points decreases; • Once an action has been triggered, soils between 3 and 6 feet will be removed to less than 1nCi/g and ALARA will be

	between the RFCA parties and the community. Broomfield will work with the DOE to draft the details of the consultative process. As a minimum, we shall be provided the information requested in the general section pertaining to surface and subsurface proposals. We do not support the use of the hot spot methodology solely to determine if very high concentrations may pose an unacceptable risk. The consultative process shall be used when hot spots are encountered.	applied through field consultation.
	13. Page 25, ¶ 2, Long Term Stewardship and Institutional Controls Revise the language that states: *The Parties presume that there will be no residential development at Rocky Flats* to: The Parties will restrict residential development at Rocky Flats consistent with its future use as a National Wildlife Refuge.	13. The RFCA Parties have determined that no change is necessary to the presumption. Institutional controls will be established consistent with the final remedy.
	14. Page 25, ¶ 3, Long Term Stewardship and Institutional Controls Broomfield supports the State's environmental covenants law (C.R.S. Section 25-15-320).	14. As of May 2003, CDPHE and DOE have not yet come to agreement on the applicability of the State environmental covenant to the Federal government. DOE and CDPHE hope to reach an agreed upon resolution. Failing an agreed upon resolution, each party reserves its rights as provided in RFCA Part 18.
33	5. <u>DOCUMENT 1-Appendix B- Subsurface Soil Conceptual Model</u> RFETS has developed and proposes to use a model, based on the burrowing activities of prairie dogs, to evaluate the need for accelerated actions for subsurface contamination resulting from buried structures (OPWL's) at RFETS. Their model essentially uses the surface soil contamination limit for a particular contaminant and some weighting factors that are specific to prairie dog burrowing, to estimate a subsurface soil concentration limit that is	Although these comments apply specifically to the Technical Basis Document, they relate to the subsurface approach. Given that fact, the RFCA Parties decided to respond to all of these comments in Category E for clarity and completeness.

	considered safe for a Refuge Worker exposure scenario. The application of this model to OPWL evaluation DOES NOT require the collection and analysis of surface soil samples. It also in no way involves present or future burrowing by prairie dogs at RFETS so that this methodology and its application are primarily theoretical. The methodology described in Appendix B is based on the following assumptions and data: a. An area of contaminated surface mound soil, or "hot spot"(A_{hs}) based on the average mound diameter *(burrow area of 0.28 m^2 based on mound diameter of 0.6 m as taken from White and Carlson, 1984),* b. An area surrounding the contaminated burrow mound (A_{pd}) based upon White and Carlson, 1984 *(160 m^2/ burrow system based on a burrow density of 6.2/1000 m^2),* c. An area below ground that is contaminated (A_{sc}) *(an unknown in the model),* d. An area below ground that is disturbed by prairie dog burrowing *(assumed to be the same as A_{pd}),* e. The concentration of contaminants in mound ($Conc_{surf}$, also C_{hs}) soil (based on the regulatory standard) that contributes less than 25 mrem/yr over A_{pd} to a Refuge Worker, and f. A calculated subsurface soil concentration	

	($Cons_{subs}$) based on items 1-5 that when excavated to the soil surface by prairie dogs contributes less than 25 mrem/yr over A_{pd} to a Refuge Worker. Their model uses two weighting factors that were derived from variables described in a, b, and c above, 1. A Dilution Factor (DF) that is the ratio of A_{pd}/A_{sc}, and 2. An Area Factor (AF) that is a derived from A_{hs} and a value from a lookup table in DOE (2002, p. 30). The equation used to predict the subsurface soil concentration limit is: $Conc_{subs} = Conc_{surf} \times DF \times AF$ (equation 1) From items a and b above, DF = 160 m^2/A_{sc} and AF = 30. Equation 1 then reduces to $Conc_{subs} = 4800m^2 \times Conc_{surf}/A_{sc}$ (equation 2) Where 4800 is the product of 160 m^2 x 30. General Comments about the model and approach In the absence of clean closure of OPWL's, developing a defensible method for estimating risk/exposures resulting	

from leaking OPWL's would be difficult at best. The risk assessor must rely on the use of "models" that are difficult to parameterize and verify. Consequently, any attempts to develop such models must be strongly based on published facts, where possible, to limit deficiencies arising from the need to make assumptions and from limited use of data.

Given that acknowledgement, it is my opinion that the methodology presented in Appendix B is based on some invalid assumptions and fails to use enough published data to support the prairie dog component of the model. In addition, statements to the contrary, it appears to me that some of the assumptions that were made by RFETS in developing the model do NOT reflect a conservative approach. Additionally, all but one of the many research publications on prairie dog burrow systems were ignored. My specific concerns are as follows.

Problems Concerning Model Assumptions

1. Assumption: Prairie Dogs are the best species to use as agents of subsurface transport of soil contaminants to the soil surface.

Based on Appendix B as well as a 1995 wildlife survey at RFETS (RMRS, 1996), it is not certain that prairie dogs even exist at RFETS. For example, Appendix B does not specifically mention the existence of prairie dogs at RFETS. If they do exist, some indication of the species present, their numbers, and their location relative to the subsurface structures is needed that would justify using them in a model as agents for transporting subsurface contaminants to the soil surface. The importance of selecting an appropriate burrowing animal stems from the

	use of species specific burrowing data in calculating AF and DF in the model. AF and DF are critical components of the model since they effectively increase the concentration of subsurface contaminants that can be "safely" left in the ground with no further action. Based on my understanding of the RFETS environs, I would have given serious consideration to pocket gophers (Geomys sp.) as a candidate agent for subsurface soil transport to the ground surface instead of using prairie dogs in the model. Pocket gophers are locally abundant at RFETS, excavate more soil over time (up to 20 metric tons/ha-yr and they do this every year) (Grinnell, 1923; Ingles, 1952; Ellison, 1946), and they exploit disturbed areas such as those that will result from cleanup in the Industrial Area at RFETS. Pocket gopher mound densities can be around 100/ha and mound sizes can be comparable to those for prairie dogs. I also would have considered ants, another fossorial animal that has prodigious burrowing capabilities, as agents of subsurface contaminant transport. Ant mound densities of up to 100/ha, burrow depths to 6 meters, and burrow mound size comparable to prairie dogs are typical of some ant species (Pemberton, 1992; Friese and Allen, 1993; Dubois, 1995; Cole, 1966; Cline et al., 1976; Hölldobler and Wilson, 1990;). Ant colonies are also an obvious feature of the RFETS environs. Concern about which species is chosen for the model would not matter except that estimates of burrow density and burrow size for the selected fossorial species serves as the basis for estimates of DF and AF in equation 1. As I mention before, DF and AF have an important effect on the concentrations of contaminants in OPWL leak areas that can be left in place. 2. Assumption: The values for burrow density and	

	mound dimension for Black Tailed Prairie Dogs are representative of the literature. *I question the use of data from only one publication in developing the values used in calculating AF and DF. For example, White and Carlson (1984) give an average black tailed prairie dog mound density of 62 burrows/ha but densities of about twice that number have been reported by the same authors (White and Carlson, 1984) as well as others (Tileston and Lechleitner, 1966; Koford, 1968).* Likewise, the average mound diameter of 0.6 meter (from White and Carlson, 1984) contrasts to a range of values that have been observed by others of 1-~7m (King, 1955; Sheets et al., 1971; Koford, 1958; Carlson and White, 1987). Carlson and White (1987) found mounds to be somewhat conical and asymmetrical in shape. They tended to measure 6.5 to 6.8 meters (about 21.3 to 22.3 feet) horizontally, 0.35 meters (about 1.15 feet) tall, and be in a cone shape. Mound diameters of 1-7m would give mound areas of 0.8–34 m^2 or about 3-120 times the value of 0.28 m^2 calculated by RFETS in Appendix B. *RFETS states that the assumptions in Appendix B that were used in developing DF and AF were considered conservative. If the model was to be conservative, I question why they didn't do a better job of including more of the extant literature and particularly, measurements representing the upper limits for burrowing parameters.* *The effect of using burrow densities of 100/ha instead of 62 as used in Appendix B, would reduce the area disturbed by a prairie dog burrow system in the*	

	subsurface as well as the area surrounding the mound by a factor of 1.6. This means that the value of 4800 in equation 2 would be reduced to 3000. *Likewise, larger mound diameters based on published data would affect the estimates of AF. Mound diameters of 1m and 7m would result in AF's of about 12 and <1 instead of 30 as calculated by RFETS in Appendix B for a mound diameter of 0.6m. This means that the constant of 4800 in equation 2 would be reduced to 800 for a 1 m diameter PD mound and, in the case of a 7m diameter mound (34m^2), the leaking OPWL area would be subject to the authorized soil limits (DOE, 2002; p. 30, Table 1) which I take to mean that AF would by default equal 1.* *Another complicating factor is that mounds tend to spread out with time due to gravitational and erosion forces. This means that a mound when first constructed will not remain at the original diameter but will expand due to those physical forces.* I also question the derivation of DF and AF, which assumes that the area disturbed by PD's below ground or the area between surface mounds takes on a rectangular configuration. Concerning DF, I speculate that PD tunnel systems as viewed from above are roughly linear in shape between the two or three burrow entrances that are generally associated with each burrow system. Thus, it is entirely conceivable that most of a PD's burrow system would lie horizontally along an OPWL and not be spread over a rectangular area corresponding to the average area between surface mounds. Should this be the case, then DF as used by RFETS in Appendix B would be near a value of 1 (i. e., DF = 1m^2/A_{sc}), not DF = 160m^2/A_{sc} as used in Appendix B.	

	I recognize that prairie dog burrow systems are likely to be variable in physical dimensions and shape depending on soils, presence of nursery chambers, population density, and abundance of food sources. However, it seems certain to me that that the assumption of a rectangular shape to the area below ground disturbed by prairie dogs cannot be supported by data and results in overestimates (i. e., not conservative) of the area surrounding the subsurface soil contamination resulting from an OPWL leak. To further my case for a non-rectangular shape to prairie dog disturbance below ground, consider that BT prairie dogs build burrows approximately 12 cm in diameter, 10-30 m long, and 1-5 m deep with two or three entrances (Sheets et al., 1971). If a 12 cm diameter burrow with a 30 m length is projected on a horizontal plane (i. e., viewed from above), the area of the burrow system would cover about 3.5 m^2 (0.12m x 30m). Thus, the actual area of PD disturbance, 3.5m^2 in this documented case, is about 50 times less than the 160 m^2 assumed in equation 1 above. What this means to me is that the assumption of 160 m^2 of PD disturbance for each burrow system in the subsurface is NOT conservative in that for a given A_{sc}, it potentially over-estimates DF by a factor of around 50. The net effect of correcting this overestimate would be to reduce the value of DF. 3. Assumption: All sub surface soil brought to the surface comes from the depth of the contaminated area. RFETS also considers this assumption to be conservative under the belief that under normal circumstances, most of the PD burrow system would be located outside the contaminated depth zone and that by constraining it to	

the leak depth zone, the chances of transporting contamination to the soil surface is increased. However, depending on the size of the leak, it is entirely conceivable that most of a PD burrow system (i. e., which encompasses and area of a few meters squared) may actually be located in the leak zone of an OPWL. However, the chance of this is less likely if it is assumed that PD disturbance includes an area that is larger than actually occurs.

Let me relate a scenario, based on actual events that occurred at Hanford that could lead to direct access to subsurface contaminants associated with a leak at an OPWL. The American Badger (Taxidea taxus) is an important predator on prairie dogs and pocket gophers. Badgers catch PD's by rapidly digging into a PD burrow complex in hopes of trapping and catching a PD. As a consequence of Badger predation, PD burrow systems can be enlarged from the 10-12 cm that is typical of PD tunnels to 15-25 cm. These expanded tunnels can go as deep as the original PD burrow system which may be as deep as 15' below the ground surface (Sheets et al., 1971). Some studies show that over 25% of PD burrow systems in some colonies have been enlarged by Badger predation (Campbell and Clark, 1981).

This scenario actually played out at Hanford when fission product sludge containing Sr^{90} in salt form was released to unlined cribs that were then backfilled with clean soil. The amount of soil backfill was not specified but was thought to be several feet in thickness. A large animal, thought to likely be a badger, burrowed down to the sludge in pursuit of pocket gopher prey. The large tunnel created by the Badger directly contacted the radioactive sludge. This provided direct access for other animals

seeking the radioactive salts. In particular, jackrabbits (O'Farrell and Gilbert, 1975) ingested the radioactive salts, became contaminated, and then excreted ^{90}Sr on the ground surface. Elevated levels of ^{90}Sr in excreta were found over an area of 15 km^2 around the burial cribs (O'Farrell and Gilbert, 1975).

4. Assumption: Risks To Burrowing Animals Not Important

Appendix B mentions risks to wildlife but provides no discussion on the topic. While I am not overly concerned about exposure of animals to subsurface contamination that is on the ground surface, I do wonder about the possibility of direct exposure of burrowing animals such as prairie dogs while they are underground. This type of exposure could be important when a nest or resting chamber is constructed within a contaminated OPWL leak zone, where "safe" concentrations of contaminants may greatly exceed regulatory standards for surface soil.

Actual radiation doses to free ranging animals at nuclear facilities have been measured using small dosimeters implanted or attached to individual animals. The first such study was conducted in the 1960's at Oak Ridge National Laboratory and involved attaching dosimeters to free ranging rodents living in contaminated sites (Kaye, 1965). Follow up studies with implanted dosimeters were conducted at Nevada Test Site with jackrabbits (French et al., 1974) and Los Alamos with several species of rodents (Miera and Hakonson, 1978). The Los Alamos studies, which used thermoluminescent dosimeters implanted into rodents living in treated liquid waste outfalls, demonstrated that doses in the rads/year range were possible for small, burrowing mammals living in

	contaminated areas (Miera and Hakonson, 1978). Several other similar studies have also been conducted with animals such as free ranging rodents, coyotes and ungulates (Arthur et.al., 1986; Groves et al., 1986; Halford et al., 1982; Halford and Markham, 1978). 5. Assumption: Plant Uptake of OPWL Contaminants Not Important While nothing is mentioned about the potential for plant uptake of OPWL contaminants, it seems that some consideration of the topic would be advised given the shallow depth of the OPWL's, the potential mix of both radioactive and hazardous waste resulting from OPWL leaks, the intent to restore the IA with a vegetated soil surface, and the nature of the OPWL wastes that will be present for many millennia. Consider the following facts. Although vegetation is very important in controlling erosion and percolation in soils (Nyhan et al., 1984), deeply penetrating plant roots have the potential to access buried waste and bring plant available constituents including contaminants to the surface of the site (Klepper et al., 1979; Wenzel et al., 1987). Soluble contaminants such as tritium can be incorporated within plant tissue and enter the food web of herbivorous or nectivorous organisms. For example, at Los Alamos National Laboratory tritium transport away from a controlled low-level waste site occurred via the soil moisture/plant nectar/honey bee/ honey pathway (Hakonson and Bostick, 1976).	

	As another example, deep-rooted Russian Thistle (Salsola kali) growing over the waste burial cribs at Hanford penetrated into the waste, mobilized ^{90}Sr, and then transferred it to the ground surface. The contaminated surface foliage was transferred away from the cribs when the matured Thistle (tumbleweeds) blew away from the site (Klepper et al., 1979). Root distribution in the soil profile is strongly related to the depth of water penetration (Canadell et al., 1996; Jackson et al., 1996). Although average and maximal reported rooting depths vary with species and life form, there is a great deal of plasticity within most species to respond to variation in soil water availability. Hence, if water is available at deeper depths, roots of a species viewed as "shallow rooted" may occur there. A common misconception is the concept of "shallow rooted" plants. This concept ignores the fact that the rooting depth for most individual plant species encompasses a broad range. Consequently, if moisture is available at deeper depths, most plant species have the capability to send roots after that moisture. In a semiarid ecosystem in New Mexico, plant roots of a number of species have been observed to depths of at least a few meters in the pursuit of soil moisture (Foxx et al., 1984; Tierney et al., 1987). Alfalfa roots have been found over 40 m below the ground surface (Foxx et al., 1984). If the root structure of certain species is confined to the upper few centimeters of the soil profile, it is largely because that is where most of the soil moisture is captured by the plants and removed from the soil. If moisture becomes available at deeper depths, most species have the potential to exploit this moisture by sending roots downward to capture available moisture.	

	often to depths greater than previously recognized (Canadell et al., 1996). In normal situations where multiple species co-exist on a site, one species may exploit moisture near the ground surface while another exploits moisture deeper in the soil profile (Evans and Ehleringer, 1994, Golluscio et al., 1998, Breshears and Barnes, 1999). 6. Long-term Biological Intrusion While the procedures outlined in the paper study in Appendix B do not actually involve live prairie dogs in any way, I would question the wisdom of a one shot analysis that will decide the long-term fate of residual OPWL contaminants at RFETS. Cleanup decisions based on present knowledge (i. e., leaks and associated contamination) ignore possible changes that may happen during centuries to millennia post-closure. During long time frames, biological processes will continue to interface with the soil profile, including residual contamination from the OPWL leaks. The consequences of long-term biointrusion on the fate and effects of OPWL contaminants cannot be reliably predicted. Therefore, the long-term consequences of biological intrusion in unremediated OPWL areas will require at least some post-closure monitoring to evaluate the possible mobilization of contaminants to the ground surface by plants and animals. Additionally, there are many post-closure variables that will affect future potential for biological intrusion at the site, including final depth of "clean" soil placed over the OPWL waste, physical and chemical form of the contaminants, species of animal and insects that come to occupy the site, and bioavailability of the contaminants. It is not clear to me that RFETS intends to conduct post-closure monitoring	

	in these OPWL sites or given thought to long term potential for transport of OPWL contaminants. To my knowledge, only one modeling study (McKenzie et al., 1982) looked specifically at the potential importance of long-term biological intrusion on dose to man under arid site conditions. They compared dose to man resulting from 100 years of animal intrusion at two reference low-level radioactive waste sites with the estimated dose based on the human intrusion scenario developed in 10 CFR 61. McKenzie et al., concluded that dose to man resulting from plant and animal intrusion was of the same order (about 50% less) as that resulting from the human intrusion scenario. This conclusion was based on modeling that used published data and assumptions about species of plants and animals present on the LLW sites, penetration depths of plant roots and animal burrows, cover thickness, depth to waste, and waste types and forms. SUMMARY OF APPENDIX B REVIEW- It is my opinion that Appendix B describes a methodology that is not conservative as stated by the authors. One problem with the methodology is the assumptions and limited data that were used in developing the weighting factors, DF and AF. If more conservative published data and realistic burrow system characteristics were used to derive AF and DF as discussed above, then the effect of DF and AF on the concentration of contaminants that could be safely left in OPWL leak soil would be minimal. Based upon application of the Appendix B methodology, RFETS has calculated that OPWL leak area soils below 3	

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	nCi/g *(based on standard of 50 pCi/g x 60, which is the weighting factor for an A_{sc} of 80m^2)* for radionuclides can be safely left in place under a Refuge Worker scenario (background document #6). It is my opinion that derivation of this concentration limit is not supported by sound model assumptions or by a good representation of the extant literature. As such, it could be argued that this concentration limit is NOT conservative and may or may not be protective of a Refuge Worker. A related concern is the very poor description of the sampling methods that will be used to characterize subsurface contaminants in OPWL leak areas and how concentration data will be handled to determine if accelerated action is or is not warranted. A two dimensional sampling scheme would be inadequate to define the subsurface contaminant source areas and concentrations.	
61	Technical Basis Document. Those of us who have followed this issue closely since 1996 can probably grasp what is meant most of the time, though it's not easy. But the RFCA Parties have performed a real disservice to the general public by putting out a document like this for public comment. I have heard complaints from numerous individuals. Work like this, rather than cultivating the public trust the RFCA parties need, is likely to have the opposite effect. Our comments essentially follow the order of the text; that is, comments are not prioritized in terms of importance. We request careful consideration to our comments and full responses to our questions and recommendations. Page numbers given in this section refer to the Technical Basis Document unless otherwise indicated.	A Technical Basis Document is by nature a technical document whose purpose is to serve as part of the Administrative Record. Cleaning up a major site like Rocky Flats is highly complex and does not lend itself to simple solutions. Because of that fact, the RFCA Parties spent several years working to educate the public, share information and hear community concerns through various forums, such as the Stakeholder Focus Group.

	A. REASONABLY MAXIMALLY EXPOSED INDIVIDUAL: p. 2: "The reasonably maximally exposed individual is the wildlife refuge worker." Can you guarantee that this will be the maximally exposed individual in 200 years? in *500* years? in 1000 years? in 2400 years (10% of the half-life of Pu-239)? The Congressional bill making Rocky Flats a national wildlife refuge stated that this designation should not be used to establish the cleanup level for the site. Yet this is exactly what is being done. Why? Recommendation *5* : Due to the long period over which plutonium will remain dangerous (240,000 years), and since DOE and the regulatory RFCA Parties have not demonstrated a funded commitment to or developed a coherent plans for long-term stewardship (LTS) or a manner for addressing changes in site use over 240,000 years, and since it is plausible that in this time-frame people may live on and farm the site and that climate or geological changes may provide for very different conditions at the site, Pu in the soil at the site should be cleaned to *5* or less picocuries per gram (p[C]i/g), with subsurface cleanup depth determined by the depth of contamination. Cleanup to this level will make the site safer for all other uses	A. Section 3176(d)(2) of the Rocky Flats National Wildlife Refuge Act states: "Cleanup levels – Nothing in this subtitle shall reduce the level of cleanup and closure at Rocky Flats required under the RFCA or any Federal or State law." Consistent with this, the use of the wildlife refuge worker scenario resulted in a more stringent action level than the Open Space Use scenario in the original Attachment 5. Please also see General Response.
	B. PUBLIC PROCESS: p. 7: The statement, "The RSALs review was conducted as an open public process," is not true. Theoretically, one could say that the review was open, but, as is demonstrated below, the outcome in major respects was pre-determined by decisions made without public input . Hence, public input into the RSAL review, by the time it happened, could have only a marginal effect. Details of the cleanup plan were rearranged; it was impossible to alter the basic	B. The RSALs review and risk-based approach development was conducted in an open public process. This process significantly influenced the outcome reflected in the approved modifications. Ultimately, it is the role of the RFCA Parties' to make the final decision. It is also incorrect to state that the issue of funding constraints was brought up late in the Stakeholder Focus Group process. It was stated at the first Stakeholder Focus Group meeting, which

	framework. 1. Matters that were decided without consulting the engaged and affected public, include the following : a) Selection of an arbitrary closure date (2006) without having first done a thorough investigation of what would be involved in doing the best cleanup possible. For example, the site had not been well characterized and still has not been thoroughly characterized. b) Agreement on a fixed sum for all closure-related activity (approximately $ 7 billion). c) Basing cleanup plans on the costs calculated to cover the 1996 RFCA, including the 1996 RSALs, even though this matter was under independent review. d) Use of the wildlife refuge scenario to calculate the cleanup level. 2. Any claim that there was "open public process" on the foregoing matters must be demonstrated point by point with full documentation. Abundance of meetings (as listed in Appendix A) demonstrates nothing. If the major defining decisions were made without involving the engaged public, how then can it be claimed that there was "an open public process"? 3. A paper entitled "Risk Communication, Fugitive Values, and the Problem of Tradeoffs at Rocky Flats by Theresa Satterfield and Josh Levin of Decision Research, on p. 26 contains the following statement: "we were explicitly informed by agency personnel that the DOE and the Congress had produced an agreement that guaranteed yearly appropriation of funds for the Rocky Flats cleanup as long as three conditions were met: 1) the cleanup be completed by 2006; 2) the cost and scope of the cleanup be	was held in June 2000.

	contained (ie., remain as negotiated); 3) conflict in the community be curtailed. . . . [Tlhe contractor and the RFCA Parties were placed in the position of having to 'minimize conflict' while meeting bottom-line budget limitations regardless of any certainty that cleanup could actually be achieved with the available resources and within the agreed upon time line." 4. This same paper says on p. 29 that the fact of "fiscal limitations" was "first brought out into the open" at a June 2001 meeting of the RFCA Focus Group. The truth that the cleanup was driven primarily by fixed funding had been withheld from participants in the Focus Group prior to this time. A DOE representative said introducing this topic was like "throwing a dead rat o[n] the table . " 5. Prior to the event of the "dead rat," stakeholders believed they were engaged in an open public process in which they might directly influence major aspects of the cleanup plan being developed. But from this point forward they were told explicitly that they were involved in a "bounded" discussion. Some topics, clearly, were out-of-bounds. As Satterfield and Levin say on p. 30 of their paper, there was "a dissonance between the public's expectations that their comments are influential, and a growing awareness that the limits of the cleanup were predetermined by political and economic decisions that are beyond their sphere of influence." 6. Simultaneous with learning about the "dead rat" of fiscal limitations, Focus Group participants were also told by a DOE spokesperson that the decision to use the wildlife refuge worker scenario to calculate the cleanup levels had already been made and was not open to discussion. By this time much of the	

	collective energy of the Focus Group had been expended -indeed, wasted - on this topic. 7. In an attempt to learn who made or influenced the wildlife refuge worker decision, RMPJC filed a FOIA request, an effort that proved futile. We still do not know who made this fateful decision, one that limits the scope of the cleanup, but we do know the decision did not grow out of the public process. Not knowing who made this decision means that stakeholders have never had the opportunity to raise their concerns with the actual decision-makers. Question ii: Can the RFCA parties identify who made or influenced the decision to use the wildlife refuge worker scenario to calculate the cleanup levels? Recommendation 6: We call on DOE to apply the full $7 billion dollars allocated for closure of Rocky Flats on cleanup and closure activities at the site. Recommendation 7: Likewise, we recommend that the full $470 million budgeted for environmental remediation at Rocky Flats be used for this purpose. Recommendation 8: If the above cannot be accomplished with funds currently available, we call on the government RFCA Parties to estimate the cost and seek public support to get the requisite funding from Congress. C. LAND USE ASSUMPTION: p. 9: What does it mean to say that "the RFCAParties *believe* it is appropriate to incorporate a wildlife refuge land use assumption into the proposed RFCA modifications"? Clearly, what the RFCA Parties "believe" is not identical to what they	C. Please see General Response.

	are required by law to do. Question iii: While EPA guidance says to use reasonably anticipated future use in determining cleanup, would it not have been possible for the RFCA Parties to make very different assumptions and to use a scenario that corresponds more closely to the long-term danger of Pu, the contaminant of principal concern at Rocky Flats? Had the RFCA Parties "belief" encompassed the notion that they should take a truly long-term approach to protection for future users at the site, would they not have recognized that Rocky Flats is likely to cease being a wildlife refuge long before Pu left in the environment ceases being dangerous in minuscule amounts? The appropriate scenario for long-term protection is the subsistence farmer scenario.	
	D. SURFACE WATER STANDARD: p. 10: "The RFCA Parties . . . agreed that the new RSALs would not be designed based on RFCA surface water standards and would not guarantee the standards will be met." As indicated above, RMPJC recommends a Pu RSAL of 5 or less pCi/g. This would probably meet the state surface water standard.	D. Although the quoted statement is in the Technical Basis Document, the text goes on to say that additional steps that might be needed to protect surface water could include excavation of contamination to levels below the RSAL.
	Question iv: Is it not the case that the RFCA parties intend to rely on some unspecified controls to deal with the water contamination problem? Won't these controls be subject to failure over time, even if they work in the first place?	Question iv: The controls are, or will be, specified in the decision documents relevant to specific actions. Required periodic reviews will evaluate the continuing protectiveness of the remedy, including long-term effectiveness of specified controls.
	E. PLUTONIUM MIGRATION: p. 11: The text says that "the potential for Pu and Am migration in the subsurface	E. These comments are similar to those submitted by this commenter for the proposed modifications. These comments are

	is very low because they are basically insoluble in groundwater." This is a dubious assertion. The question of solubility vs. insolubility of Pu in the Rocky Flats environment has not been settled. Though the issue was discussed at several Actinide Migration Evaluation (AME) meetings, key questions were never resolved. Attached is a letter I addressed to Christine Dayton and the AME researchers on 18 April 2000 raising a series of questions (Attachment D). Along with numerous studies regarding potential Pu mobility mentioned in this letter, I now cite only one, a presentation given at an AME meeting on 20 August 1997 by Dr. Bruce Honeyman of the Colorado School of Mines. According to minutes from this meeting, Honeyman said his research demonstrated that under some conditions 90% of the Pu in the Rocky Flats environment could become "very soluble" and potentially "very mobile in that form" and that the only question about its eventual migration off the site was the rate of its movement. His assertions were never withdrawn or corrected, in fact never adequately addressed by the AME team. In response to my request for written answers to the questions raised in my 18 April 2000 letter, Dave Shelton of Kaiser-Hill stated in the public meeting that Kaiser-Hill would not spend its money on such. My 4 September 2002 letter refers to these issues again; this letter has not even been acknowledged much less answered. In sum, the reported work of Bruce Honeyman was never refuted, and my own questions were never answered. I've since learned of a report on "factors affecting radionuclide transport" issued for the Yucca Mountain site. It says forthrightly that under certain conditions Pu "in oxidized form . . . can be quite mobile" (see www.ymp. gov/documents/m2nu a/sect10/sect10-01.htm) .	addressed in Category E.

	Question v: Given the publicly available information and the unanswered questions, the assertion by the RFCA parties that Pu is "basically insoluble in groundwater" seems grounded more in desire than in evidence. Can the RFCA parties demonstrate that in fact Pu will does not and cannot become soluble and thus mobile in the Rocky Flats environment? If it does become soluble under some conditions, can it migrate in a way that eludes detection? Is it the case that the RFCA Parties are relying on unspecified controls to try to deal with the problem to which Dr. Honeyman referred? Is it not unwise for the RFCA Parties to base an important part of their cleanup plan on a non-verified assumption about Pu insolubility?	These comments are similar to those submitted by this commenter for the proposed modifications. These comments are addressed in Category E.
	Question vi: Because Pu-239 decays into U-235 and U-235 is known to be readily soluble, what effect does this have on the question of water safety both on and off the Rocky Flats site?	The half-life of uranium-235 is 30,000 times longer than the half-life of plutonium- 239. For every picoCurie of plutonium-239 that decays, we are left with uranium-235 with an activity that is 30,000 times less. This activity cannot result in a significant impairment of surface water quality should such materials be mobilized, even if no consideration is given for milleniums of time over which such dispersion would potentially occur.
	F. CONTAMINANTS OF CONCERN: p.15: The text on this page refers to Table 3 of Attachment 5. This table lists 16 contaminants of concern (COCs) and 143 potential COCs. The text on p.15 defines COCs "are the hazardous substances that are wide-spread contaminants at the site and are found or suspected to be at concentrations that pose a greater than 1 X 10-5 risk to a wildlife refuge worker."	F. The list of COCs is comprehensive. The intent of designating sitewide COCs is to ensure that all soil sample analysis include these analytes, at a minimum. Additional IHSS-specific COCs will be determined based on process knowledge and/or the results of prior characterization.
	Question vii: Will analysis for each of these 159 contaminants be done at each individual hazardous substance site (IHSS)? How are the IHSSs chosen? What can be missed?	Question vii: IHSSs have been selected based on historical information, such as process knowledge, photographs, interviews and records. Periodic reviews of new information are done. Please see the Historical Release Report, located in the Reading Rooms.

	G. CHARACTERIZATION: p.15: Related to the above, why does the text speak of "comprehensive Site characterization purposes" when it is well known that the characterization in fact has been and will be limited and selective?	G. The Site will be thoroughly characterized in accordance with CERCLA requirements and nationally accepted practices.
	Question viii: How can the term "comprehensive" be used when there is no plan for such? Again, what is likely to be missed? Can the RFCA Parties provide assurance that they are not missing significant hot spots or pockets of contamination of one or more of the many actual or potential COCs?	Question viii: The approach is based on accepted statistical methods. The Industrial Area and Buffer Zone SAP methodology is based upon a confidence level greater than 90%.
	Question ix: The final paragraph on this page speaks of "the analytical suites represented by the potential IHSS-specific COCs." What is meant by this phrase? What I are its implications for the characterization program?	Question ix: See foregoing responses.
	Recommendation 9: We recommend thorough characterization of the whole of the Rocky Flats site.	Recommendation 9: The Site will be thoroughly characterized.
	H. INTEGRATED RISK-BASED CONCEPT: p.16: The text states that "a risk-based approach must account for the fact that subsurface radionuclide contamination at the Site poses significantly less risk than surface contamination." This statement makes sense only for the short term, not for the long term.	H. Please see the General Response.
	Question x: Can the RFCA Parties demonstrate that radionuclides left in the subsurface environment pose significantly less risk over the time plutonium remains dangerous? Can it be shown to pose less risk in all eventualities?	Question x: This approach is consistent with CERCLA requirements and generally accepted risk assessment methodologies.

	I. ASSUMPTIONS REGARDING RISK-BASED SUBSURFACE APPROACH p.17: The three assumptions stated at the top of the page are each highly questionable. a. Regarding the first, see the discussion above on plutonium migration. The statement here that Pu "has not been detected as moving in groundwater" is questionable. In May 1995, when the soil at Rocky Flats became thoroughly saturated, Dr. M. Iggy Litaor and his assistants detected significant Pu migration in the "interstices" (his term), which, as I understand, means the area below the surface but above the water table. Part of the crucial nature of what he discovered is that Pu that would otherwise be relatively immobile moved under the extreme conditions of a saturated environment. Studies cited in the section above on Pu migration show that Pu has migrated considerable distances in the subsurface environment at other sites.	I. These comments are similar to those submitted by this commenter for the proposed modifications. These comments are addressed in Category E. a. The results of years of ground water monitoring at Rocky Flats indicate no significant movement of plutonium in the subsurface.
	Question xi: This first assumption seems inaccurate. Aren't the wet conditions of May 1995 [sic] likely to be repeated over time?	Question xi: Wet conditions are likely to be repeated, but we believe the statement about movement to be accurate.
	b. The second assumption, about the efficacy of "groundwater passive barriers and treatment cells" to "control and remove groundwater contamination" may be true in the short term, but that these systems will prove effective over the long-term is questionable.	b. We understand that these treatment barriers and cells have a limited life. However, the contaminants being captured and treated will decrease over time (within a few decades) and that the systems will no longer be needed.
	Question xii: How do the RFCA Parties define "foreseeable future"? Moreover, is it not true that these systems, even if effective, could be located in the wrong place to "control and remove" contamination? What has	Question xii: Please see foregoing response related to this comment.

	been concluded about the 1995 storm event, that it was a 50-year event? Or is the period of likely repetition even shorter?	
	c. The third assumption, namely, that "the Site will remain under federal jurisdiction and control," ignores human history. All of recorded history is barely 10,000 years, and in that period governments and empires have come and gone repeatedly.	c. Please see the General Response.
	Question xiii: Isn't this assumption totally specious by comparison to the half-life of Pu, not to mention the ten half-lives and more over which it will remain dangerous in minuscule amounts?	Question xiii: Please see the General Response.
	J. DEFINITION OF SURFACE FOR REMOVAL OF RADIONUCLIDES: p.17: Because of the likelihood that human or non-human action, including climatic and geological, may radically alter the Rocky Flats environment and bring subsurface material to the surface, radionuclides in the environment in excess of the RSALs should be removed to a depth greater than 3 feet. Contamination does not need a current surface expression to pose a danger. If contamination begins at 3 feet below the surface and extends to, say 8 feet lower, it should be cleaned out.	J. Please see the General Response.
	Recommendation 10: RMPJC recommends that the cleanup level for Pu be set at 5 or less pCilg (see recommendation 5 above) and that depth of removal be determined by depth of contamination.	Recommendation 10: Please see the General Response.
	K. AREAS OF CONCERN WHERE CONTROLS WILL BE IN PLACE: pp.18, 24-25, and Attachment 5, Figure 1: We have two concerns, first, that controls put	K. The controls are, or will be, specified in the decision documents relevant to specific actions. Required periodic reviews will evaluate the continuing protectiveness of the remedy, including

	in place are bound to fail, so that failure should be anticipated and prepared for (see National Academy of Sciences, "Long-term Institutional Management of U.S. Department of Energy Legacy Waste Sites," 2000), and, second, that surprises may lurk in the environment both within and outside the area delineated for placement of controls. Incomplete characterization particularly raises suspicions about the second of these.	long-term effectiveness of specified controls.
	L. PRAIRIE DOG EXCAVATION OF SOILS: p.19 and Appendix C: We call attention to the critique on this topic written by Dr. Tom Hakonson for the CAB. He shows that the study of prairie dogs is questionable, selective and incomplete and that other burrowing creatures should be considered.	L. Please refer to the response to Dr. Hakonson's comments (#33), which are addressed in Category E.
	Recommendation 11: We recommend that Appendix C, which is quite inadequate as it stands, be completely redone and that the new version be subjected to wholly independent peer review by people knowledgeable in this area.	Recommendation 11: We believe that this comment was meant to refer to Appendix B. The RFCA Parties have reviewed and responded to Dr. Hakonson's comments and have determined that the prairie dog model is adequate to evaluate this potential pathway to the surface from subsurface contamination.
	M. ORIGINAL PROCESS WASTE LINES: pp.21-23 and Attachment 14 : 1. This portion of the document reveals the folly of incomplete characterization, since characterization itself of the area around the OPWLs is based on what has been reported or suspected. Of course, characterization must be done in such areas, but it should be extended to include the whole of the OPWLs. 2. It also demonstrates the folly of calculating the cleanup levels merely to protect a wildlife refuge worker, since this short-term approach ignores the far more serious long-term dangers entailed by the	M. Please see response to Comments in Category K.

	plan. 3. The discussion about what will be removed is quite unclear and seems to leave a lot to the discretion of the Lead Regulatory Agency (p.2 of Att. 14). On first reading, it appears that the plan is to remove Pu in excess of 3 nCi/g at depths below 3 feet, but then there's the proviso that the Lead Regulatory Agency can decide whether reduction in the concentration to this level is "not reasonably achievable through removal." This lack of specificity is not very reassuring. 4. There is also the implication that Pu below 3 feet in concentrations above 3 nCi/g may in effect be averaged away over large tracts of land and thus not removed (p.23 and pp.2-3 of Att.14). The text, at best, is confusing. 5. The Rocky Flats long-term stewardship strategy document now out for review mentions leaks from new process waste lines, including that some of these lines around the Solar Ponds have been removed. These lines should not be regarded as safe.	
	Question xiv: A high percentage of the OPWLs may remain in the environment under the current proposal. What is the breakdown of length of line by material type and by contaminant type below 3 feet? How long do the RFCA parties believe these lines will remain intact?	Question xiv: Based upon the limited amount of OPWL removed to date, including in the 700 area, the OPWL have not been highly contaminated. Please see the Industrial Area Sampling and Analysis Plan, which is located in the Reading Rooms, for a breakdown of the OPWL material types and depths. Based on preliminary investigations of OPWL performed in the mid-1990's we believe that OPWL was drained (and flushed in some instances) prior to discontinuing the use of these lines.
	Question xv: Why is there a plan to do Pu speciation in soil at certain OPWL locations "to determine the mobility profile of Pu in the soil" (p. 3 of Att.14) when	Question xv: OPWL carried dilute solutions of plutonium. This analysis is intended to show conclusively that the species of plutonium associated with reported or suspected OPWL leaks that

	the text otherwise treats Pu mobility as of a matter of no concern (see Four.E above)?	may have caused subsurface contamination becomes insoluble within short distances after entering the soil.
	Question xvi: Why is it assumed that pipes made of stainless steel (p. 21) are "unlikely to deteriorate," when it is well known that stainless steel can corrode and fail and the timeline for contaminants in the environment is so long? Please provide data showing the resistance of stainless steel to the COCs in the Rocky Flats environment. How long do the RFCA parties expect stainless steel pipes in the Rocky Flats subsurface environment to remain intact?	Question xvi: The RFCA Parties have determined that in relation to the other types of materials used for OPWLs, stainless steel is relatively unlikely to deteriorate. This is bolstered by field observations of excavated stainless steel OPWL. We do not claim that the pipes will remain intact for any specified period.
	Recommendation 12: We advocate full characterization of areas around the OPWLs and total removal of all process waste lines, newer as well as older.	Recommendation 12: The RFCA Parties recognize that there is strong community concern over the uncertainties surrounding the process waste lines. In response to that concern, the final RFCA Attachment 14 requires an increase in the amount of characterization required for original process waste lines. When an action is taken to remove plutonium contamination associated with original process waste lines at a depth of 3 to 6 feet, DOE will remove that contamination to concentrations that are less than 1 nCi/g.
	N. PERMITTED ANNUAL DOSE: p. 22: In the midst of the discussion of the OPWLs suddenly appears reference to "a rural resident" and the plan to permit exposure to this person of up to 100 mrem/yr. (p. 22, footnote 35). 1. Assuming that one accepts the official way of calculating risk, allowing "an approximate annual dose to a rural resident of 100 mrem/y[r]" is not acceptable, since it allows the total allowable annual dose of 100 mrem to come all from one source. The reason the proposed EPA rule that was used in the 1996 RFCA allowed a maximum annual dose of	N. Footnote 35 merely recognized one criterion in the decommissioning rule. It was not intended as an analysis of the Nuclear Regulatory Commission's rulemaking.

	only 85 mrem/y[r] was that EPA correctly recognized that an individual's total radiation exposure from human sources was unlikely to come from a single source.	
	Question xvii: Has the NRC decommissioning rule that allows all 100 mrem to come from a single source been tested in court. What is the legal opinion on this issue?	Question xvii: This comment goes beyond the scope of the modifications to RFCA Attachments.
	Question xviii: Isn't the 100 mrem/y[r] dose level well outside the CERCLA risk range of 10-4 to 10-6? 2. At this point the authors of the proposed revisions of RFCA appear to be mixing and matching a variety of regulatory regimes to get the result they want, even if it means more permissible exposure.	Question xviii: The RFCA Parties are required to consider ARARs in accordance with RFCA.
	Question xix: Is not such mixing and matching a poor practice that sets a very bad precedent for cleanup of highly contaminated sites?	Question xix: CERCLA requires compliance with Applicable or Relevant and Appropriate Requirements as well as the risk range.
	O. RCRA/CHWA Interim Status Units: pp.23-24: This seems another place where the RFCA parties are mixing and matching a variety of regulatory regimes to achieve results they want. The choice appears to be in favor of the least protective end of the regulatory possibilities.	O. The RCRA regulations have been updated since RFCA was signed in 1996 and the modifications to Attachment 10 reflect that update.
	P. CDPHE PREFERENCE FOR CLEANUP TO UNRESTRICTED USE LEVELS: p24. We applaud CDPHE's "policy preference to require cleanups to unrestricted use levels," and would like to raise several questions about its application at Rocky Flats.	P. Comment noted.
	Question xx: Did CDPHE require an analysis of what would be required for cleanup of Rocky Flats to unrestricted use levels? Is so, we would like to see the	Question xx and Recommendation 13: An alternatives analysis, including cleanup to unrestricted use levels, is being addressed in a major modification to the Environmental Restoration RFCA

	study? If not, why not? Recommendation 13: Without an analysis of what would be required for cleanup of Rocky Flats to unrestricted use levels, it is not possible to know whether cleanup to this level is possible or appropriate. In the event that such an analysis has not been done, we therefore recommend that CDPHE commission such an analysis and make it publicly available before proceeding with approval of the proposed RFCA revisions.	Standard Operating Protocol for Routine Soil Remediation (ER RSOP), which will be released for formal public comment.
	Q. PRESUMPTION RE. RESIDENTIAL DEVELOPMENT p.25: The RFCA parties "presume that there will be no residential development at Rocky Flats, consistent with its future use as a National Wildlife Refuge." We at RMPJC do not share this short-term presumption. "Presume," in fact is the correct word, since the Merriam Webster's Collegiate Dictionary, 10th edition, gives the following definitions for this term: "1. to undertake without leave or clear justification; 2. to expect or assume esp. with confidence; 3. to suppose to [b]e true without proof; 4. to take for granted."	Q. Not all parties share the presumption of no residential development at Rocky Flats. However, given the property's designation as at National Wildlife Refuge and the strong preference expressed by surrounding communities to keep Rocky Flats as Open Space, we have a high degree of confidence that residential development will not occur in the foreseeable future.
	Recommendation 14: Because of total uncertainty on our part today about future conditions and/or future use of the Rocky Flats site in the future, and because the most protective cleanup for Rocky Flats would be a cleanup designed to protect the family of a hypothetical subsistence farmer family living for generations on the site, we recommend cleanup to protect such a family (repeats recommendations 1 and 5).	Recommendation 14: Please see General Response and responses regarding Long-Term Stewardship (Category F).
	R. LONG-TERM STEWARDSHIP: Recommendation 15: If the RFCA Parties reject the foregoing recommendations in favor of the partial	Recommendation 15: Please see responses regarding Long-Term Stewardship (Category F).

	cleanup they have proposed, we recommend that as a condition f o r moving ahead the RFCA parties develop legally enforceable mechanisms for long-term stewardship (LTS) as an integral part of the RFCA. Such a program should include the following as legally enforceable items: a. Assured and dedicated funding to cover all LTS costs, including contingencies. b. Public participation and oversight c. Information management systems. d. Environmental monitoring of all media (air, groundwater, surface water, and soil). e. Surveillance and maintenance of physical, engineered, and institutional controls. f. Periodic performance review and assessment of all program activities and features. g. Delegation of authority to responsible parties to make sure the program is maintained. h. Ongoing education of the public regarding the condition of the site. i. Continued scientific research into cleanup technologies that can be applied on the site to achieve better cleanup. j. Continued scientific research for evidence of adverse health effects in plant, animal, and human life (including a well-publicized voluntary screening program for J. humans, and establishment and maintenance of a data base on body burdens of wildlife on site, with particular attention to long-term genetic effects). k. Acce[p]tance by DOE of the Colorado State Environmental Covenant. NOTE: The acronym list at the beginning of the	The Technical Basis Document is not being updated.

	Technical Basis Document is missing several acronyms: COC, POC, ROD, CAD, LRA, perhaps others.	

ATTACHMENT 5

ACTION LEVEL FRAMEWORK

Rocky Flats Environmental Technology Site Action Levels and Standards Framework for Surface Water, Ground Water, and Soils

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Action Level Framework

1.0 GENERAL BACKGROUND

1.1 Goal of Action Levels and Standards Framework

During negotiations that resulted in the Final Rocky Flats Cleanup Agreement (RFCA), a working group consisting of the Department of Energy (DOE), the Environmental Protection Agency (EPA), the Colorado Department of Public Health and Environment (CDPHE), and Kaiser-Hill teams was formed to develop a consensus proposal for the appropriate cleanup standards for surface water and action levels for all media that should apply to the Rocky Flats Environmental Technology Site (RFETS or Site). The working group developed this Action Levels and Standards Framework for Surface Water, Ground Water, and Soil (ALF) as its final recommendation in 1996 and several modifications were subsequently proposed, approved and incorporated into ALF. ALF was developed in a manner generally consistent with the Rocky Flats Vision (Vision) and Rocky Flats Cleanup Agreement (RFCA) Preamble Objectives. In some cases, the working group found it necessary to more precisely define aspects of the objectives so that applicability of action levels and required mitigating actions could be completely defined.

The goal of the ALF is to:

- provide a basis for future decision-making;
- define the common expectations of all parties; and
- incorporate land- and water-use controls into Site cleanup.

The Parties have determined that a National Wildlife Refuge is the reasonably anticipated future land use for the purpose of making cleanup decisions. This determination is based upon the assumption that a National Wildlife Refuge will be established in accordance with the Rocky Flats National Wildlife Refuge Act of 2001 (Refuge Act). This determination is also consistent with the RFCA Preamble and RFCA Vision land use assumptions. As a National Wildlife Refuge, the Parties assume that the Site will remain in federal ownership, and the surface will be managed as a Refuge where possible. Residential use is not recognized as a reasonably anticipated future land use. However, the rural resident exposure scenario was evaluated for the purposes of establishing risk-based surface soil action levels for plutonium, americium and uranium. A rural resident exposure scenario was also used to calculate the annual radiation dose under unrestricted land use conditions in order to demonstrate that the risk-based action levels meet assumed relevant and appropriate radiation control standards.

This ALF establishes action levels for groundwater and soil, action levels and cleanup standards for surface water and put-back levels for soil. Action levels are numeric levels that, when exceeded, trigger an action determination evaluation in

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accordance with ALF Sections 2-5 and an appropriate accelerated response action. In some cases, concentrations of contaminants below action levels may also trigger an accelerated action (e.g., cleanup of soils contamination that is below soil action levels, but that may impact surface water quality).

A standard is an enforceable narrative and/or numeric restriction established by regulation and applied so as to protect one or more existing or potential future uses. Within this framework, standards are associated with surface water use classifications and applied at points of compliance (POCs). Surface water standards are not being directly applied to ground water or soils; instead, contaminated soils and groundwater are evaluated to determine whether they may adversely impact surface water quality.

Put-back levels apply to soils that contain contaminants at levels that do not trigger an accelerated action, but that are excavated incidental to the conduct of accelerated actions. Put-back levels also apply to soils that have been treated to remove contaminants to below action levels as provided in an accelerated action decision document. DOE is allowed to replace these soils back into the ground if the contaminant concentration does not exceed the action levels listed in Table 3. Soils may be replaced into the ground only in the same Operable Unit (OU) in which they originated. OUs are designated in Attachment 1-*Operable Unit Consolidation Plan.* DOE may, with LRA approval after appropriate consultation, replace excavated soils with contaminant concentrations greater than the put-back levels. In such cases decision factors to be considered include remedy effectiveness and protectiveness, reasonably anticipated future land uses, contaminant levels in surrounding soils, potential for contaminants to affect surface water quality, and costs. Decisions resulting in soil put-back will be recorded in the appropriate closeout report.

Action levels are risk-based and risk is considered additive when multiple contaminants are present. Radiological and non-radiological effects will be assessed independently on a project-specific basis using methodology that is protective of human health and the environment. The cumulative radiological and non-radiological effects will be assessed on a project-specific basis if the concentrations are near their respective action levels.

Following implementation of accelerated actions, final remedial/corrective action decisions, including final cleanup levels will be determined in a Corrective Action Decision/Record of Decision (CAD/ROD). The final remedial/corrective actions specified in a CAD/ROD may require additional work based on the final cleanup levels to ensure an adequate remedy.

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1.2 Programmatic Assumptions

The working group developed this framework using the following inter-related programmatic or Site-Wide assumptions:

- The framework must be consistent with the Vision and RFCA Preamble;
- Implementation of the framework must protect human health and the environment; and
- Implementation of the framework must protect surface water uses and quality.

Institutional controls will be part of the final remedy as appropriate to ensure protection of human health and the environment. The need for, and extent of, specific institutional controls and other long-term stewardship activities will be analyzed in the RCRA Facility Investigation-Remedial Investigation/Corrective Measures Study-Feasibility Study. These other long-term stewardship activities include such things as monitoring, maintenance, information management, and remedy review. Appropriate requirements for institutional controls and other long-term stewardship activities will be described as part of the preferred alternative in the Proposed Plan. Subject to modification agreed upon following the public comment period for this plan, such requirements will also be contained in all final CAD/ROD(s) and in any modified RFCA agreement, consistent with RFCA Paragraph 286. As of May 2003, DOE and CDPHE have not reached agreement as to whether a post-closure permit (or, alternatively, an enforceable document as defined in 6 CCR 1007-3, § 100.10(d)) will be required for Rocky Flats, and if so, whether that permit (or enforceable document) will also contain appropriate requirements for institutional controls and other long-term stewardship activities. The Parties will endeavor to resolve this matter. Failing an agreed-upon resolution, each Party reserves its rights as provided in RFCA Part 18.

While the selection of individual institutional controls is dependent upon the final remedy selected, and therefore cannot be known at this time, the following institutional controls will be used as appropriate to protect human health and the environment:

- prohibition of construction and use of buildings in contaminated areas;
- prohibition on drilling wells for water use into contaminated groundwater, the use of contaminated groundwater and/or pumping groundwater that could adversely affect the remedy;
- restrictions on excavation in areas above subsurface contamination or intrusion into subsurface contamination;
- restrictions on activities that cause soil disturbance in areas with surface soil contamination; and
- other restrictions to protect engineered controls (such as covers, groundwater barriers and treatment cells) and monitoring systems.

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The anticipated extent of areas with institutional controls at closure is shown in Figure 1. The anticipated boundary of areas that will be subject to institutional controls depicted in Figure 1 is subject to modification based upon characterization, future response actions, the results of the comprehensive risk assessment, and the final remedial/corrective action decision in the final CAD/ROD. The Parties additionally presume that there will be no residential development at Rocky Flats.

Section 25-15-320, C.R.S., requires an environmental covenant under certain conditions. As of April 2003, the Parties have not reached agreement on the applicability of this statute to the federal government. Failing an agreed-upon resolution, each Party reserves its rights as provided in RFCA Part 18.

1.3 Action Prioritization and Implementation

Accelerated actions will be supportive of the Intermediate and Long-Term Site Conditions as discussed in the RFCA Preamble and to the extent practicable, will contribute to the efficient performance of any anticipated long-term remedial actions. Protection of all surface water uses with respect to fulfillment of the Intermediate and Long-Term Site Conditions will be the basis for making soil and ground water accelerated action decisions. Accelerated actions will also be designed to prevent adverse impacts to ecological resources and ground water consistent with the ALF. Because the ALF does not address the inherent value of ground water, any residual effects on ground water not addressed through this Framework will be addressed under a Natural Resources Damage Assessment (NRDA).

Response action decisions may be implemented by means of an accelerated action (Proposed Action Memorandum [PAM], Interim Measure/ Interim Remedial Action [IM/IRA], or RFCA Standard Operating Protocol [RSOP]) or addressed as necessary in the CAD/ROD for the affected area. Actions will be developed in an integrated manner with other actions being taken and will be consistent with best management practices.

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2.0 SURFACE WATER

2.1 Basis for Standards and Action Levels

Protection of surface water will be a basis for making soil and groundwater accelerated response action decisions pursuant to ALF Sections 3-5, so that at the completion of all cleanup activities, surface water leaving RFETS should be of sufficient quality to support all uses. The surface water standards this framework is designed to protect are found in the WQCC Regulation No. 31: Basic Standards and Methodologies for Surface Water (5 CCR 1002-31) ("Basic Standards") and the site-specific water quality standards in the WQCC Regulation No. 38 (5 CCR 1002-38) ("Site-Specific Standards").

The Colorado Water Quality Control Commission (WQCC) determines water quality standards throughout Colorado. Local municipalities, including Westminster, Broomfield, Thornton, and Northglenn, have been and will be involved and consulted in surface water decisions, including recommendations to the WQCC.

Surface water exists in creeks and ponds on RFETS as well as immediately offsite. These surface waters are part of Segments 4a/4b and 5 of Big Dry Creek as follows:

- Segment 4a – Mainstem and all tributaries to Woman Creek and Walnut Creeks from the sources to Standley Lake and Great Western Reservoir, except for specific listings in Segments 4b and 5;
- Segment 4b – North and South Walnut Creek and Walnut Creek, from the outlet of Pond A-4 and B-5 to Indiana Street;
- Segment 5 – Mainstems of North and South Walnut Creek, including all tributaries, lakes, and reservoirs, from their sources to the outlets of Ponds A-4 and B-5, on Walnut Creek, and Pond C-2 on Woman Creek.

  See Figure 2, *Sketch of Stream Segments 4a, 4b, and 5.*

2.2 Numeric Levels During Active Remediation (Near-Term Site Condition)

During the period of active remediation, the Table 1 values will apply as standards in Segment 4a/4b of Big Dry Creek and as action levels in Segment 5.

A. Non-radionuclides

1. The numeric values that will apply throughout both stream segments are based on Colorado surface water use classifications consistent with the uses described in the RFCA Preamble:
   - Water Supply;
   - Aquatic Life - Warm 2;
   - Recreation 2; and
   - Agricultural.

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2. Numeric values will be derived from the following:
   a. For metals, the site-specific standards or the basic standards apply, except where temporary modifications apply. If the basic and site-specific standards differ for a particular metal, the site-specific standard applies.
   b. For inorganics, the site-specific standards apply or the basic standards apply, except where temporary modifications apply. If the basic or site-specific standards differ for a particular inorganic, the site-specific standard applies.
   c. For organic chemicals, the more stringent of the basic standards or the site-specific standards applies, except where temporary modifications apply.

3. Effective March 2, 1997, maximum contaminant levels (MCLs) were adopted as temporary modifications for six organic compounds in Segment 5. These temporary modifications of surface water standards were granted through the year 2009 by the WQCC and must be re-examined every three years. Other temporary modifications to the numeric values during active remediation may be developed through subsequent working group efforts.

   a. The basis for proposing the temporary modifications may include one or more of the following:
      - A determination of ambient conditions in a manner consistent with the Basic Standards (5 CCR 1002-3 1);
      - A mass-balance equation that calculates maximum influent concentrations in Segment 5 that will be protective of numeric values at Segment 4a/4b POCs without allowing treatment within waters of the State; and
      - Some other methodology agreed to by all Parties.

   b. These temporary modifications should be developed together with other stakeholders (i.e., the local municipalities that are impacted by surface water from the RFETS).

4. Any contamination in surface water resulting from releases from a unit at RFETS subject to RCRA interim status requirements will be addressed through this ALF and through remedial actions rather than through RCRA closure (see Attachment 10 to RFCA, RCRA Closure for Interim Status Units). This would include surface water containing nitrates that has been impacted by the Solar Ponds ground water plume. Addressing the nitrates through this framework will allow these waters to be managed in a more cost-effective and flexible manner. The Parties recognize that changes in the management of nitrates may cause the surface water to more routinely approach the current 10 mg/L standard at the POC.

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5. Due to detention and batch release operations of Pond A-4 and Pond B-5 waters, exceedance of the numerical pH of 9.00 occurs. Both the wastewater treatment plant effluent and storm water inflows to the ponds have pH values within the numerical range of 6.5 to 9.00 prior to detention in Pond B-5 and A-4; however, the nutrient loading to the ponds promotes algae growth which can shift carbonate equilibria. These conditions cause pH exceedance above 9.00 (with a calculated 85th percentile value of 9.10). All parties agree that aquatic use is likely not impacted by pH exceedances; however, the DOE will strive to control pH in the pond waters through prudent pond water management.

B. Radionuclides

1. Numeric values for plutonium and americium for Segments 4a/4b and 5 are risk-based (1×10^{-6} lifetime excess cancer risk from direct exposure including consumption). These values are the statewide basic standards, effective March 2, 1997, as set by the WQCC.

2. Both radionuclides will be analyzed separately, and compared to the numeric value below:
   a. 0.15 pCi/L for plutonium and
   b. 0.15 pCi/L for americium.
   There is no total pCi/L limit.

3. The Parties agree that in the event that the plutonium and americium numerical standards are exceeded, the DOE will make every effort to

   identify the source of the exceedance. This will include documenting: hydrologic characteristics; preventive actions, terminal pond operational parameters; and any abnormal conditions and occurrences. Further, specific decisions regarding the terminal pond operations and the release of water will be guided by the Pond Operations Plan. This plan includes specific responses for identified circumstances and preserves dam safety. DOE shall have the burden to demonstrate prudent pond water management and strive to maintain the lowest detained volume practicable in the terminal ponds.

6. In Segments 4a/4b and 5, numeric values for gross alpha, gross beta, tritium and uranium will be the site-specific standards found in Table 2 of 5 CCR 1002-8-38. Numeric values for radium and strontium are based on the statewide Basic Standards (5 CCR 1002-31.11). The Parties will re-examine these values based upon conditions in the basins and will propose alternative values if appropriate.

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C. POCs/Points of Evaluation (POEs)

1. In Segment 4a/4b, POCs will be placed at the existing sampling locations for the outfalls of the terminal ponds (Ponds A-4, B-5, and C-2) in both Walnut Creek and Woman Creek. Additional POCs for plutonium and americium will be established near where Indiana Street crosses Walnut and Woman Creeks. In the event that exceedances simultaneously occur for either plutonium or americium at both the Indiana Street POC and the associated Terminal Pond POC, then this occurrence will be treated as a single enforcement action. As conditions at the RFETS change, the locations of the POCs may need to change. Such changes can be made by agreement of the Parties pursuant to Part 9 of RFCA.

2. In Segment 5, exceedance of action levels will be measured at POEs upstream in the main stream channel at existing gauging/sampling stations or at additional sampling locations in the main stream channel as necessary. POEs will be identified in the Integrated Monitoring Plan. A POE in Segment 5 will be established below the v-notch weir following the Sewage Treatment Plant disinfection process. At the POE below the v-notch weir, plutonium, americium and uranium will be monitored. When Sewage Treatment Plant operations cease, this POE will be eliminated.

3. Compliance will be measured using a 30-day moving average for those contaminants for which this is appropriate. When necessary to protect a particular use, acute and chronic levels will be measured differently as described in the current Integrated Monitoring Plan.

4. Compliance will be measured for plutonium and americium using an annual average at the existing POCs at the outfalls of the terminal ponds (Ponds A-4, B-5, and C-2) in both Walnut Creek and Woman Creek contingent upon WQCC adoption of an annual average period. CDPHE will take action to obtain WQCC adoption of the annual average period. During active remediation, compliance will continue to be measured for plutonium and americium using a 30-day moving average at the existing POCs near where Indiana Street crosses Walnut and Woman Creeks.

5. Performance monitoring points are Segments 4a/4b and 5 in-stream locations identified in any accelerated action decision document and/or in any CAD/ROD where surface water is sampled to determine whether the concentration of any contaminant identified for sampling in the response action meets specified water quality objectives. Such performance monitoring may be incorporated into the Integrated Monitoring Plan after the response action is implemented.

2.3 Numeric Levels After Active Remediation (Intermediate and Long-Term Site Conditions)

When the Intermediate Site Condition is achieved following completion of active remediation, the surface water must be of sufficient quality to support any surface water use classification in both Segments 4a/4b and 5. All final remedies must be designed to protect surface water for any use as measured at the nearest and/or most directly impacted surface water in Segments 4a/4b and 5. Interim remedies will be consistent with this as a goal. Any temporary modifications will be removed. POCs will be at the outfalls of the terminal ponds and near where Indiana Street crosses both Walnut and Woman Creeks. Compliance will be measured for plutonium and americium using an annual average at the existing POCs at the outfalls of the terminal ponds (Ponds A-4, B-5, and C-2) in both Walnut Creek and Woman Creek. However, compliance will be measured for plutonium and americium using a 30-day moving average at the existing POCs near where Indiana Street crosses Walnut and Woman Creeks. If the terminal ponds are removed, new monitoring and compliance points will be designated and will consider ground water in stream alluvium. The need for and location of POEs and performance monitoring points will be addressed as necessary in the CAD/ROD.

2.4 Action Determinations

A. When contaminant concentrations exceed the Table 1 standards at a POC, source evaluation and mitigating action will be required. Specific remedial actions will be determined on a case-by-case basis, but must be designed such that surface water will meet applicable standards at the POCs. If standards are exceeded at a POC, DOE will inform the CDPHE and EPA of such exceedances within 15 days of gaining knowledge of the exceedances. In addition, DOE will, within 30 days of gaining knowledge of the exceedances,

submit to CDPHE and EPA a plan and schedule for source evaluation for the exceedance, including a preliminary plan and schedule for mitigating action. Final plans and schedules for mitigating actions will be developed and implemented by DOE, in consultation with CDPHE and EPA, following completion of the source evaluation. Nothing in this paragraph, however, shall preclude DOE from undertaking timely mitigation once a source has been identified. Once an initial notification, source evaluation, and mitigating action have been triggered for a particular exceedance, additional exceedances from the same source would not require separate notifications or additional source evaluations or mitigation. The Standley Lake Protection Project (SLPP) Operations Agreement addresses conditions and timing of storage and releases of waters in the Woman Creek Reservoir. Consistent with the SLPP Operations Agreement, it is the intent of the Parties that waters which. meet the standards at the Indiana Street POC are acceptable for any use.

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B. During active remediation, when contaminant concentrations in Segment 5 exceed the Table 1 action levels, source evaluation will be required. If mitigating action is appropriate, the specific actions will be determined on a case-by-case basis, but must be designed such that surface water will meet applicable standards at the POCs. In the case of action level exceedances in Segment 5, DOE will inform the CDPHE and EPA of such exceedances within 15 days of gaining knowledge of the exceedances. In addition, DOE will, within 30 days of gaining knowledge of the exceedances, submit to CDPHE and EPA a plan and schedule for source evaluation for the exceedance, including a preliminary plan and schedule for mitigating action. Final plans and schedules for mitigating actions will be developed and implemented by DOE, in consultation with CDPHE and EPA, following completion of the source evaluation. Nothing in this paragraph, however, shall preclude DOE from undertaking timely mitigation once a source has been identified. Once an initial notification, source evaluation, and mitigating action (if appropriate) have been triggered for a particular exceedance, additional exceedances from the same source would not require separate notifications or additional source evaluations or mitigation.

C. Exceedances of water quality standards at a POC may be subject to civil penalties under sections 109 and 310(c) of CERCLA. In addition, failure of DOE to notify CDPHE and EPA of such exceedances, or to undertake source evaluations or mitigating actions as described in paragraph 2.4.A, above, shall be enforceable consistent with the terms of Part 16 of the RFCA.

D. Exceedances of action levels in Segment 5 shall not be subject to civil penalties. However, failure of DOE to notify CDPHE and EPA of such exceedances, or to undertake source evaluations or mitigating actions (if appropriate) as described in paragraph 2.4.B above, shall be enforceable consistent with the terms of Part 16 of the RFCA.

2.5 Surface Water Monitoring Network

A. Surface water monitoring will continue as currently established unless subsequent changes are agreed to by all Parties. Surface water monitoring will be consistent with the Integrated Monitoring Plan which will be reviewed and revised on an annual basis.

B. All parties will receive quarterly surface water monitoring reports which will highlight any exceedances of surface water standards or action levels and any significant changes to surface water flow conditions.

3.0 GROUND WATER

3.1 Basis of Action Levels

At the time RFCA was signed, three ground water classifications applied at RFETS: Domestic Use Quality, Agricultural Use Quality, and Surface Water Protection. Effective March 2, 1997, the WQCC removed the domestic use and agricultural use classifications since direct use of ground water will be prevented at the Site through institutional controls. Surface water protection was retained as the only use classification for ground water at RFETS. During the period of active remediation; ground water action levels will apply and must be protective of surface water standards and quality as well as of ecological resources. Since no other human exposure to on-site ground water is foreseen, ground water action levels are based on surface water and ecological protection. This framework for ground water action levels assumes that all contaminated ground water emerges to surface water before leaving the RFETS.

3.2 Action Level Strategy

The strategy for ground water is intended to prevent contamination of surface water by applying MCLs as ground water action levels. MCLs have been established by EPA for many chemical contaminants and represent the maximum permissible level of a contaminant in drinking water. MCLs are listed at 40 CFR 141.61 and 141.62. Where an MCL for a particular contaminant is lacking, the residential ground water ingestion-based Preliminary Remediation Goal (PRG) value will apply. Ground water action levels are based on a two-tier approach. Tier I action levels consist of near-source action levels for accelerated cleanups, and Tier II are action levels that are protective of surface water.

A. Tier I
   1. Action levels consist of 100 x MCLs (see Table 2).
   2. Designed to identify high concentration ground water "sources" that should be addressed through accelerated actions.

B. Tier II
   1. Action levels consist of MCLs (see Table 2).
   2. Designed to prevent surface water from exceeding surface water standards/action levels by triggering ground water management actions when necessary.
   3. Situations where ground water is contaminating or could contaminate surface water at levels above surface water standards/action levels will trigger a Tier II action.
   4. Tier II Action Levels are to be measured in designated wells as identified in the Integrated Monitoring Plan.

      a. Tier II wells are either currently uncontaminated or contaminated at levels less than MCLs. In general, Tier II wells are located between the down gradient edge of each plume and the surface water towards which the plume is most directly migrating.

b. If the proposed new wells are shown to be contaminated or if additional plume information dictates, new or alternate wells will need to be chosen.

3.3 Action Determinations

A. Tier I

1. If Tier I action levels are exceeded, an evaluation is required to determine if remedial or management action is necessary to prevent surface water from exceeding standards. If this evaluation determines that action is necessary, the type and location of the action will be delineated and implemented as an accelerated action. This evaluation may include a trend analysis based on existing data. Accelerated action priority will be given to plumes showing no significant decreasing trend in ground water contaminant concentrations over 2 years.

2. Additional ground water that does not exceed the Tier I action levels may still need to be remediated or managed through accelerated actions or CAD/RODs to protect surface water quality or ecological resources and/or prevent action level exceedances at Tier II wells (e.g., lower-level, but fast-moving contamination). The plume areas to be remediated and the cleanup levels or management techniques utilized will be determined on a case-by-case basis.

B. Tier II

1. If concentrations in a Tier II well exceed MCLs during a regular sampling event, as specified in the Integrated Monitoring Plan, monthly sampling in that well will be required. Three consecutive monthly samples showing contaminant concentrations greater than MCLs will trigger an evaluation. This will require a ground water remedial action, if modeling, which considers mass balancing and flux calculations and multiple source contributions, predicts that surface water action levels will be exceeded in surface water. These actions will be determined on a case-by-case basis and will be designed to treat, contain, manage, or mitigate the contaminant plume.

2. Ground water contaminated at levels above ground water action levels currently exists at several locations. Each of these situations will be addressed according to appropriate decision documents.

3. Any contamination in ground water resulting from releases from a unit at RFETS subject to RCRA interim status requirements will be addressed through this ALF and through remedial actions rather than through RCRA closure (see Attachment 10 to RFCA, RCRA Closure for Interim Status Units). This would include ground water containing nitrates from the Solar Ponds plume. Addressing the nitrates through this framework will

allow these waters to be managed in a more cost-effective and flexible manner.

C. Other Considerations

1. Efficient, cost-effective, and feasible actions that are taken to remediate or manage contaminated ground water may not necessarily be taken at the leading edge of plumes; but rather at a location within the plume. Factors contributing to this situation could include technical impracticability at the plume edge, topographical or ecological problems at the plume edge, etc. This situation may result in a portion of a plume that will not be remediated or managed. This plume portion may cause exceedance of MCLs at Tier II wells or exceedance of surface water standards/action levels. When an up-gradient ground water action is taken that results in this situation, DOE and its subcontractor may request relief from the ground water and/or surface water standards. CDPHE and EPA will evaluate the request and may grant temporary relief or a change to the standards/action levels for a specific area. Soil or subsurface soil source removals will not be considered as the sole justification for the changed standard/action levels. In addition, such changes will be determined such that surface water use classifications are not jeopardized and surface water quality does not exceed standards at POCs.

2. Ground water plumes that can be shown to be stationary and do not therefore present a risk to surface water, regardless of their contaminant levels, will not require remediation or management. They will require continued monitoring to demonstrate that they remain stationary.

3. Where background levels exceed action levels, more frequent sampling and remedial actions will not be triggered. For those constituents where high background levels exist, a modified action level considering background will be developed.

3.4 Ground Water Monitoring Network

A. Ground water monitoring will be consistent with the Integrated Monitoring Plan, which will be reviewed on an annual basis.

B. All ground water monitoring data as well as changes in hydrologic conditions and exceedances of ground water action levels will be reported quarterly and summarized annually to all parties.

C. If quarterly reporting shows that previously uncontaminated wells are contaminated above ground water action levels, the sampling frequency will be increased to monthly. Three consecutive monthly samples showing exceedances will trigger an evaluation to determine if a remedial or management action is necessary. If three consecutive monthly samples then

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show no exceedances, the sampling frequency will revert back to the frequency specified in the Integrated Monitoring Plan.

D. All ground water plumes that exceed ground water action levels must continue to be monitored until the need for institutional controls is mitigated.

E. All ground water remedies, as well as some soil remedies, will require ground water performance monitoring. The amount, frequency, and location of any performance monitoring will be based on the type of remedy implemented and will be determined on a case-by-case basis within decision documents. The remedy should also consider that surface water quality will be acceptable for all uses after active remediation.

4.0 SOILS CONTAMINATED WITH NON-RADIOACTIVE MATERIALS

4.1 Action Levels and Basis

A. Action levels are the concentrations in soils of non-radioactive contaminants and uranium for its toxicity, listed in Table 3, Soil Action Levels.

B. Action levels have been calculated to be protective of:

1. A wildlife refuge worker:

   a. Based on a lifetime excess cancer risk of $1x10^{-5}$ to a wildlife refuge worker; and

   b. Based on a Hazard Index (HI) of 1 for a wildlife refuge worker; and

2. Ecological resources.

4.2 Action Determinations

The Site will undergo characterization in accordance with the Industrial Area Sampling and Analysis Plan (IA SAP) or the Buffer Zone SAP (BZ SAP). Non-radionuclide soil contamination will be evaluated for Action Determinations as described in A-H, below. Actions will be determined on a case-by-case basis and may include any or a combination of removal, treatment, institutional controls, or engineering controls. For volatile organic compounds, where VOC contamination levels approach free product concentrations, such as at IHSS 118.1, a combination of contaminated soil source removal and groundwater treatment may be selected as the appropriate accelerated action. Where characterization data indicate that soil contamination exceeds action levels within the top 6 inches, DOE will propose to remove the contamination, unless this is not appropriate considering Sections 4.2.G and H.

A. Where soil contamination is identified below 6 inches in depth, the Soil Risk Screen (Figure 3) will be used to evaluate the potential risk of exposure and the need for further accelerated action.

B. Additional soil contamination may need to be remediated or managed to protect surface water quality in accordance with Section 2.0.

C. Where soil contamination exceeds the ecological action levels in Table 3, *Soil Action Levels*, DOE will consider the target species and the exposure unit for that species, and the location, areal extent, and concentration of contamination in evaluating and determining appropriate accelerated actions necessary to protect ecological resources. Accelerated actions to protect ecological resources may include the use of biota barriers, soil removal or target species management actions.

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D. Following accelerated actions soils with residual contamination will be evaluated in the RFI/RI-CMS/FS and an appropriate response action will be documented in the CAD/ROD. It is anticipated that institutional controls or a combination of institutional controls and engineered controls will generally be used to manage these lower risk sites.

E. Where asphalt, concrete or other man-made material at existing surface grade covers the soil surface, the basis for action will be determined as if the material had been removed.

F. Soils beneath "below-grade" structures, e.g., basements, valve vaults, pits, etc., will be addressed through the application of the Subsurface Soil Risk Screen in Figure 3.

G. Factors to be considered for all Action Determinations:
   1. Actions will be developed in an integrated manner with other actions being taken;
   2. Actions will be consistent with best management practices; and
   3. Actions may be accomplished by means of an interim or final action; and
   4. Remediation and/or management actions will be implemented to protect ecological resources where those actions can be implemented without damaging other ecological resources.

H. Isolated Data Points
   1. Single geographically isolated data points of contamination greater than action levels will be evaluated using the data aggregation and "hot spot" methodology outlined in the IA SAP and the BZ SAP, and action will be taken as warranted.
   2. These single data points will not trigger a source removal, remedial, or management action, in the absence of the source evaluation.

I. No Further Accelerated Action Determinations
   1. Any determination that No Further Accelerated Action is required by this section will be made in accordance with the decision criteria found in this section.
   2. If an action is required to be taken based on a determination made in accordance with this section, the action will be taken and be documented in a Closeout Report. The LRA's approval of the Closeout Report is the determination that No Further Accelerated Action is required by this section.

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3. If no action is required to be taken based on a determination made in accordance with this section, the determination will be documented for LRA review and approval. The LRA's approval of the Data Summary Report is the determination that No Further Accelerated Action is required by this section.

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5.0 SOILS CONTAMINATED WITH RADIOACTIVE MATERIALS

5.1 Basis for Action Levels:

A. Action levels are the concentrations of radioactive materials contamination in soils that have been selected from levels provided in *Results of the Interagency Review of Radionuclide Soil Action Levels,* September 30, 2002.

B. Action level concentrations result in a calculated annual radiation dose, under conditions of unrestricted land use, that does not exceed the annual dose limits in the Colorado Radiation Control Regulations, *Radiological Criteria for License Termination,* 6 CCR 1007-1 RH 4.61 (results in a radiation dose of less than 25 mrem/year to either a wildlife refuge worker or a rural resident), which is a potentially relevant and appropriate requirement for any final remedy.

C. Action levels have been calculated to be protective of:
   1. a wildlife refuge worker; a rural resident, in the event the land use is not restricted to a Wildlife Refuge; and

   2. ecological resources (action levels for radioactive contamination that are protective of human health are lower than concentrations of radioactive contamination that are protective of ecological resources).

5.2 Action Levels

A. Radioactive soil contamination exceeding action levels in Table 3, Soil Action Levels, will be evaluated for Action Determinations as described in 5.3, below. These action levels result in a lifetime excess cancer risk of $1x10^{-5}$ to a wildlife refuge worker. For plutonium and americium, these action levels also equate to an excess lifetime cancer risk to a hypothetical rural resident of less than $1x10^{-4}$.

B. The total risk from multiple radionuclides will be accounted for by the sum-of-ratios method.

5.3 Action Determinations

The Site will undergo characterization in accordance with the Industrial Area Sampling and Analysis Plan (IA SAP) or the Buffer Zone SAP (BZ SAP). Actions will be determined on a case-by-case basis and may include any or a combination of removal, treatment, institutional controls, or engineering-controls consistent with A–K, below.

A. Where characterization data show that plutonium-239/240 and americium-241 soil contamination exceeds the action level, DOE will remove sufficient

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radionuclide contamination to at least meet the action level within the top 3 feet. If plutonium-239/240 and/or americium-241 soil contamination greater than the action level extends below 3 feet in depth, the Subsurface Soil Risk Screen, Figure 3, will be used to evaluate the potential risk of exposure and the need for further accelerated action.

B. Where characterization data show that uranium soil contamination originating at the surface exceeds the action level, DOE will remove sufficient contamination to at least meet the action level within the top 6 inches. If uranium soil contamination greater than the action level extends below 6 inches in depth, the Subsurface Soil Risk Screen, Figure 3, will be used to evaluate the potential risk of exposure and the need for further accelerated action.

C. Plutonium-239/240 and americium-241 soil contamination found in the 3-6 foot depth interval will be addressed as follows:

1. If during characterization of soils between three and six feet total plutonium-239/240 and americium-241 contamination is found at an activity concentration of greater than 3nCi/g, "step out" sampling will be performed to determine the areal extent of contamination.
2. Based upon the results of the "step out" sampling, a removal action may be triggered depending on the areal or volumetric extent of the contamination. If plutonium-239/240 and americium-241 soil contamination is found in the 3-6 foot depth interval that exceeds 3 nCi/g, and the areal extent of the contamination is found to be greater than 80m^2, it will be removed to an activity concentration less than 1 nCi/g.
3. If plutonium-239/240 and americium-241 soil contamination is found in the 3-6 foot depth interval at activity concentrations greater than 7 nCi/g, it will be removed to an activity concentration less than 1 nCi/g without additional sampling to determine the areal extent. For contamination between 3 and 7 nCi/g, the areal or volumetric extent of contamination will determine if an action is required. The contaminant levels and areal or volumetric triggers are listed below.

Contamination Level (nCi/g)	Areal Extent Limit (m^2)	Volume Extent Limit (m^3)
7	0	0
6	40	25
5	50	31
4	60	37
3	80	50

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4. Once excavation is initiated, the principle of ALARA will be applied by removing all soil contamination to less than 1 nCi/g.

5. *If contamination between 1 and 3 nCi/g* is found at multiple sampling points for any IHSS or group of IHSSs in close proximity, the DOE and LRA will evaluate the potential for risk of exposure and consult with the community regarding the need for further action.

D. Original Process Waste Lines (OPWLs) and associated radionuclide contaminated soils are addressed through the OPWL characterization approach described in Attachment 14.

E. Additional soil contamination may need to be remediated or managed to protect surface water quality in accordance with Section 2.0.

F. Following accelerated actions soils with residual contamination will be evaluated in the RFI/RI-CMS/FS and an appropriate response action will be documented in the CAD/ROD. It is anticipated that institutional controls or a combination of institutional controls and engineered controls will generally be used to manage these lower risk sites.

G. Where asphalt, concrete or other man-made material at existing surface grade covers the soil surface, the basis for action will be determined as if the material had been removed.

H. Soils beneath "below-grade" structures, e.g., basements, valve vaults, pits, etc., will be addressed through the application of the Subsurface Soil Risk Screen in Figure 3.

I. Factors to be considered for all Action Determinations:

1. Actions will be developed in an integrated manner with other actions being taken;

2. Actions will be consistent with best management practices;

3. Actions may be accomplished by means of an interim or final action; and

4. Remediation and/or management actions will be implemented to protect ecological resources where those actions can be implemented without significantly damaging other ecological resources.

J. Isolated Data Points:

1. Single geographically isolated data points of contamination greater than the action levels will be evaluated using the data aggregation and "hot

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spot" methodology outlined in the IA SAP and the BZ SAP, and action will be taken as warranted.

2. These single data points will not trigger a source removal, remedial, or management action, in the absence of the source evaluation.

K. No Further Accelerated Action Determinations

1. Any determination that No Further Accelerated Action is required by this section will be made in accordance with the decision criteria found in this section.

2. If an action is required to be taken based on a determination made in accordance with this section, the action will be taken and be documented in a Closeout Report. The LRA's approval of the Closeout Report is the determination that No Further Accelerated Action is required by this section.

3. If no action is required to be taken based on a determination made in accordance with this section, the determination will be documented for LRA review and approval. The LRA's approval of the Data Summary Report is the determination that No Further Accelerated Action is required by this section.

Table 1 - Surface Water Action Levels & Standards

Analyte	CAS Reference Number	Standards and Action Levels [a] (mg/L)	Basis [b]	Temporary Modifications [c] (mg/L)	PQLs [d] (mg/L)
Acenaphthene	83-32-9	4.20E-01	W+F, WS		1.00E-02
Acenaphthylene	208-96-8	2.80E-06	W+F		1.00E-02
Acetone	67-64-1	3.65E+00	PRG		
Acrolein	107-02-8	2.10E-02	AL		1.00E-02
Acrylonitrile	107-13-1	5.90E-05	W+F		5.00E-03
Alachlor	15972-60-8	1.20E-03	W+F		2.00E-03
Aldicarb	116-06-3	7.00E-03	WS		1.00E-02
Aldicarb sulfone	1646-88-4	7.00E-03	WS		3.00E-03
Aldicarb sulfoxide	1646-87-3	7.00E-03	WS		3.00E-03
Aldrin	309-00-2	1.30E-07	W+F*		1.00E-04
Aluminum, dissolved	7429-90-5	8.70E-02	AL		
Ammonia, un-ionized	7664-41-7	[e]	[e]		
Anthracene	120-12-7	2.10E+00	W+F, WS		1.00E-02
Antimony, total recoverable	7440-36-0	6.00E-03	W+F, WS		1.00E-02
Arsenic, total recoverable	7440-38-2	1.80E-05	W+F		
Atrazine	1912-24-9	3.00E-03	WS		1.00E-03
Barium, total recoverable	7440-39-3	4.90E-01	WS		
Benzene	71-43-2	1.20E-03	W+F, WS	5.00E-03	1.00E-03
Benzidine	92-87-5	1.20E-07	W+F		1.00E-02
alpha-BHC	319-84-6	3.90E-06	W+F		5.00E-05
beta-BHC	319-85-7	1.40E-05	W+F		5.00E-05
gamma-BHC [Lindane]	58-89-9	8.00E-05	AL		5.00E-05
Benzo(a)anthracene	56-55-3	4.40E-06	W+F		1.00E-02
Benzo(a)pyrene	50-32-8	4.40E-06	W+F		2.00E-04
Benzo(b)fluoranthene	205-99-2	4.40E-06	W+F		1.00E-02
Benzo(g,h,i)perylene	191-24-2	4.40E-06	W+F		1.00E-02
Benzo(k)fluoranthene	207-08-9	4.40E-06	W+F		1.00E-02
Beryllium	7440-41-7	4.00E-03	SS, WS		5.00E-03
Boron, total	7440-42-8	7.50E-01	AG, SS		
Bromodichloromethane	75-27-4	5.60E-04	W+F [f]		1.00E-03
Bromoform [Tribromomethane]	75-25-2	4.30E-03	W+F [f]		1.00E-03
Bromomethane [Methyl Bromide]	74-83-9	4.80E-02	W+F		1.00E-03
2-Butanone [Methylethyl Ketone]	78-93-3	2.19E+01	PRG		
Butylbenzylphthalate	85-68-7	1.40E+00	W+F, WS		1.00E-02
Cadmium, dissolved	7440-43-9	1.50E-03	TVS [g]		5.00E-03
Carbofuran	1563-66-2	4.00E-02	WS		7.00E-03
Carbon disulfide	75-15-0	3.65E+00	PRG		
Carbon tetrachloride	56-23-5	2.50E-04	W+F	5.00E-03	1.00E-03
Chlordane	5103-71-9	2.10E-06	W+F		1.00E-03
Chlorobenzene	108-90-7	1.00E-01	W+F, WS		5.00E-03
Chloroethane	75-00-3	2.94E-02	PRG		
bis(2-Chloroethyl)ether	111-44-4	3.10E-05	W+F		1.00E-02

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Table 1 - Surface Water Action Levels & Standards

Analyte	CAS Reference Number	Standards and Action Levels [a] (mg/L)	Basis [b]	Temporary Modifications [c] (mg/L)	PQLs [d] (mg/L)
Chloroform [Trichloromethane]	67-66-3	5.70E-03	W+F [f]		1.00E-03
bis(2-Chloroisopropyl)ether	39638-32-9	2.80E-01	W+F, WS		1.00E-02
Chloromethane [Methyl Chloride]	74-87-3	5.70E-03	W+F		1.00E-03
4-Chloro-3-methylphenol	59-50-7	3.00E-02	AL		5.00E-02
2-Chloronaphthalene	91-58-7	5.60E-01	W+F, WS		
2-Chlorophenol	95-57-8	3.50E-02	W+F, WS		5.00E-02
Chloropyrifos	2921-88-2	4.10E-05	AL		1.00E-04
Chromium III, Total Recoverable	16065-83-1	5.00E-02	SS, WS		
Chromium VI, dissolved	18540-29-9	1.10E-02	TVS [g]		
Chrysene	218-01-9	4.40E-06	W+F		1.00E-02
Copper, dissolved	7440-50-8	1.60E-02	TVS [g]		
Cyanide	57-12-5	5.00E-03	SS		
4,4-DDD	72-54-8	8.30E-07	W+F		1.00E-04
4,4-DDE	72-55-9	5.90E-07	W+F		1.00E-04
4,4-DDT	50-29-3	5.90E-07	W+F		1.00E-04
Dalapon	75-99-0	2.00E-01	WS		1.30E-02
Demeton	8065-48-3	1.00E-04	AL		1.00E-03
Dibenzo(a,h)anthracene	53-70-3	4.40E-06	W+F		1.00E-02
Dibromochloromethane	124-48-1	8.00E-02	WS [f]		1.00E-03
1,2-Dibromo-3-chloropropane	96-12-8	2.00E-04	WS		1.00E-03
Di-n-butylphthalate	84-74-2	3.65E+00	PRG		1.00E-02
1,2-Dichlorobenzene	95-50-1	6.00E-01	W+F, WS		1.00E-02
1,3-Dichlorobenzene	541-73-1	4.00E-01	W+F		1.00E-02
1,4-Dichlorobenzene	106-46-7	7.50E-02	W+F, WS		1.00E-02
3,3-Dichlorobenzidine	91-94-1	3.90E-05	W+F		1.00E-02
1,1-Dichloroethane	75-34-3	3.65E+00	PRG		1.00E-03
1,2-Dichloroethane	107-06-2	3.80E-04	W+F, WS	5.00E-03	1.00E-03
1,1-Dichloroethene	75-35-4	7.00E-03	W+F, WS	7.00E-03	1.00E-03
1,2-Dichloroethene (cis)	156-59-2	7.00E-02	WS		5.00E-03
1,2-Dichloroethene (trans)	156-60-5	1.00E-01	W+F, WS		5.00E-03
2,4-Dichlorophenol	120-83-2	2.10E-02	W+F, WS		5.00E-02
Dichlorophenoxyacetic acid [2,4-D]	94-75-7	7.00E-02	WS		1.00E-03
1,2-Dichloropropane	78-87-5	5.20E-04	W+F, WS		1.00E-03
1,3-Dichloropropylene	542-75-6	1.00E-02	W+F		1.00E-03
Dieldrin	60-57-1	1.40E-07	W+F		1.00E-04
Di(2-ethylhexyl)adipate	103-23-1	4.00E-01	WS		6.00E-03
Diethylphthalate	84-66-2	5.60E+00	W+F, WS		1.00E-02
Diisopropyl methyl phosphonate	1445-75-6	8.00E-03	WS		1.00E-03
2,4-Dimethylphenol	105-67-9	1.40E-01	W+F, WS		5.00E-02
Dimethylphthalate	131-11-3	3.13E+02	W+F		1.00E-02
4,6-Dinitro-2-methylphenol	534-52-1	2.70E-03	W+F, WS		5.00E-02
2,4-Dinitrophenol	51-28-5	1.40E-02	W+F, WS		5.00E-02
2,4-Dinitrotoluene	121-14-2	1.10E-04	W+F, WS		1.00E-02
2,6-Dinitrotoluene	606-20-2	2.30E-01	AL		1.00E-02
Dinoseb	88-85-7	7.00E-03	WS		2.00E-03
Dioxin (2,3,7,8 TCDD)	1746-01-6	1.30E-11	W+F		
1,2-Diphenylhydrazine	122-66-7	4.00E-05	W+F		

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Table 1 - Surface Water Action Levels & Standards

Analyte	CAS Reference Number	Standards and Action Levels [a] (mg/L)	Basis [b]	Temporary Modifications [c] (mg/L)	PQLs [d] (mg/L)
Diquat	65-00-7	2.00E-02	WS		4.00E-03
Endosulfan	115-29-7	5.60E-05	AL		1.00E-04
Endosulfan, alpha	95-99-88	5.60E-05	AL		1.00E-04
Endosulfan, beta	3321-36-59	5.60E-05	AL		1.00E-04
Endosulfan sulfate	1031-07-8	5.60E-05	AL		1.00E-04
Endothall	145-73-3	1.00E-01	WS		9.00E-02
Endrin (technical)	72-20-8	3.60E-05	AL		1.00E-04
Endrin aldehyde	7421-93-4	7.60E-04	W+F		1.00E-04
Ethylbenzene	100-41-4	7.00E-01	W+F,WS		1.00E-02
Ethylene dibromide [1,2-Dibromomethane]	106-93-4	5.00E-05	WS		
bis(2-Ethylhexyl)phthalate	117-81-7	1.80E-03	W+F		1.00E-02
Fluoranthene	206-44-0	2.80E-01	W+F, WS		1.00E-02
Fluorene	86-73-7	2.80E-01	WS		1.00E-02
Fluoride	7782-41-4	2.00E+00	WS		
Glyphosate	1071-83-6	7.00E-01	WS		6.00E-02
Guthion	86-50-0	1.00E-05	AL		1.50E-03
Heptachlor	76-44-8	2.10E-07	W+F		5.00E-05
Heptachlor epoxide	1024-57-3	1.00E-07	W+F		5.00E-05
Hexachlorobenzene	118-74-1	7.50E-07	W+F		1.00E-02
Hexachlorobutadiene	87-68-3	9.30E-03	AL		1.00E-02
Hexachlorocyclohexane, Technical	608-73-1	1.20E-05	W+F		2.00E-04
Hexachlorocyclopentadiene	77-47-4	5.00E-03	AL		1.00E-02
Hexachloroethane	67-72-1	7.00E-03	W+F, WS		1.00E-02
Indeno(1,2,3-cd)pyrene	193-39-5	4.40E-06	W+F		1.00E-02
Isophorone	78-59-1	3.60E-02	W+F		1.00E-02
Lead, dissolved	7439-92-1	6.50E-03	TVS [g]		1.00E-02
Malathion	121-75-4	1.00E-04	AL		2.00E-04
Mercury, total	7439-97-6	1.00E-05	SS		1.00E-03
Methoxychlor	72-43-5	3.00E-05	AL		5.00E-04
Methylene chloride [Dichloromethane]	75-09-2	4.70E-03	W+F, WS		1.00E-03
4-Methyl-2-pentanone [Isopropoacetone]	108-10-1	2.92E+00	PRG		
2-Methylphenol [o-Cresol]	95-48-7	1.83E+00	PRG		
Mirex	2385-85-5	1.00E-06	AL		1.00E-04
Naphthalene	91-20-3	2.80E-02	W+F, WS		1.00E-02
Nickel, dissolved	7440-02-0	1.23E-01	TVS [g]		
Nitrate	14797-55-8	1.00E+01	AG	100 [h]	
Nitrite	14797-65-0	5.00E-01	AL [i]	4.5 [h]	
Nitrobenzene	98-95-3	3.50E-03	W+F, WS		1.00E-02
Nitrophenol 4	100-02-7	5.60E-02	WS, W+F		
Nitrosodibutylamine N	924-16-3	6.40E-06	W+F		1.00E-02
Nitrosodiethylamine N	55-18-5	8.00E-07	W+F		1.00E-02
Nitrosodimethylamine N	62-75-9	6.90E-07	W+F		1.00E-02
n-Nitrosodiphenylamine	86-30-6	5.00E-03	W+F		1.00E-02
n-Nitrosodipropylamine	621-64-7	5.00E-06	W+F		1.00E-02
Nitrosopyrrolidine N	930-55-2	1.60E-05	W+F		1.00E-02
Oxamyl(vydate)	23135-22-0	2.00E-01	WS		2.00E-02
PCBs	1336-36-3	1.70E-04	W+F [j]		1.00E-02

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Table 1 - Surface Water Action Levels & Standards

Analyte	CAS Reference Number	Standards and Action Levels [a] (mg/L)	Basis [b]	Temporary Modifications [c] (mg/L)	PQLs [d] (mg/L)
Parathion	56-38-2	1.30E-05	AL		
Pentachlorobenzene	608-93-5	3.50E-03	W+F		1.00E-02
Pentachlorophenol	87-86-5	2.80E-04	W+F		5.00E-02
Phenanthrene	85-01-8	2.80E-06	W+F		1.00E-02
Phenol	108-95-2	2.56E+00	AL		5.00E-02
Picloram	1918-02-1	5.00E-01	WS		1.00E-03
Pyrene	129-00-0	2.10E-01	W+F, WS		1.00E-02
Selenium	7782-49-2	4.60E-03	AL		1.00E-02
Silver, dissolved	7440-22-4	6.00E-04	TVS [g]		5.00E-03
Simazine	122-34-9	4.00E-03	WS		7.00E-04
Sulfide	18496-25-8	2.00E-03	SS		
Styrene	100-42-5	1.00E-01	WS		5.00E-03
1,2,4,5-Tetrachlorobenzene	95-94-3	2.10E-03	WS		1.00E-02
1,1,2,2-Tetrachloroethane	79-34-5	1.70E-04	W+F		1.00E-03
Tetrachloroethene	127-18-4	8.00E-04	W+F	5.00E-03	1.00E-03
Thallium	7440-28-0	5.00E-04	W+F, WS		1.20E-02
Toluene	108-88-3	1.00E+00	W+F, WS		5.00E-03
Toxaphene	8001-35-2	2.00E-07	AL		3.00E-03
1,2,4-Trichlorobenzene	120-82-1	5.00E-02	AL		1.00E-02
1,1,1-Trichloroethane	71-55-6	2.00E-01	W+F, WS		5.00E-03
1,1,2-Trichloroethane	79-00-5	3.00E-03	W+F, WS		1.00E-03
Trichloroethene	79-01-6	2.70E-03	W+F	5.00E-03	1.00E-03
2,4,6-Trichlorophenol	88-06-2	2.10E-03	W+F		5.00E-02
Trichlorophenoxyproprionic acid	93-72-1	1.00E-02	W+F		5.00E-03
Vinyl chloride	75-01-4	2.00E-03	W+F, WS		2.00E-03
Xylene (total)	1330-20-7	1.00E+01	WS		5.00E-03
Zinc, dissolved	7440-66-6	1.41E-01	TVS [g]		
PHYSICAL PARAMETERS:					
Dissolved oxygen (minimum)		5.0 mg/L	SS		
pH		6.5-9.0	SS		
RADIONUCLIDES:		pCi/L			
Americium 241	14596-10-2	0.15	BS		
Plutonium 239/240	10-12-8	0.15	BS		
Radium 226/228		5 [k]	BS		
Strontium 89/90	11-10-9	8	BS		
Tritium	10028-17-8	500	SS		
Uranium, total	7440-61-1	11(10) [l]	SS		
Gross alpha, total	14127-62-9	7(11) [l]	SS		
Gross beta, total	12587-47-2	8(19) [l]	SS		

NOTES:

[a] The values in this table reflect the classifications and standards approved by the Colorado WQCC effective October 30, 2001. Values apply as standards in Segments 4a and 4b and as action levels in Segment 5. Values based on PRGs are applied only as action levels and are not enforceable standards. Standards for chloride, dissolved iron, dissolved manganese, and sulfate are Secondary Drinking Water Standards, which are based on aesthetic considerations. They have been removed as site-specific standards since Segments 4a, 4b, and 5 waters will not be used for drinking water supply.

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[b] Acronyms: AG = Agriculture; AL = Aquatic Life; BS = Basic Standard; PRG = Preliminary Remediation Goal for residential groundwater ingestion; SS = Site Specific Standard; TVS = Table Value Standard; WS = Water Supply; W+F = Water plus Fish

[c] Temporary modifications affect Segment 5 only and apply until December 31, 2009.

[d] Whenever the practical quantitation level (PQL) for a pollutant is higher (less stringent) than a standard/action level or temporary modification, "less than" the PQL will be used as the compliance threshold. These less stringent PQLs are shaded.

[e] There is no un-ionized ammonia standard for Segment 5 or Segment 4b. A standard of 0.1 mg/L applies to Segment 4a, which begins in Walnut Creek downstream of Indiana Street.

[f] Per the Basic Standards, the Total Trihalomethane (TTHM) standard applies to the sum of the four TTHM compounds. For dibromochloromethane the TTHM value for water supply, 80 parts per billion, was applied.

[g] Table value standards for metals are based on a toxicity equation which uses a hardness value of 143 mg/L.

[h] The temporary modifications for nitrate and nitrite apply to the Walnut Creek drainage only.

[i] The listed nitrite value is the chronic aquatic life standard based on chloride levels in excess of 22 mg/L in Segment 4.

[j] The total PCB standard in the Basic Standards is based on the sum of the Araclor analytes.

[k] Per the basic standard, this value applies to the sum of the two radium isotopes.

[l] Radiological parameters are distinguished by drainage basin in Table 2 of 5 CCR 1002-38. The first value is the standard for Woman Creek and the paranthetical value is the standard for Walnut Creek.

The scientific notation used in this table indicates the power of ten by which the two-decimal-place number is multiplied (e.g., 2.52E-02 = 2.52×10^{-2} = .0252).

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Table 2 - Ground Water Action Levels

Analyte	CAS Reference Number	Tier I [a] (mg/L)	Tier II (mg/L)	Basis [b]	PQLs [c] (mg/L)
Acenaphthene	83-32-9	2.19E+02	2.19E+00	[2]	1.00E-02
Acetone [c]	67-64-1	3.65E+02	3.65E+00	[2]	
Aldrin	309-00-2	5.01E-04	5.01E-06	[2]	1.00E-04
Aluminum	7429-90-5	3.65E+03	3.65E+01	[2]	
Ammonium (as Ammonia)	7664-41-7	3.54E+03	3.54E+01	[2]	
Anthracene	120-12-7	1.10E+03	1.10E+01	[2]	1.00E-02
Antimony	7440-36-0	6.00E-01	6.00E-03	[1]	1.00E-02
Aroclor-1016	12674-11-2	5.00E-02	5.00E-04	[1]	1.00E-03
Aroclor-1221	11104-28-2	5.00E-02	5.00E-04	[1]	1.00E-03
Aroclor-1232	11141-16-5	5.00E-02	5.00E-04	[1]	1.00E-03
Aroclor-1242	53469-21-9	5.00E-02	5.00E-04	[1]	1.00E-03
Aroclor-1248	12672-29-6	5.00E-02	5.00E-04	[1]	1.00E-03
Aroclor-1254	11097-69-1	5.00E-02	5.00E-04	[1]	1.00E-03
Aroclor-1260	11096-82-5	5.00E-02	5.00E-04	[1]	1.00E-03
Arsenic	7440-38-2	5.00E+00	5.00E-02	[1]	
Barium	7440-39-3	2.00E+02	2.00E+00	[1]	
Benzene	71-43-2	5.00E-01	5.00E-03	[1]	1.00E-03
alpha-BHC	319-84-6	1.35E-03	1.35E-05	[2]	5.00E-05
beta-BHC	319-85-7	4.73E-03	4.73E-05	[2]	5.00E-05
gamma-BHC [Lindane]	58-89-9	2.00E-02	2.00E-04	[1]	5.00E-05
Benzo(a)anthracene	56-55-3	1.17E-02	1.17E-04	[2]	1.00E-02
Benzo(a)pyrene	50-32-8	2.00E-02	2.00E-04	[1]	2.00E-04
Benzo(b)fluoranthene	205-99-2	1.17E-02	1.17E-04	[2]	1.00E-02
Benzo(k)fluoranthene	207-08-9	1.17E-01	1.17E-03	[2]	1.00E-02
Benzoic Acid	65-85-0	1.46E+04	1.46E+02	[2]	
Benzyl Alcohol	100-51-6	1.10E+03	1.10E+01	[2]	
Beryllium	7440-41-7	4.00E-01	4.00E-03	[1]	5.00E-03
Bromodichloromethane	75-27-4	1.00E+01	1.00E-01	[1]	1.00E-03
Bromoform [Tribromomethane]	75-25-2	1.00E+01	1.00E-01	[1]	1.00E-03
Bromomethane [Methyl bromide]	74-83-9	5.11E+00	5.11E-02	[2]	1.00E-03
2-Butanone [Methylethyl ketone]	78-93-3	2.19E+03	2.19E+01	[2]	
Butylbenzylphthalate	85-68-7	7.30E+02	7.30E+00	[2]	1.00E-02
Cadmium	7440-43-9	5.00E-01	5.00E-03	[1]	5.00E-03
Carbon disulfide	75-15-0	3.65E+02	3.65E+00	[2]	
Carbon tetrachloride	56-23-5	5.00E-01	5.00E-03	[1]	1.00E-03
alpha-Chlordane	5103-71-9	2.00E-01	2.00E-03	[1]	1.00E-03
beta-Chlordane	5103-74-2	2.00E-01	2.00E-03	[1]	1.00E-03
gamma-Chlordane	12789-03-6	2.00E-01	2.00E-03	[1]	1.00E-03
4-Chloroaniline	106-47-8	1.46E+01	1.46E-01	[2]	
Chlorobenzene	108-90-7	1.00E+01	1.00E-01	[1]	5.00E-03
Chloroethane	75-00-3	2.94E+00	2.94E-02	[2]	
bis(2-Chloroethyl)ether	111-44-4	7.74E-03	7.74E-05	[2]	1.00E-02
Chloroform [Trichloromethane]	67-66-3	1.00E+01	1.00E-01	[1]	1.00E-03
bis(2-Chloroisopropyl)ether	39638-32-9	1.22E-01	1.22E-03	[2]	1.00E-02
Chloromethane [Methyl chloride]	74-87-3	6.55E-01	6.55E-03	[2]	1.00E-03
2-Chloronaphthalene	91-58-7	2.92E+02	2.92E+00	[2]	
2-Chlorophenol	95-57-8	1.83E+01	1.83E-01	[2]	5.00E-02

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Table 2 - Ground Water Action Levels

Analyte	CAS Reference Number	Tier I [a] (mg/L)	Tier II (mg/L)	Basis [b]	PQLs [c] (mg/L)
Chromium (total)	7440-47-3	1.00E+01	1.00E-01	[1]	
Chrysene	218-01-9	1.17E+00	1.17E-02	[2]	1.00E-02
Cobalt	7440-48-4	2.19E+02	2.19E+00	[1]	
Copper	7440-50-8	1.30E+02	1.30E+00	[3]	
Cyanide	57-12-5	2.00E+01	2.00E-01	[1]	
4,4-DDD	72-54-8	3.55E-02	3.55E-04	[2]	1.00E-04
4,4-DDE	72-55-9	2.50E-02	2.50E-04	[2]	1.00E-04
4,4-DDT	50-29-3	2.50E-02	2.50E-04	[2]	1.00E-04
Dalapon	75-99-0	2.00E+01	2.00E-01	[1]	1.30E-02
Dibenzo(a,h)anthracene	53-70-3	1.17E-03	1.17E-05	[2]	1.00E-02
Dibenzofuran	132-64-9	1.46E+01	1.46E-01	[2]	
Dibromochloromethane	124-48-1	1.01E-01	1.01E-03	[2]	1.00E-03
1,2-Dibromo-3-chloropropane	96-12-8	2.00E-02	2.00E-04	[1]	1.00E-03
Di-n-butylphthalate	84-74-2	3.65E+02	3.65E+00	[2]	1.00E-02
1,2-Dichlorobenzene	95-50-1	6.00E+01	6.00E-01	[1]	1.00E-02
1,3-Dichlorobenzene	541-73-1	6.00E+01	6.00E-01	[1]	1.00E-02
1,4-Dichlorobenzene	106-46-7	7.50E+00	7.50E-02	[1]	1.00E-02
3,3-Dichlorobenzidine	91-94-1	1.89E-02	1.89E-04	[2]	1.00E-02
1,1-Dichloroethane	75-34-3	3.65E+02	3.65E+00	[2]	1.00E-03
1,2-Dichloroethane	107-06-2	5.00E-01	5.00E-03	[1]	1.00E-03
1,1-Dichloroethene	75-35-4	7.00E-01	7.00E-03	[1]	1.00E-03
1,2-Dichloroethene (total)	75-35-4	7.00E+00	7.00E-02	[1]	5.00E-03
2,4-Dichlorophenol	120-83-2	1.10E+01	1.10E-01	[2]	5.00E-02
2,4-Dichlorophenoxyacetic acid (2,4-D)	94-75-7	7.00E+00	7.00E-02	[1]	1.00E-03
1,2-Dichloropropane	78-87-5	5.00E-01	5.00E-03	[1]	1.00E-03
cis-1,3-Dichloropropene	10061-01-5	4.73E-02	4.73E-04	[2]	1.00E-03
trans-1,3-Dichloropropene	10061-02-6	4.73E-02	4.73E-04	[2]	1.00E-03
Dieldrin	60-57-1	5.32E-04	5.32E-06	[2]	1.00E-04
Diethylphthalate	84-66-2	2.92E+03	2.92E+01	[2]	1.00E-02
2,4-Dimethylphenol	105-67-9	7.30E+01	7.30E-01	[2]	5.00E-02
Dimethylphthalate	131-11-3	3.65E+04	3.65E+02	[2]	1.00E-02
4,6-Dinitro-2-methylphenol	534-52-1	3.65E-01	3.65E-03	[2]	
2,4-Dinitrophenol	51-28-5	7.30E+00	7.30E-02	[2]	5.00E-02
2,4-Dinitrotoluene	121-14-2	1.25E-02	1.25E-04	[2]	1.00E-02
2,6-Dinitrotoluene	606-20-2	1.25E-02	1.25E-04	[2]	1.00E-02
Di-n-octylphthalate	117-84-0	7.30E+01	7.30E-01	[2]	
Endosulfan I	959-98-8	2.19E+01	2.19E-01	[2]	1.00E-04
Endosulfan II	33213-65-9	2.19E+01	2.19E-01	[2]	1.00E-04
Endosulfan sulfate	1031-07-8	2.19E+01	2.19E-01	[2]	1.00E-04
Endosulfan (technical)	115-29-7	2.19E+01	2.19E-01	[2]	1.00E-04
Endrin (technical)	72-20-8	2.00E-01	2.00E-03	[1]	1.00E-04
Ethylbenzene	100-41-4	7.00E+01	7.00E-01	[1]	1.00E-02
bis(2-Ethylhexyl)phthalate	117-81-7	6.00E-01	6.00E-03	[1]	1.00E-02
Fluoranthene	206-44-0	1.46E+02	1.46E+00	[2]	1.00E-02
Fluorene	86-73-7	1.46E+02	1.46E+00	[2]	1.00E-02
Fluoride	7782-41-4	4.00E+02	4.00E+00	[1]	
Glyphosate	1071-83-6	7.00E+01	7.00E-01	[1]	6.00E-02
Heptachlor	76-44-8	4.00E-02	4.00E-04	[1]	5.00E-05
Heptachlor epoxide	1024-57-3	2.00E-02	2.00E-04	[1]	5.00E-05
Hexachlorobenzene	118-74-1	1.00E-01	1.00E-03	[1]	1.00E-02
Hexachlorobutadiene	87-68-3	1.09E-01	1.09E-03	[2]	1.00E-02

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Table 2 - Ground Water Action Levels

Analyte	CAS Reference Number	Tier I [a] (mg/L)	Tier II (mg/L)	Basis [b]	PQLs [c] (mg/L)
Hexachlorocyclopentadiene	77-47-4	5.00E+00	5.00E-02	[1]	1.00E-02
Hexachloroethane	67-72-1	6.08E-01	6.08E-03	[2]	1.00E-02
Indeno(1,2,3-cd)pyrene	193-39-5	1.17E-02	1.17E-04	[2]	1.00E-02
Isophorone	78-59-1	8.96E+00	8.96E-02	[2]	1.00E-02
Lead (dissolved)	7439-96-5	1.50E+00	1.50E-02	[3]	1.00E-02
Lithium	7439-93-2	7.30E+01	7.30E-01	[2]	
Manganese	7439-96-5	1.72E+02	1.72E+00	[2]	
Mercury	7439-97-6	2.00E-01	2.00E-03	[1]	1.00E-03
Methoxychlor	72-43-5	4.00E+00	4.00E-02	[1]	5.00E-04
Methylene chloride [Dichloromethane]	75-09-2	5.00E-01	5.00E-03	[1]	1.00E-03
2-Methylnaphthalene	91-57-6	1.46E+02	1.46E+00	[2]	
4-Methyl-2-pentanone	108-10-1	2.92E+02	2.92E+00	[2]	
2-Methylphenol	95-48-7	1.83E+02	1.83E+00	[2]	
4-Methylphenol	106-44-5	1.83E+01	1.83E-01	[2]	
Molybdenum	7439-98-7	1.83E+01	1.83E-01	[2]	
Naphthalene	91-20-3	1.46E+02	1.46E+00	[2]	1.00E-02
Nickel	7440-02-0	1.40E+01	1.40E-01	[1]	
Nitrate (MCL as N)	14797-55-8	1.00E+03	1.00E+01	[1]	
Nitrite (MCL as N)	14797-65-0	1.00E+02	1.00E+00	[1]	
2-Nitroaniline	88-74-4	2.19E-01	2.19E-03	[2]	
Nitrobenzene	98-95-3	1.83E+00	1.83E-02	[2]	1.00E-02
4-Nitrophenol	100-02-7	2.92E+01	2.92E-01	[2]	
n-Nitrosodiphenylamine	86-30-6	1.74E+00	1.74E-02	[2]	1.00E-02
n-Nitrosodipropylamine	621-64-7	1.22E-03	1.22E-05	[2]	1.00E-02
Pentachlorophenol	87-86-5	1.00E-01	1.00E-03	[1]	5.00E-02
Phenol	108-95-2	2.19E+03	2.19E+01	[2]	5.00E-02
Pyrene	129-00-0	1.10E+02	1.10E+00	[2]	1.00E-02
Selenium	7782-49-2	5.00E+00	5.00E-02	[1]	1.00E-02
Silver	7440-22-4	1.83E+01	1.83E-01	[2]	5.00E-03
Strontium	7440-24-6	2.19E+03	2.19E+01	[2]	
Styrene	100-42-5	1.00E+01	1.00E-01	[1]	5.00E-03
Sulfate	14808-79-8	5.00E+04	5.00E+02	[4]	
1,1,2,2-Tetrachloroethane	79-34-5	4.26E-02	4.26E-04	[2]	1.00E-03
Tetrachloroethene	127-18-4	5.00E-01	5.00E-03	[1]	1.00E-03
Thallium	7440-28-0	2.00E-01	2.00E-03	[1]	1.20E-02
Tin	7440-31-5	2.19E+03	2.19E+01	[2]	
Toluene	108-88-3	1.00E+02	1.00E+00	[1]	5.00E-03
Toxaphene	8001-35-2	3.00E-01	3.00E-03	[1]	3.00E-03
1,2,4-Trichlorobenzene	120-82-1	7.00E+00	7.00E-02	[1]	1.00E-02
1,1,1-Trichloroethane	71-55-6	2.00E+01	2.00E-01	[1]	5.00E-03
1,1,2-Trichloroethane	79-00-5	5.00E-01	5.00E-03	[1]	1.00E-03
Trichloroethene	79-01-6	5.00E-01	5.00E-03	[1]	1.00E-03
2,4,5-Trichlorophenol	95-95-4	5.00E+00	5.00E-02	[1]	
2,4,6-Trichlorophenol	88-06-2	7.74E-01	7.74E-03	[2]	5.00E-02
Vanadium	7440-62-2	2.56E+01	2.56E-01	[2]	
Vinyl acetate	108-05-4	3.65E+03	3.65E+01	[2]	
Vinyl chloride	75-01-4	2.00E-01	2.00E-03	[1]	2.00E-03
Xylene (total)	1330-20-7	1.00E+03	1.00E+01	[1]	5.00E-03
Zinc	7440-66-6	1.10E+03	1.10E+01	[2]	
RADIONUCLIDES:		pCi/L	pCi/L		

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Table 2 - Ground Water Action Levels

Analyte	CAS Reference Number	Tier I [a] (mg/L)	Tier II (mg/L)	Basis [b]	PQLs [c] (mg/L)
Americium-241	14596-10-2	14.5	0.145	[2]	
Cesium-137+D	10045-97-3	151	1.51	[2]	
Plutonium-239/240	10-12-8	15.1	0.151	[2]	
Radium-226/228+D		2000 [d]	20 [d]	[1]	
RADIONUCLIDES: (continued)		pCi/L	pCi/L		
Strontium-89/90	11-10-9	85.2	0.852	[2]	
Tritium	10028-17-8	2,000,000	20,000	[1]	
Uranium-233/234	11-08-5	106	1.06	[2]	
Uranium-235	15117-96-1	101	1.01	[2]	
Uranium-238	7440-61-1	76.8	0.768	[2]	

NOTES:

[a] Tier I action levels are 100 times the corresponding Tier II value.

[b] Basis for Tier II action level:

[1] Maximum Concentration Level (MCL)

[2] Residential groundwater ingestion Preliminary Remediation Goal (PRG)

[3] EPA Action Level based on the Lead and Copper Rule (40 CFR 141.2)

[4] Proposed MCL

[c] If the practical quantitation level (PQL) for a pollutant is higher (less stringent) than an action level, "less than" the PQL will be used as the compliance threshold. These less stringent PQLs are shaded.

[d] This value applies to the sum of the two radium isotopes.

D = Daughters (Indicates that cancer risk estimates for these radionuclides include the contributions from their short-lived decay products, assuming secular equalibrium with the principal nuclide in the environment. Sample analyses for these radionuclides will not include any activity contribution from daughter products.

The scientific notation used in this table indicates the power of ten by which the two-decimal-place number is multiplied (e.g., 2.52E-02 = 2.52 X 10^{-2} = .0252).

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Table 3 - Soil Action Levels

Analyte	CAS Reference Number	Wildlife Refuge Worker [a]	Ecological Receptor [b]	Units
ORGANIC ANALYTES				
Acenaphthene	83-32-9	4.08E+07*		µg/kg
Acetone[d]	67-64-1	1.02E+08*	2.11E+05 (PD)	µg/kg
Aldrin	309-00-2	1.62E+03		µg/kg
Ammonium (as Ammonia)	7664-41-7	> 1E+09*[d]		µg/kg
Anthracene	120-12-7	2.04E+08*		µg/kg
Aroclor 1016	12674-11-2	4.64E+04*		µg/kg
Aroclor 1221	11104-28-2	1.24E+04		µg/kg
Aroclor 1232	11141-16-5	1.24E+04		µg/kg
Aroclor 1242	53469-21-9	1.24E+04		µg/kg
Aroclor 1248	12672-29-6	1.24E+04		µg/kg
Aroclor 1254	11097-69-1	1.24E+04	3.71E+05 (PD)	µg/kg
Aroclor 1260	11096-82-5	1.24E+04		µg/kg
Benzene	71-43-2	2.05E+05		µg/kg
alpha-BHC	319-84-6	5.24E+03		µg/kg
beta-BHC	319-85-7	1.84E+04		µg/kg
gamma-BHC (Lindane)	58-89-9	2.55E+04		µg/kg
Benzo(a)anthracene	56-55-3	3.49E+04	8.00E+05 (PD)	µg/kg
Benzo(a)pyrene	50-32-8	3.49E+03	2.57E+04 (I)	µg/kg
Benzo(b)fluoranthene	205-99-2	3.49E+04	1.01E+06 (PD)	µg/kg
Benzo(k)fluoranthene	207-08-9	3.49E+05	1.01E+06 (PD)	µg/kg
Benzoic Acid (at pH 7)	65-85-0	> 1E+09*		µg/kg
Benzyl Alcohol	100-51-6	3.07E+08*		µg/kg
Bromodichloromethane	75-27-4	6.17E+05		µg/kg
Bromoform	75-25-2	3.73E+06		µg/kg
Bromomethane (methyl bromide)	74-83-9	1.93E+05*		µg/kg
2-Butanone (methyl ethyl ketone)	78-93-3	1.92E+08*	4.33E+05 (PD)	µg/kg
Butylbenzylphthalate	85-68-7	1.47E+08*		µg/kg
Carbon disulfide	75-15-0	1.51E+07*		µg/kg
Carbon tetrachloride[c]	56-23-5	8.15E+04*	8.32E+04 (PM)	µg/kg
alpha-Chlordane	5103-71-9	9.44E+04		µg/kg
beta-Chlordane	5103-74-2	9.44E+04		µg/kg
gamma-Chlordane	12789-03-6	9.44E+04		µg/kg
4-Chloroaniline	106-47-8	2.95E+06*		µg/kg
Chlorobenzene	108-90-7	6.09E+06*		µg/kg
Chloroethane (ethyl chloride)	75-00-3	1.32E+07		µg/kg
bis(2-chloroethyl)ether	111-44-4	3.48E+04		µg/kg
Chloroform[c]	67-66-3	1.92E+04*	1.01E+05 (PD)	µg/kg
bis(2-chloroisopropyl)ether	39638-32-9	5.47E+05		µg/kg
Chloromethane (methyl chloride)	74-87-3	3.71E+05		µg/kg
2-Chloronaphthalene	91-58-7	8.18E+07*		µg/kg
2-Chlorophenol	95-57-8	5.11E+06*		µg/kg
Chrysene	218-01-9	3.49E+06		µg/kg
4,4-DDD	72-54-8	1.43E+05		µg/kg
4,4-DDE	72-55-9	1.01E+05		µg/kg

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Table 3 - Soil Action Levels

Analyte	CAS Reference Number	Wildlife Refuge Worker [a]	Ecological Receptor [b]	Units
4,4-DDT	50-29-3	1.00E+05		µg/kg
Dibenz(a,h)anthracene	53-70-3	3.49E+03		µg/kg
Dibenzofuran	132-64-9	2.95E+06*		µg/kg
Dibromochloromethane	124-48-1	3.29E+05		µg/kg
Di-n-butylphthalate	84-74-2	7.37E+07*		µg/kg
1,2-Dichlorobenzene (o-)	95-50-1	3.12E+07*		µg/kg
1,4-Dichlorobenzene (p-)	106-46-7	8.40E+05		µg/kg
3,3-Dichlorobenzidine	91-94-1	6.13E+04		µg/kg
1,1-Dichloroethane	75-34-3	2.25E+07*		µg/kg
1,2-Dichloroethane	107-06-2	1.06E+05		µg/kg
1,1-Dichloroethene	75-35-4	1.70E+04		µg/kg
1,2-Dichloroethene (total)	540-59-0	9.20E+06*		µg/kg
2,4-Dichlorophenol (at pH 6.8)	120-83-2	3.07E+06*		µg/kg
1,2-Dichloropropane	78-87-5	3.45E+05*		µg/kg
cis-1,3-Dichloropropene	10061-01-5	6.57E+03		µg/kg
trans-1,3-Dichloropropene	10061-02-6	6.57E+03		µg/kg
Dieldrin	60-57-1	1.72E+03		µg/kg
Diethylphthalate	84-66-2	5.90E+08*		µg/kg
2,4-Dimethylphenol	105-67-9	2.04E+07*		µg/kg
Dimethylphthalate	131-11-3	> 1E+09*		µg/kg
4,6-Dinitro-2-methylphenol (4,6-dinitro-o-cresol)	534-52-1	1.02E+06*		µg/kg
2,4-Dinitrophenol	51-28-5	2.04E+06*		µg/kg
2,4-Dinitrotoluene	121-14-2	5.63E+04		µg/kg
2,6-Dinitrotoluene	606-20-2	5.63E+04		µg/kg
Di-n-octylphthalate	117-84-0	1.47E+07		µg/kg
Endosulfan I	959-98-8	4.42E+06*		µg/kg
Endosulfan II	33213-65-9	4.42E+06*		µg/kg
Endosulfan sulfate	1031-07-8	4.42E+06*		µg/kg
Endosulfan (technical)	115-29-7	4.42E+06*		µg/kg
Endrin (technical)	72-20-8	2.21E+05*		µg/kg
Ethylbenzene	100-41-4	4.25E+06		µg/kg
bis(2-ethylhexyl)phthalate	117-81-7	1.97E+06		µg/kg
Fluoranthene	206-44-0	2.72E+07*		µg/kg
Fluorene	86-73-7	4.08E+07*		µg/kg
Fluoride (as fluorine)	7782-41-4	6.13E+07*		µg/kg
Heptachlor	76-44-8	6.12E+03		µg/kg
Heptachlor epoxide	1024-57-3	3.03E+03		µg/kg
Hexachlorobenzene	118-74-1	1.72E+04		µg/kg
Hexachlorobutadiene	87-68-3	1.47E+05*		µg/kg
Hexachlorocyclopentadiene	77-47-4	3.50E+06*		µg/kg
Hexachloroethane	67-72-1	7.37E+05*	1.99E+06 (PD)	µg/kg
Indeno(1,2,3-cd)pyrene	193-39-5	3.49E+04		µg/kg
Isophorone	78-59-1	2.91E+07		µg/kg
Methoxychlor	72-43-5	5.11E+06*		µg/kg
Methylene chloride (dichloromethane)[c]	75-09-2	2.53E+06	3.95E+04 (PD)	µg/kg
2-Methylnaphthalene	91-57-6	2.04E+07*		µg/kg

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Table 3 - Soil Action Levels

Analyte	CAS Reference Number	Wildlife Refuge Worker [a]	Ecological Receptor [b]	Units
4-Methyl-2-pentanone (methyl isobutyl ketone)	108-10-1	1.64E+07*		µg/kg
2-Methylphenol (o-cresol)	95-48-7	3.69E+07*		µg/kg
4-Methylphenol (p-cresol)	106-44-5	3.69E+06*		µg/kg
Naphthalene	91-20-3	3.09E+06*		µg/kg
2-Nitroaniline	88-74-4	1.67E+07*		µg/kg
Nitrobenzene	98-95-3	3.32E+05*		µg/kg
4-Nitrophenol	100-02-7	8.18E+06*		µg/kg
n-Nitrosodiphenylamine	86-30-6	7.81E+06		µg/kg
n-Nitrosodipropylamine	621-64-7	5.47E+03		µg/kg
Pentachlorophenol	87-86-5	1.62E+05		µg/kg
Phenol	108-95-2	6.13E+08*		µg/kg
Pyrene	129-00-0	2.21E+07*		µg/kg
Styrene	100-42-5	1.23E+08*		µg/kg
1,1,2,2-Tetrachloroethane	79-34-5	1.00E+05		µg/kg
Tetrachloroethene[c]	127-18-4	6.15E+05	3.75E+04 (PM)	µg/kg
Toluene	108-88-3	3.13E+07*	1.28E+05 (PM)	µg/kg
Toxaphene	8001-35-2	2.50E+04		µg/kg
1,2,4-Trichlorobenzene	120-82-1	9.23E+06*		µg/kg
1,1,1-Trichloroethane	71-55-6	7.97E+07*		µg/kg
1,1,2-Trichloroethane	79-00-5	2.36E+05		µg/kg
Trichloroethene[c]	79-01-6	1.96E+04	5.09E+05 (PD)	µg/kg
2,4,5-Trichlorophenol	95-95-4	1.02E+08*		µg/kg
2,4,6-Trichlorophenol	88-06-2	3.47E+06*		µg/kg
Vinyl acetate	108-05-4	9.63E+08*		µg/kg
Vinyl chloride[c]	75-01-4	4.12E+04	1.66E+02 (PM)	µg/kg
Xylene (total)	1330-20-7	2.04E+06		µg/kg
INORGANIC ANALYTES				
Aluminum	7429-90-5	2.28E+05*		mg/kg
Antimony	7440-36-0	4.09E+02*		mg/kg
Arsenic[c]	7440-38-2	2.22E+01	2.16E+01 (PD)	mg/kg
Barium	7440-39-3	2.64E+04*		mg/kg
Beryllium[c]	7440-41-7	9.21E+02*	2.15E+00 (PD)**	mg/kg
Cadmium (food)[c]	7440-43-9	9.62E+02*		mg/kg
Chromium III	16065-83-1	> 1E+06*		mg/kg
Chromium VI	18540-29-9	2.68E+02		mg/kg
Cobalt	7440-48-4	1.55E+03*		mg/kg
Copper	7440-50-8	4.09E+04*		mg/kg
Cyanide	57-12-5	2.04E+04*		mg/kg
Iron	7439-89-6	3.07E+05*		mg/kg
Lead[c]	7439-92-1	1.00E+03[e]	2.56E+01 (K)**	mg/kg
Lithium	7439-93-2	2.04E+04*		mg/kg
Manganese	7439-96-5	3.48E+03*		mg/kg
Mercury (elemental)	7439-97-6	2.52E+04*		mg/kg
Molybdenum	7439-98-7	5.11E+03*		mg/kg

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Table 3 - Soil Action Levels

Analyte	CAS Reference Number	Wildlife Refuge Worker [a]	Ecological Receptor [b]	Units
Nickel (soluble)	7440-02-0	2.04E+04*		mg/kg
Nitrate	14797-55-8	> 1E+06*		mg/kg
Nitrite	14797-65-0	1.02E+05*		mg/kg
Selenium	7782-49-2	5.11E+03*		mg/kg
Silver	7440-22-4	5.11E+03*		mg/kg
Strontium	7440-24-6	6.13E+05*		mg/kg
Tin	7440-31-5	6.13E+05*		mg/kg
Uranium (Total)		2.75E+03*[f]	6.78E+01 (PD)	mg/kg
Vanadium	7440-62-2	7.15E+03*	4.33E+02 (K)	mg/kg
Zinc	7440-66-6	3.07E+05*		mg/kg
RADIONUCLIDES [g]				
Americium-241[c]	14596-10-2	7.60E+01	1.90E+03	pCi/g
Plutonium-239/240[c]	10-12-8	5.00E+01/ 1.16E+02 [h]	3.80E+03	pCi/g
Uranium-234[c]	11-08-5	3.00E+02	1.80E+03	pCi/g
Uranium-235[c]	15117-96-1	8.00E+00	1.90E+03	pCi/g
Uranium-238[c]	7440-61-1	3.51E+02	1.60E+03	pCi/g
TO BE DETERMINED [i]				
Acenaphthylene	208-96-8	TBD		
Benzo(g,h,i)perylene	191-24-2	TBD		
4-Bromophenyl phenyl ether	101-55-3	TBD		
Dioxin	1746-01-6	TBD		
Furan	110-00-9	TBD		
Hexachlorocyclohexane, gamma	58-89-9	TBD		
Pendimethalin	40487-42-1	TBD		
Pentachlorobenzene	608-93-5	TBD		
Pentachloronitrobenzene	82-68-8	TBD		
Phenanthrene	85-01-8	TBD		
1,2,4,5-Tetrachlorobenzene	95-94-3	TBD		
Trifluralin	1582-09-8	TBD		

Notes:

[a] Values are based on PRG calculations for a wildlife refuge worker (see RFCA Appendix 3, Implementation Guidance Document Appendix N). Values represent either a 1×10^{-5} lifetime excess cancer risk or a HQ=1 for non-cancer toxicity. An "*" indicates that the value for the wildlife refuge worker is based on HQ=1 for non-cancer toxicity. All toxicity factors used in the calculations are from IRIS, from HEAST, or are approved by the NCEA.

[b] Listed values are based on PRG calculations for ecological receptors (see RFCA Appendix 3, Implementation Guidance Document Appendix N) and are based on Lowest-Observed-Adverse-Effects Level (LOAEL) end points. The action level listed is the lowest action level that was calculated for each of the five selected wildlife receptors: Preble's meadow jumping mouse and black tailed prairie dog (fossorial (burrowing) small mammals), mourning dove (small ground-feeding bird), terrestrial invertebrate (multiple species), and American kestrel (avian predator). The acronym in parentheses is the ecological receptor that is the basis for the Action Level shown: (PM) – Preble's Meadow Jumping Mouse; (PD) - Prairie Dog; (MD) Mourning Dove; (I) - Invertebrate; and (K) - Kestrel.

A "**" indicates that the action level is less than the mean plus 2 standard deviations of the Site background concentration.

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In these cases, the ecological action levels will default to background levels.

Inferential statistics are recommended to demonstrate cleanup to background levels.

[The Ecological Risk Working Group is evaluating all analytes listed in Table 3 to determine if the analyte is an ecological potential contaminant of concern (PCOC). PRGs will be calculated for analytes determined to be ecological PCOCs. Table 3 will be modified, as appropriate, based on this evaluation.]

[c] Sitewide human health analytes that will be analyzed during characterization at a minimum.
[d] > 1E+09 or >1E+06 indicates the action level has a calculated value greater than 1.00E+09 mg/kg (1,000,000,000 ug/kg) or 1.00 + 06 mg/kg

(1,000,000 mg/kg) respectively.

[e] U.S. Environmental Protection Agency (EPA). 1994. Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities. Office of Solid Waste and Emergency Response. Washington, D.C. Directive 9355.4-12

[f] The action level for total uranium in units of mg/kg accounts for the non-cancer risk. If uranium contamination reported in pCi/g is collocated with plutonium and/or americium contamination, the radiological action levels for uranium isotopes will be included in sum-of-ratios calculations. If uranium concentrations exceeds either action level, an action determination in accordance with ALF Section 5.3 is triggered.

[g] Wildlife refuge worker values for radionuclides are from the Task 3 Report and Appendices: Calculation of Surface Radionuclide Soil Action Levels for Plutonium, Americium, and Uranium (September 30, 2002). The values are for individual radionuclides and are based on a 1×10^{-5} excess cancer risk and the 5th percentile of the RSAL distribution. In order to account for the total dose from the multiple radionuclides, sum-of-ratios calculations will be applied to all radionuclides which are present above background. Actual values that trigger actions will therefore likely be lower than the values listed in this table. Action levels for other radionuclides will be determined as necessary and in the same manner used to calculate the values listed in this table.

[h] Although the Pu-239 calculated value at 1×10^{-5} risk is 116 pCi/g, the RFCA parties have agreed that accelerated actions are required for soil with Pu activity levels above 50 pCi/g.

[i] Analytes with the note "TBD" are being reviewed to determine if the analyte was used or could have been used at RFETS. If it is determined that the analyte was used or could have been used at RFETS, then a wildlife refuge worker action level will be determined in the same manner used to calculate the wildlife refuge worker values listed in this table.

The scientific notation used in this table indicates the power of ten by which the two-decimal place number is multiplied (e.g., 2.52E-02 = 2.52×10^{-2} = 0.0252)

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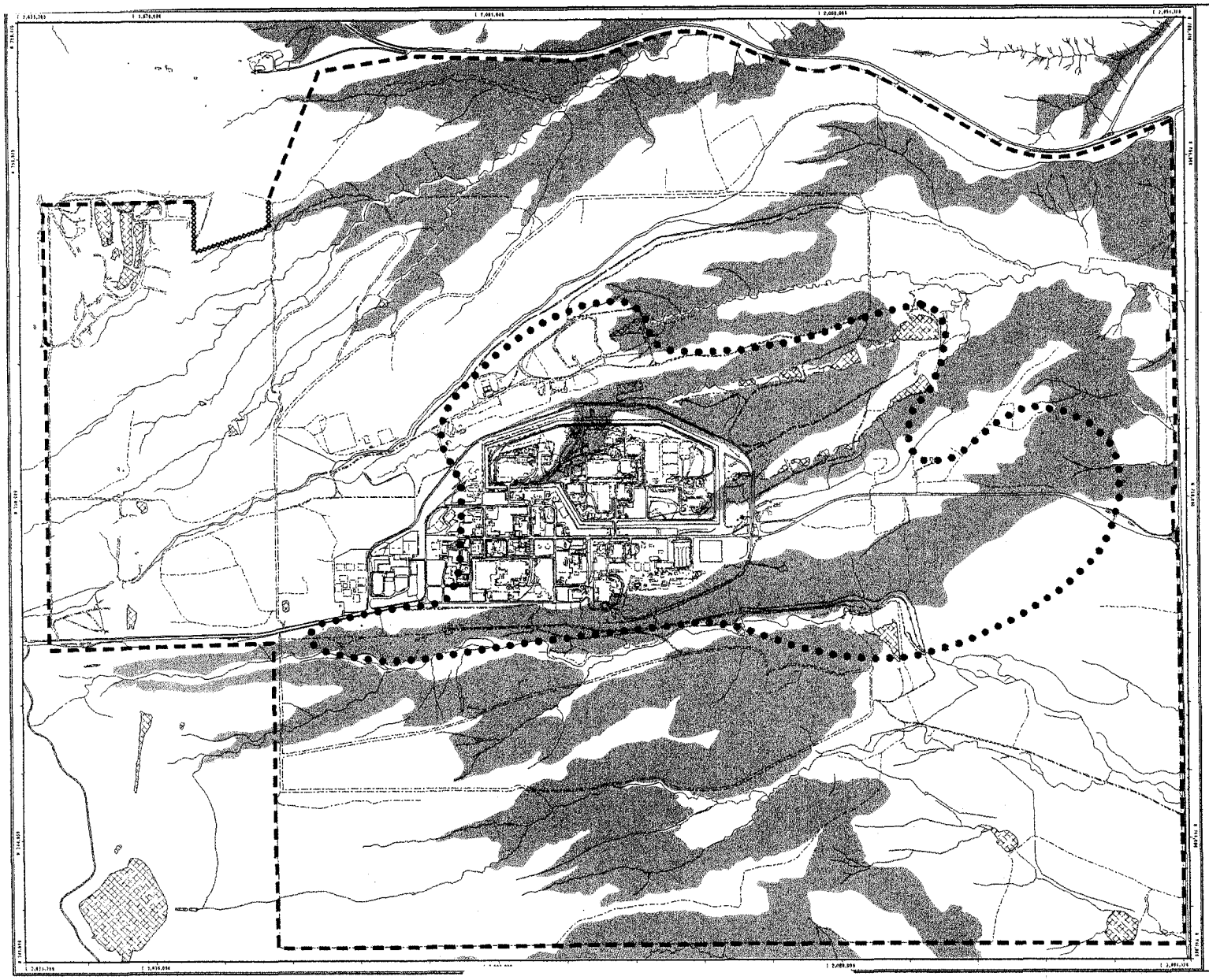

RFCA
Attachment 5
Figure 1

EXPLANATION

Areas of landslides and high erosion. Contaminated sites within these areas must be evaluated per Risk Screen 2 of Figure 3.

The anticipated boundary of areas that will be subject to institutional controls is subject to modification based upon characterization, future response actions, the results of the comprehensive risk assessment, and the final remedial/corrective action decision in the final CAD/ROD. See Section 1.2.

Approximately 25 acres identified as proposed Wind Technology Expansion Area in Rocky Flats National Wildlife Refuge Act 2001.

Standard Map Features

- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Rocky Flats Environmental Technology Site boundary
- Paved roads
- Dirt roads

NOTES:

References:

1. Report on Soil Erosion and Surface Water Sediment Transport Modeling for the Actinide Migration Evaluation at the Rocky Flats Environmental Technology Site (August 2000)
2. Geologic Mapping: Shroba, R.R., and Carrara, P.E. Preliminary Surficial Geologic Map of the Rocky Flats Plant and Vicinity, Jefferson and Boulder Counties, Colorado: U.S. Geological Survey Open-File Report 94-162, Scale 1:6000 Site source of topo base; see OFR 94-162 (on map)

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

April 15, 2003

NT_Svr w:/projects/fy2003/03-0010/figure1-asize_03-0293_v1.ami

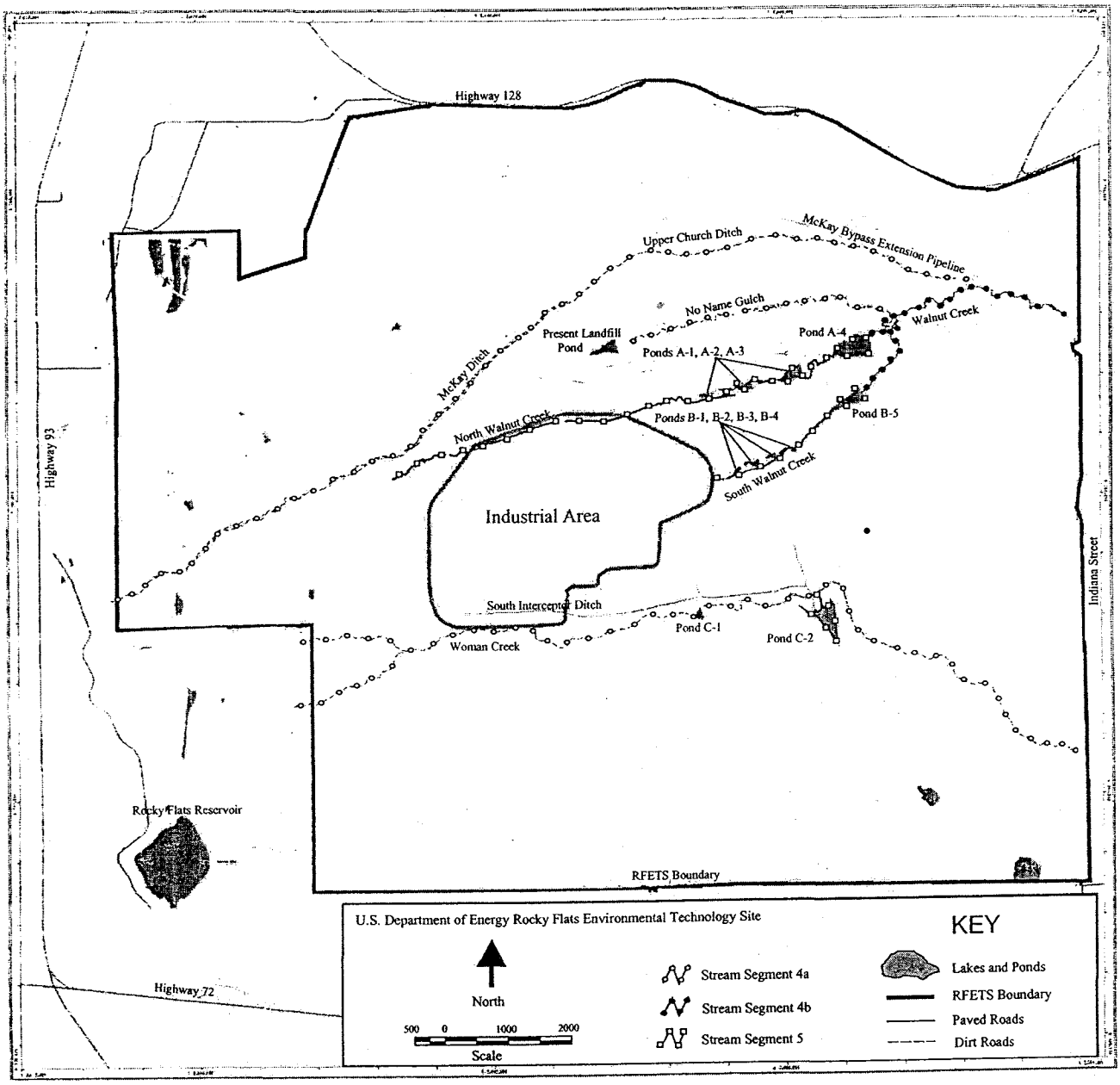

Figure 2
Sketch of Stream Segments
4a,4b and 5

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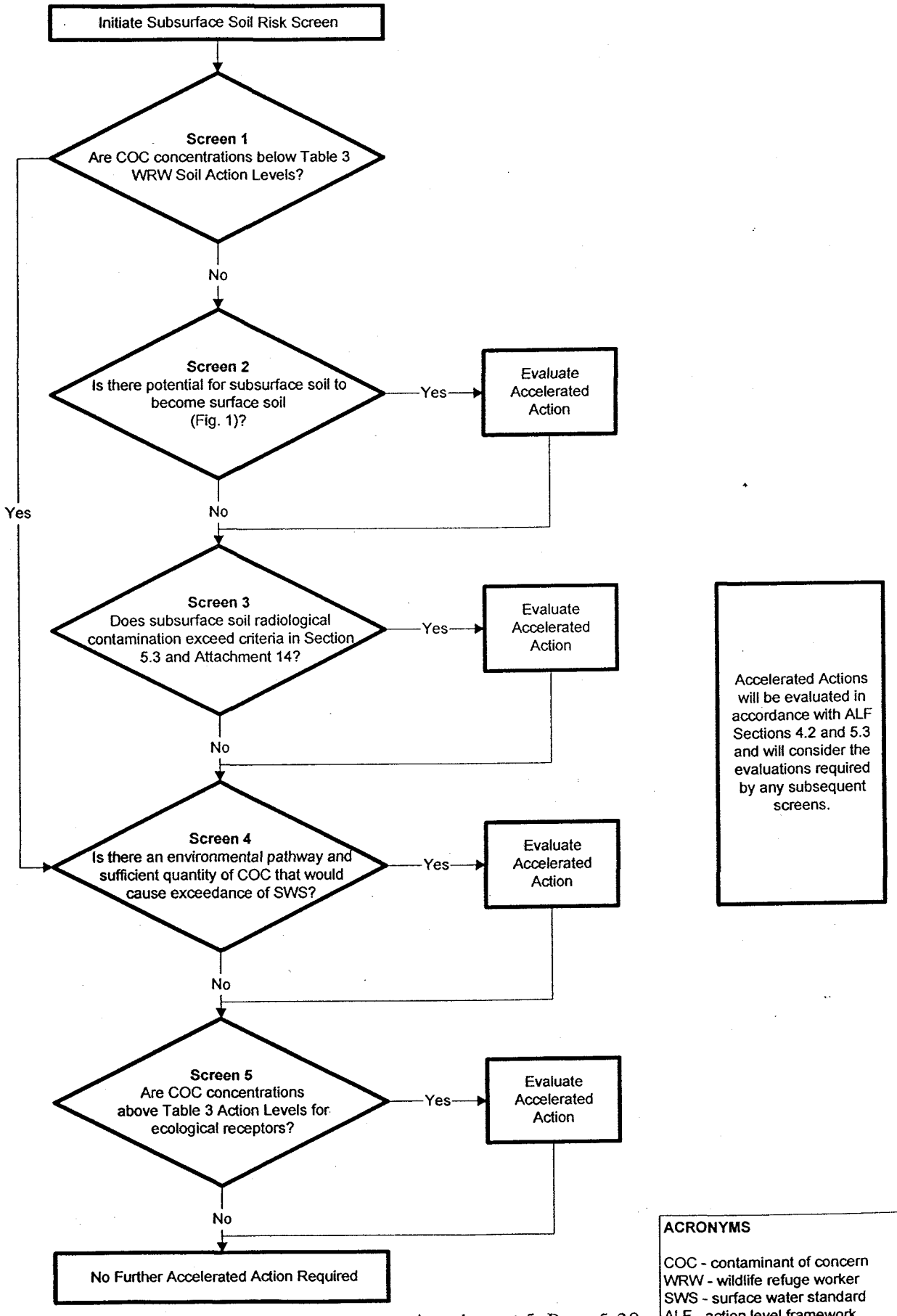
RFCA Attachment 5
Figure 3: Subsurface Soil Risk Screen



ACRONYMS

COC - contaminant of concern
WRW - wildlife refuge worker
SWS - surface water standard
ALF - action level framework

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ATTACHMENT 10

RCRA/CHWA CLOSURE FOR INTERIM STATUS UNITS

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RCRA/CHWA Closure for Interim Status Units

I. For closure of the Solar Evaporation Ponds (IHSS 101) and the Present Landfill (IHSS 114), which are both subject to RCRA/CHWA interim status requirements, and which will be closed in-place, DOE must, at a minimum:

A. Place a cap/cover over the unit using two design criteria:
   1. "design concentration limits (DCLs)" calculated to be protective of the most directly impacted surface water using the water quality standards listed in Table 1 of Attachment 5.
      - DCLs would be calculated on a unit-specific basis for ground water passing the downgradient unit boundary. Since closure remedies must last beyond the period of active remediation, DCLs would be back-calculated from the surface water quality standards listed in Table 1 of Attachment 5.
      - DCLs assume an ongoing release from the unit, but at levels that are protective of human health and the environment, consistent with the RFETS Vision.
      - DCLs, as a cap/cover design criteria for closure, will be presented within the appropriate decision documents.
   2. For units with existing ground water contamination, the cap/cover must be designed to control any remaining source to the extent that further contaminant contribution to the plume from the unit is not capable of enlarging the plume or increasing contaminant concentrations within the plume. The parties recognize that existing plumes may continue to migrate or expand independent of continued source contamination loading. As a design criteria for a cap/cover, the unit/source must have its rate of continuing release controlled to the extent necessary to prevent enlarging the plume or increasing contaminant concentrations.

B. After the cap/cover has been installed, points of compliance (POCs) for each unit will be determined. The POCs will generally be at the unit boundaries, but may:
   1. utilize existing monitoring wells to the greatest extent possible, and
   2. utilize "waste management areas" (see CHWR, Section 264.95(b)(2)). For the Solar Ponds, the waste management area would be the area prescribed by a line circumscribing all five surface impoundments, including the area covered by the outermost berms of each. For the Present Landfill, the waste management area would be the entire area in which waste has been placed. If waste management areas are used, POCs may be chosen at the downgradient limit of the area rather than the downgradient limit of each individual unit.

C. At the POCs, compliance would be based on:
   1. non-exceedance of "alternate concentration limits (ACLs)" at units/areas with either no ground water contamination or levels of contamination less than the ACLs.
   2. Generally declining contamination levels for units/areas with pre-existing ground water contamination levels greater than the ACLs (this assumes placement of a DCL cap/cover is in place).
   3. As with DCLs, ACLs would be calculated on a unit/area specific basis for ground water passing the POCs. Since closure remedies must last beyond the period of active remediation, ACLs would be back-calculated from the surface water quality standards listed in Table 1 of
   4. Attachment 5 so as to be protective of the most directly impacted surface water. To the extent that points of compliance are unit boundaries, the ACLs should equal the DCLs for those units. ACLs may be different from the DCLs when several units have been consolidated within a waste management area.

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5. The POCs and ACLs will be designated within the appropriate decision document and approved by the regulators when the decision document is approved after appropriate public review and comment.

D. Closure requirements will not extend to remediation or management of existing ground water contamination from these units except as delineated in B.2 above. Existing ground water contamination will be addressed through coordinated RCRA corrective action/CERCLA remedial action, as described in RFCA.

E. Other large-scale remedial actions taken at RFETS may enhance the ability to comply with closure requirements. For instance, units that can benefit from large-scale dewatering or ground water diversion projects may be able to demonstrate ACL compliance with a minimal non-standard cover/cap.

F. Any materials generated during implementation of a closure action that are also generated as part of a corrective action will be considered "remediation wastes" for the purpose of CAMU utilization.

G. All post-closure requirements, including monitoring, maintenance, access control, and security requirements, will be delineated in the Closure Plan, IM/IRA, or CAD/ROD decision document for the unit or waste management area.

II. To meet the RCRA/CHWA closure requirements for all other IHSSs subject to interim status requirements (portions of the former OU 9, OU 10 and OU 13 consisting of tanks, ancillary equipment, and storage pads —See Attachment 3), DOE must, at a minimum:

A. Remove all wastes from the units.

B. If the units have not had a release, close the units and associated ancillary equipment. For the tanks and storage areas that make up this universe of units at RFETS, this should be able to be accomplished via:
   1. decontamination of the unit and any ancillary equipment, and/or

   2. removal and appropriate disposition/disposal of the unit and any ancillary equipment.

   Closure via 1. or 2. above should result in "clean" closure (i.e., no ongoing responsibility for post-closure care) and DOE may obtain complete closure certification.

C. If the units have had a release, DOE should proceed through the activities outlined II.B above. However, DOE must also remove all contaminated soil affected by the unit unless a demonstration can be made that the contaminated soil cannot practicably be removed (265.197(a)). If this demonstration can be made and soil contaminated by a release from any of these units is left in place, the unit must close as a landfill (265.197(b)). In addition, back-filling a tank and its ancillary equipment with material that effectively and permanently immobilizes any remaining contaminants would be an acceptable means of closure in place. If either contaminated soil or a back-filled tank is left in place, Section I of this attachment, including post-closure requirements, would apply. If the contaminated soils and the tank can be practicably removed and the requirements of II.B.1 or II.B.2

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have been accomplished, the unit can be "clean" closed with no ongoing responsibility for post-closure care and DOE may obtain complete closure certification.

D. Closure requirements will not extend to remediation or management of existing ground water contamination from these units except as delineated in I.B.2 above. Existing ground water contamination will be addressed through coordinated RCRA corrective action/CERCLA remedial action, as described in RFCA.

E. After initially removing hazardous waste inventory from the units, all wastes generated during implementation of a closure action will be considered" remediation wastes" for the purpose of CAMU utilization.

F. All post-closure requirements, including monitoring, maintenance, access control, and security requirements, will be delineated in the Closure Plan, IM/IRA, or CAD/ROD decision document for the unit or waste management area.

III. CDPHE and DOE agree that past decisions regarding IHSSs (or portions thereof) at RFETS subject to closure requirements will be reviewed (See Attachment 3). Based upon this review, and in consideration of more complete information, it is the expectation of the CDPHE and DOE that several of these IHSSs may not be subject to interim status closure requirements.CDPHE and DOE have reviewed the information related to the Original Process Waste Lines (OPWL), IHSS 121 of former OU-9 and other IHSSs. The OPWL network originally consisted of approximately 35,000 feet of pipeline. Parts of the OPWL were converted to New Process Waste Lines, or other systems. The OPWL system now consists of approximately 29,000 feet of pipeline. A 1986 RCRA Compliance Order and CERCLA Agreement granted interim status to mixed waste units including the process waste lines that were in use at that time (NPWL) and did not include OPWL. That agreement is the reason that OPWL are not subject to interim status closure requirements.

IV. CDPHE agrees that tank system interim status units identified in Part II of this Attachment may qualify for closure in accordance with standards that are alternative to the requirements specified in Part II of this Attachment, as provided in revisions to the Colorado Hazardous Waste Regulations, 265.110 (d). CDPHE also agrees that IHSS 101 and/or IHSS 114 identified in Part I of this Attachment may qualify for closure in accordance with these alternative requirements, but more information is needed to make a determination. Because the alternative requirements in 265.110(d) will protect human health and the environment, such qualified interim status units are eligible to be closed in accordance with the performance standard in 265.111 (a) and (b) in lieu of the requirements specified in Parts I and II of this Attachment. Closure in accordance with these alternative requirements will meet the following :

A. Be protective of the wildlife refuge worker to a lifetime excess cancer risk of $1x10^{-5}$ and;

B. Provide that the concentration of contaminants do not result in a Hazard Index (HI) of greater than 1 for a wildlife refuge worker and;

C. Assure that contaminants that exceed the ecological action level for target species, listed in Table 3, Soil Action Levels, in Attachment 5 do not pose an unacceptable hazard considering the target species and the exposure unit for that species, and the location, areal extent, and concentration of contamination.

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ATTACHMENT 14

ORIGINAL PROCESS WASTE LINES (OPWL) SUBSURFACE SOIL APPROACH

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ORIGINAL PROCESS WASTE LINES (OPWL) SUBSURFACE SOIL APPROACH

The characterization and removal approach for the contaminated soil associated with reported or suspected OPWL leaks and associated valve vaults is defined below.

I. GENERAL

All OPWLs within 3 feet of the surface will be removed. Soil contaminated at concentrations above the soil action level for plutonium and americium by any leaks from OPWLs within 3 feet of the surface will be removed to a depth of 3 feet. To minimize the risk of mobilizing and transporting contaminants into subsurface soil, flushing of the OPWL lines is not anticipated or required.

A. All soils associated with OPWLs that are between 3 and 6 feet deep with reported leak locations will be directly sampled at the reported leak location to 8 feet below the surface. Approximately 27 initial sampling locations based on reported leaks between 3 and 6 feet have been identified. Sampling will consist of biased sampling directly into the soils surrounding the reported leak location. If initial sampling indicates contamination >3nCi/g plutonium, then subsequent step-out sampling will be performed. Step-out sampling will be approximately two meters on either side of the initial sampling location, perpendicular to the piping run, and between five and ten meters on either side of the initial sampling location in the direction of the piping as indicated in Table A14-1. Additional soil sampling will be designed to adequately characterize soil contamination to implement the soil risk screen in Attachment 5, "RFETS Action Levels and Standards Framework for Surface Water, Ground Water and Soils" (ALF), Figure 3, based on the initial and step-out sample results.

B. OPWL sections where leaks are suspected to have occurred between 3 and 6 feet below the surface but where specific leak locations are not identified will be characterized. Approximately 58 initial sampling locations based on suspected leaks between 3 and 6 feet have been identified. Sample locations are based on OPWL structures with higher leak potential and material of construction. The sampling strategy for Original Process Waste Line (OPWL) Leaks less than six feet deep with uncertain leak locations is based on the Operable Unit 9 Final Phase I RCRA Facility Investigation/ Remedial Investigation (RFI/RI) Work Plan Dated February 1992. Site walks and interviews were conducted under this work plan in 1994-1995. These identified sampling locations based on the rationale in the RFI/RI work plan. The same locations will be used for sampling sections of the pipeline where the exact location of the leak could not be ascertained. If initial sampling indicates contamination >3nCi/g plutonium, then subsequent step-out sampling will be performed. Step-out sampling will be approximately two meters on either side of the initial sampling location, perpendicular to the piping run, and between five and ten meters on either side of the initial sampling location in the direction of the piping as indicated in Table A14-1. Additional soil sampling will be designed to adequately characterize soil contamination to implement the soil risk screen in Attachment 5, "RFETS Action Levels and Standards Framework for Surface Water, Ground Water and Soils" (ALF), Figure 3, based on the initial and step-out sample results.

Characterization in accordance with this attachment and in accordance with the Industrial Area Sampling and Analysis Plan (IA SAP), of under building contamination (UBC), potential areas of concern (PACs), other Individual Hazardous Substance Sites (IHSSs), and areas between

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C. IHSS's that are not yet characterized that overlie OPWLs will provide adequate characterization of soils for all other OPWLs. In addition, the RFETS groundwater monitoring network required by ALF Section 3.4 provides analytical data on the presence and mobility of subsurface soil column contaminants. Action determinations for groundwater contamination are made in accordance with ALF Section 3.3. Samples for OPWL will extend to 8 feet below the surface in order to quantify any remaining contamination.

If plutonium concentration is >3 nCi/g between 3 and 6 feet below the surface and the areal or volumetric extent of contamination exceeds the trigger values provided in Table A14-1,DOE shall remove radionuclide contamination to less than 1 nCi/g.

Table A14-1

Contamination Level (nCi/g)	Areal Extent Limit (m^2)	Volume Extent Limit (m^3)	Step-out Sample Locations
7	0	0	None
6	40	25	2m x 5m
5	50	31	2m x 6m
4	60	37	2m x 7.5m
3	80	50	2m x 10m

Areal or volumetric extent of contamination will be determined based on the "step-out" sampling approach described in Sections A & B and Table A14-1. An accelerated action would be triggered if plutonium contamination exceeds the values in Table A14-1 or if contamination from other contaminants of concern pose a lifetime excess cancer risk greater than $1x10^{-5}$or a Hazard Index >1.

D. An attempt will be made to perform plutonium speciation in the soil contaminated by OPWL leaks at each of 3 locations where known leaks have occurred. This will be done to determine the mobility profile of plutonium in the soil directly around the leaks.

E. DOE will remove valve vaults down to a minimum of 6 feet below the surface. Valve vaults deeper than 6 feet below the surface will be removed to the extent practicable giving due consideration to the safety of workers (there are approximately 30 total valve vaults). DOE will follow the ER RSOP Notification process for valve vault removal. Practicality is based on three aspects, listed in order of priority - safety, technical, and cost/benefit. These aspects are not necessarily independent. For example, while a condition may arise that makes removing a valve vault unsafe or not technically feasible using normal methods, safety or engineering measures could be implemented to complete the job safely. However, the cost may be prohibitive when weighed against the potential benefit to the refuge worker and the environment. Safety considerations are predominantly associated with confined spaces and working in deep excavations. Technical feasibility includes prohibitions of layback due to other structures and groundwater level. The practical approach includes the following:

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1. Evaluate conditions for valve vaults deeper than 6 feet to determine if the potential benefit to the refuge worker and the environment justifies the cost. If costs do not justify complete removal, remove the valve vault to a depth of at least 6 feet.
2. Evaluate the need for grouting and back filling the remaining portion of the vault and any associated OPWLs.

F. Once an OPWL or associated valve vault is opened, and where safe and practical, the pipe will be grouted or foamed to minimize the possibility of mobilizing contamination inside the OPWL.