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C. A. BICHER	✓	✓
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D. A. RANDALL	✓	✓
CORRES. CONTROL	X	
ADMIN RECORD	X	✓
PROJECT FILE	X	
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IN REPLY TO RFP CC NO: N/A

ACTION ITEM STATUS:
PARTIAL/OPEN ☐
N/A CLOSED ☐

LETTER APPROVALS:

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53490

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EG&G ROCKY FLATS, INC.
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April 26, 1995

95-RF-03766

Kurt Muenchow
Environmental Restoration Division
DOE, RFFO

OPERABLE UNIT 5 (OU5) WOMAN CREEK PRIORITY DRAINAGE: EXPOSURE ASSESSMENT TECHNICAL MEMORANDUM (EATM) #12 - CAB-044-95

Action: Transmit the response to comments to the Environmental Protection Agency (EPA) and the Colorado Department of Public Health and Environment (CDPHE)

This letter transmits the Response to Comments that were submitted by the EPA and the CDPHE on the Draft-Final Exposure Assessment Technical Memorandum #12 for Operable Unit 5.

The comment responses have been reviewed by both the EPA and CDPHE and satisfactorily dispositioned. The EATM will be finalized to incorporate these comments.

Please transmit these Response to Comments to the EPA and the CDPHE. Contact me at 966-9100 with any additional questions regarding this transmittal.

CAB. 1

Carol A. Bicher
Operable Unit No. 5 Closures
Environmental Restoration Program Division

CAB:cb

Orig. and 1 cc - K. Muenchow

Attachment:
As Stated

A-OU05-000363

REVIEW COMMENT SHEET

Return to: Carol Bicher
8663 OU 5,6, and 7 Closures 9100 080
FAX Name Ext. Location

Reviewer: Joe Schieffelin, CDPHE

Please review the attached procedure: EATM Draft-Final, Rev. 1
Number Rev. Draft

Title: OU5, Tech Memo No. 12, Exposure Scenarios

Comment Due Date: _____

[X] Internal Review [ ] Parallel Review [ ] Verification [ ] Validation [ ] Revalidation

General (G) comments require resolution but do not require resolution acceptance. Mandatory (M) comments require resolution and resolution acceptance. 1-88000-PP-004 provides complete definitions of General and Mandatory comments.

ITEM G or M	PAGE	SECTION OR STEP	COMMENT	RESOLUTION	Resolution accepted INIT/DATE
		Table 3-4	"Dermal contact with soil" should be inserted into the AOC 1 and AOC 2 columns for the current offsite resident scenario. "Groundwater ingestion" and "indoor VOC inhalation" should be inserted into the AOC 1 and AOC 2 columns for the future onsite resident scenario. Later in this document (Chapter 4), these pathways are included for these receptors, so this omission appears to be an oversight.	The OU5 EATM executive summary will state that the land use scenarios are consistent with the recommendations of the Rocky Flats Future Site Use Working Group. The onsite and offsite residential receptors will be deleted from the OU5 risk assessment.	
		Section 4.4	The reference to concentrations exceeding background levels for organics in the last line on page 4-3 should be deleted.	The reference will be deleted.	
		Section 4.5.1	As stated, fish ingestion from fish caught in Woman Creek is likely a negligible route of exposure. Since the Woman Creek drainage probably acts as a sink for the whole southern portion of Rocky Flats, however, the potential effects of OU5 contamination on onsite surface water and sediments as well as on Standley Lake, Mower Reservoir, and other offsite areas downstream should probably be considered.	Ingestion of fish is potentially an applicable pathway for residential receptors only. The residential receptor will be deleted from the OU5 EATM.	

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8663 OU 5,6, and 7 Closures 9100 080
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Reviewer: Joe Schieffelin, CDPHE

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			DOE is probably correct in its assessment that agriculture in the offsite areas around Rocky Flats is not likely to continue in the future because of poor economics. DOE has not, however, given adequate documentation to its assertion that homegrown beef ingestion is currently a negligible exposure pathway in the Rocky Flats area.	This paragraph will be replaced with text that states the current and future offsite residential receptors may have potentially complete pathways for beef ingestion. OU5 COCs only partially contribute to these receptors, therefore, these receptors will be deleted from the OU5 risk assessment.	
		Sections 4.5.2.1 and 4.5.2.5	Although root uptake of contaminants by fruits and vegetables is considered for future onsite residents, this pathway is not taken into account for offsite residents (pages 4-9) and 4-17). Because this release mechanism will be included in calculations for potential onsite residents, its inclusion for offsite residents may be insignificant. However, a justification for omitting potential contaminant concentrations due to root uptake in an offsite scenario should be stated.	The offsite residential receptor will be deleted from the OU5 EATM.	

REVIEW COMMENT SHEET

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8663 OU 5,6, and 7 Closures 9100 080
FAX Name Ext. Location

Reviewer: Joe Schieffelin, CDPHE

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Comment Due Date: _____

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ITEM G or M	PAGE	SECTION OR STEP	COMMENT	RESOLUTION	Resolution accepted INIT/DATE
		Section 4.5.2.2	In the first sentence on page 4-10, "future" onsite worker should be changed to "current" onsite worker. In addition, DOE continues to invoke its Health and Safety program for workers as a means of protection. Under CERCLA, the baseline risk assessment needs to be performed without taking any institutional controls into account. An incomplete pathway is indicated by the fact that patrols by security workers consist of vehicular travel and that contact with surface water is unlikely. DOE does not need to invoke its H&S program.	The word "future" in the first sentence will be changed to "current." Additionally, the reference to invoking the H&S plan will be removed.	
		Section 4.5.2.3	If a future onsite gravel miner is potential receptor, then contact with seep/groundwater is a potential exposure pathway.	The mining scenario will be deleted from the OU5 EATM. Text will be added in section 3 to state that there is not enough minable aggregate in OU5 for mining to be feasible.	
		Section 4.5.2.5	On page 4-16, the sentence, "Of these primary release mechanisms, all except volatilization provide potential exposure routes to the future offsite resident," does not agree with the discussion in the rest of this section indicating that Woman Creek loses water to groundwater east of the C-2 Pond and therefore volatilization from groundwater can be considered a potential, although insignificant, pathway.	The off site residential receptor will be deleted from the OU5 EATM.	

REVIEW COMMENT SHEET

Return to: Carol Bicher
8663 OU 5,6, and 7 Closures 9100 080
FAX Name Ext. Location

Reviewer: Joe Schieffelin, CDPHE

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ITEM G or M	PAGE	SECTION OR STEP	COMMENT	RESOLUTION	Resolution accepted INIT/DATE
		Attachment 1	All exposure factors that were modified in the December 12, 1994 Template meeting among technical staff of the three agencies should be inserted in the tables in this section. The exposure factors listed here are not acceptable, especially those that are identical for both the RME and central tendency.	The Rocky Flats Site-Specific Exposure Factors for Quantitative Human Health Risk Assessment, as agreed to by EPA, CDPHE and DOE, (dated 03/17/95), will be incorporated in Attachment 1.	

Reviewer: (Comments not signed by Reviewer/POC will be considered unofficial and not subject to resolution)

☐ No Comments

☐ This procedure revision has no impact or relevance to our discipline or organization and we waive need to concur. We acknowledge this concurrence waiver does not affect our responsibility to implement the requirements of this procedure when needed.

Name _____ Signature _____

Ext./Pager/Fax _____ Bldg./Dept./AGM _____ Date _____

Resolutions Accepted:

_____ _____
Signature Date

If questions on content, please call the SME:

Win Chromec 8641/5144
Name Ext.

NOTE: These reviews will be completed by qualified reviewers in accordance with 1-88000-PP-004 in concert with 1-88000-PP-001 and 1-88000-PP-003.

REVIEW COMMENT SHEET

Return to: Carol Bicher
8663 OU 5,6, and 7 Closures 9100 080
FAX Name Ext. Location

Reviewer: Bonnie Lavelle, EPA

Please review the attached procedure: EATM Draft-Final, Rev. 1
Number Rev. Draft

Title: OU5, Tech Memo No. 12, Exposure Scenarios

Comment Due Date: _____

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ITEM G or M	PAGE	SECTION OR STEP	COMMENT	RESOLUTION	Resolution accepted INIT/DATE
G			No mention is made in TM 12 of the work of the Future Site Uses Working Group. The charge of this group is to provide direction and make recommendations to DOE, EPA, CDPHE, and local decision makers regarding the future use of the Rocky Flats site. Although at this time, the group's work should be considered preliminary, it warrants serious consideration and discussion in this technical memorandum. The preliminary options generated by the group indicate that open space use includes recreational and/or interpretive uses. The areas being considered for more limited access (such as ecological reserve use) are generally on the periphery of the buffer zone. Areas close to the present industrial area are being considered for more recreational uses. This information needs to be presented in this document and taken into account in developing exposure scenarios and parameters for OU5.	The OU5 EATM executive summary will state that the land use scenarios are consistent with the recommendations of the Rocky Flats Future Site Use Working Group. The onsite and offsite residential receptors will be deleted from the OU5 risk assessment. The Rocky Flats Site-Specific Exposure Factors for Quantitative Human Health Risk Assessment, dated 03/17/95, will be used.	

REVIEW COMMENT SHEET

Return to: Carol Bicher
8663 OU 5,6, and 7 Closures 9100 080
FAX Name Ext. Location Reviewer: Bonnie Lavelle, EPA

Please review the attached procedure: EATM Draft-Final, Rev. 1
Number Rev. Draft

Title: OU5, Tech Memo No. 12, Exposure Scenarios

Comment Due Date: _____

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ITEM G or M	PAGE	SECTION OR STEP	COMMENT	RESOLUTION	Resolution accepted INIT/DATE
	Pg. 4-6	Section 4.5.1, Fourth Paragraph	This paragraph indicates that ingestion of beef from livestock is a negligible exposure pathway for off-site residential receptors. EPA believes that the off-site receptors should not be evaluated in OU5 but in OU3 and in a comprehensive sitewide risk assessment. When these assessments are performed, the ingestion of homegrown beef must be included. Although the contribution of this pathway to overall exposure may be negligible, it is a complete pathway and should be evaluated for current and future off-site receptors in agriculturally zoned areas. All potentially complete exposure pathways should be quantitatively evaluated in the Human Health Risk Assessment (HHRA).	This paragraph will be replaced with text that states the current and future offsite residential receptors may have potentially complete pathways for beef ingestion. OU5 COCs only partially contribute to these receptors, therefore, these receptors will be deleted from the OU5 risk assessment	
G	Pg. 4-13	Second Paragraph	While exposure to surface water may be an incomplete pathway for office workers, it may be complete for construction workers and should be assessed quantitatively in the HHRA.	It is believed that construction will not be taking place in the OU5 drainage areas, therefore, exposure to surface water for the construction worker is considered an incomplete pathway. The bounding scenario for exposure to surface water is expected to be the open space receptor that will be added to the EATM.	

REVIEW COMMENT SHEET

Return to: Carol Bicher
8663 OU 5,6, and 7 Closures 9100 080
FAX Name Ext. Location

Reviewer: Bonnie Lavelle, EPA

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Number Rev. Draft

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ITEM G or M	PAGE	SECTION OR STEP	COMMENT	RESOLUTION	Resolution accepted INIT/DATE
G	Pg. 4-17	Third Paragraph	The text states that external irradiation exposure to off-site residents is an incomplete pathway because the maximum activity of plutonium detected in off-site samples was below a "conservative (health protective) risk-based level of 3.43 pCi/g for long-term residential exposure to soil." Risk-based concentrations should not be used to evaluate the completeness of exposure pathways. External irradiation should be evaluated for all detected or modeled concentrations of gamma emitting radioactive COCs in the risk assessments where off-site receptors are considered.	The offsite residential receptor will be deleted from this section of the OU5 HHRA. This section will be updated to discuss the future onsite open space receptor and external irradiation will be discussed as a potentially complete pathway.	

REVIEW COMMENT SHEET

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8663 OU 5,6, and 7 Closures 9100 080
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		Attachment 1, General	The Exposure Scenarios Technical Memorandum does not consider recreational use. EPA understands that the open space scenarios currently being discussed as options for Rocky Flats do not preclude access to the site for recreational purposes and suggest that recreational uses are likely. Please develop and submit the recreational scenario for approval.	An open space receptor will be added to the OU5 HHRA for all three AOCs. The Rocky Flats Site-Specific Exposure Factors for Quantitative Human Health Risk Assessment, as agreed to by EPA, CDPHE and DOE, (dated 03/17/95), will be used.	
			EPA and CDPHE request that DOE further develop the ecological worker scenario. At this time it is unclear what DOE is envisioning for future use of RFETS. More concise definition of the potential ecological reserve use of RFETS along with supporting rationale will help reduce the uncertainties in the exposure parameters for associated receptors.	The Rocky Flats Site-Specific Exposure Factors for Quantitative Human Health Risk Assessment, as agreed to by EPA, CDPHE and DOE, (dated 03/17/95), will be used. Comment noted.	
			EPA believes it is necessary for all agencies to begin work on the quantitative uncertainty analysis at this time. In generating the parameter distributions necessary for the uncertainty analysis, the central tendency values will be defined.	The Rocky Flats Site-Specific Exposure Factors for Quantitative Human Health Risk Assessment, as agreed to by EPA, CDPHE and DOE, (dated 03/17/95), will be used. Comment noted.	

REVIEW COMMENT SHEET

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8663 OU 5,6, and 7 Closures 9100 080
FAX Name Ext. Location

Reviewer: Bonnie Lavelle, EPA

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ITEM G or M	PAGE	SECTION OR STEP	COMMENT	RESOLUTION	Resolution accepted INIT/DATE
		Exposure Pathway Specific Pathways	1. Soil Ingestion: The soil rate for an ecological worker should be 106 mg/day (RME) and 33 mg/day (mg/day) (CT) based on the Rocky Mountain Arsenal (RMA) exposure assessment work. Likewise, the exposure frequency and duration for this receptor should be 242 days/year for 19 years (RME) and 225 days/year for 7 years (CT). (A copy of the RMA exposure assessment was provided to EG&G on December 12, 1994 and they agreed to consider it.) The fraction ingested from contaminated source parameter must be set at 1.00 for the RME for all receptors. The chemical specific matrix effect parameter must be formally transmitted in a separate letter to EPA and CDPHE for their approval before submittal for the baseline risk assessment. This will avoid potential problems in the draft RFI/RI report.	The Rocky Flats Site-Specific Exposure Factors for Quantitative Human Health Risk Assessment, as agreed to by EPA, CDPHE and DOE, (dated 03/17/95), will be incorporated into the OU5 EATM. COC chemical specific matrix effect parameters will be documented and transmitted to EPA and CDPHE for review.	

REVIEW COMMENT SHEET

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8663 OU 5,6, and 7 Closures 9100 080
FAX Name Ext. Location

Reviewer: Bonnie Lavelle, EPA

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ITEM G or M	PAGE	SECTION OR STEP	COMMENT	RESOLUTION	Resolution accepted INIT/DATE
			2. Soil/Dust Inhalation: The inhalation rates for the construction worker and ecological worker need to be re-examined. EPA believes the rate for the ecological worker should be 1.4 m^3 per hour based on information in the Exposure Factors Handbook (EPA/600/8-89/043, March 1989). The most current data on PM-10 measurements at RFETS should be considered in determining the respirable fraction value. EPA and CDPHE insist that the location of the PM-10 monitors be considered for their appropriateness for inclusion in the calculation for average PM-10 values. The 24-hour maximum PM-10 value will be used for the RME. The respiratory deposition factor of 0.85 from the RMA exposure assessment should be considered for use at RFETS.	The Rocky Flats Site-Specific Exposure Factors for Quantitative Human Health Risk Assessment, as agreed to by EPA, CDPHE and DOE, (dated 03/17/95), will be incorporated into the OU5 EATM. Locations of PM-10 monitors will be provided in the RI.	
			3. Soil/Dust Dermal Contact: Similar to the comments on the soil ingestion pathway, the fraction contracted from contaminated source must be 1.0 for all receptors for the RME. Delete the reference to "reasonable worst case" in footnote (20) as this term is obsolete. Its use in this document may cause confusion.	The Rocky Flats Site-Specific Exposure Factors for Quantitative Human Health Risk Assessment, as agreed to by EPA, CDPHE and DOE, (dated 03/17/95), will be incorporated into the OU5 EATM. "Reasonable worst case" will be deleted.	

REVIEW COMMENT SHEET

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8663 OU 5,6, and 7 Closures 9100 080
FAX Name Ext. Location

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			4. Surface Water/Suspended Sediment Ingestion: The ecological worker scenario needs to be further defined in order to understand likely exposure frequency. EPA suggest that, at a minimum, surface water and sediment sampling activities are likely to occur once per month or 12 times per year.	The Rocky Flats Site-Specific Exposure Factors for Quantitative Human Health Risk Assessment, as agreed to by EPA, CDPHE and DOE, (dated 03/17/95), will be incorporated into the OU5 EATM.	
			5. Surface Water Dermal Contact: Similar to above comment, the exposure frequency parameter appears to be too low.	The Rocky Flats Site-Specific Exposure Factors for Quantitative Human Health Risk Assessment, as agreed to by EPA, CDPHE and DOE, (dated 03/17/95), will be incorporated into the OU5 EATM.	
			6. Homegrown Produce Ingestion: The proposed "washoff factor" is generally not used in EPA and CDPHE risk assessments. EG&G provided the reference for their proposed factor (Transuranic Elements, Volume II) to EPA and CDPHE on December 12, 1994. Because the reference is an older document, it is appropriate to look at the RMA off-post exposure assessment. Ingestion of homegrown produce was considered in the assessment and no washoff factor was used. EPA and CDPHE believe that if a "washoff factor" is used at all on RFETS, it should be limited to the CT estimate.	The Rocky Flats Site-Specific Exposure Factors for Quantitative Human Health Risk Assessment, as agreed to by EPA, CDPHE and DOE, (dated 03/17/95), will be incorporated into the OU5 EATM. The residential receptor will be deleted from the OU5 HHRA.	

REVIEW COMMENT SHEET

Return to: Carol Bicher
8663 OU 5,6, and 7 Closures 9100 080
FAX ' Name Ext. Location Reviewer: Bonnie Lavelle, EPA

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			7. Ground Water Ingestion: Because office workers can be exposed to groundwater via ingestion, exposure parameters must be developed for these receptors also. Rationale to support the judgement of whether this pathway is complete or incomplete should be submitted on an OU specific basis in the Exposure Scenarios Technical Memorandum. The RME ingestion rate for an office worker is 1 liter per day. The fraction ingested from contaminated source is 1.0 (RME) and 0.3 (CT). The exposure frequency, duration, body weight, and averaging time for the office worker should be consistent with those used for this receptor in other direct exposure pathways.	Because of the lack of available groundwater at RFETS it is not expected that a well or wells will be drilled to provide water for an office building, and therefore, this is not considered a complete pathway. However, parameters for this pathway are provided in the The Rocky Flats Site-Specific Exposure Factors for Quantitative Human Health Risk Assessment, dated 03/17/95.	
			8. Groundwater Subsurface Soil VOC Inhalation: The assumptions about construction worker inhalation rates for outdoor exposure to particulates must make sense in comparison to assumptions about outdoor vapor inhalation from subsoil excavation at construction sites. Therefore the inhalation rate for construction workers must be reexamined.	The Rocky Flats Site-Specific Exposure Factors for Quantitative Human Health Risk Assessment, as agreed to by EPA, CDPHE and DOE, (dated 03/17/95), will be incorporated into the OU5 EATM.	

REVIEW COMMENT SHEET

Return to: Carol Bicher
8663 OU 5,6, and 7 Closures 9100 080
FAX Name Ext. Location Reviewer: Bonnie Lavelle, EPA

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			9. External Irradiation: The CT exposure frequency parameter must be consistent with the same parameter used in the soil ingestion exposure pathway. Use 234 days per year for both.	The Rocky Flats Site-Specific Exposure Factors for Quantitative Human Health Risk Assessment, as agreed to by EPA, CDPHE and DOE, (dated 03/17/95), will be incorporated into the OU5 EATM.	
G			If future mining is not likely in the vicinity of OU5, which appears to be the case, this exposure scenario should be deleted from consideration in the baseline risk assessment.	The mining scenario will be deleted from the OU5 EATM. Text will be provided in section 3 to state that there is not enough minable aggregate in OU5 to make this option feasible.	
			We believe that the need to understand the risks associated with residential use, even if hypothetical, is satisfied by conservative screen conducted for OU5 to comply with CDPHE requirements. DOE may delete this scenario from the baseline risk assessments for all operable units except OU3.	The residential receptors will be deleted from the OU5 EATM.	

REVIEW COMMENT SHEET

Return to: Carol Bicher
8663 OU 5,6, and 7 Closures 9100 080
FAX Name Ext. Location

Reviewer: Bonnie Lavelle, EPA

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Reviewer: (Comments not signed by Reviewer/POC will be considered unofficial and not subject to resolution)

- ☐ No Comments
- ☐ This procedure revision has no impact or relevance to our discipline or organization and we waive need to concur. We acknowledge this concurrence waiver does not affect our responsibility to implement the requirements of this procedure when needed.

Name _____ Signature _____

Ext./Pager/Fax _____ Bldg./Dept./AGM _____ Date _____

Resolutions Accepted:

Signature _____ Date _____

If questions on content, please call the SME:

Win Chromec 8641/5144
Name Ext.

NOTE: These reviews will be completed by qualified reviewers in accordance with 1-88000-PP-004 in concert with 1-88000-PP-001 and 1-88000-PP-003.