



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VIII

999 18th STREET - SUITE 500
DENVER, COLORADO 80202-2405

OCT 7 1991

Ref. 8HWM-FF

Mr. Frazer Lockhart
U.S. Department of Energy
Rocky Flats Office
P.O. Box 928
Golden, CO 80402-0928

Re: Review of Draft RFI/RI
Workplan for Operable Unit 3

Dear Mr. Lockhart:

This letter transmits EPA's review comments on the draft RFI/RI Workplan for Operable Unit 3 (OU 3) as submitted by the Department of Energy (DOE) on July 10, 1991 (Enclosure 1). Our comments are organized in three sections. The General Comments section provides a discussion of problems with the general approach DOE proposes to take in the investigation of OU 3. The identified problems are not necessarily keyed to specific pages of the workplan. The second section, Specific Comments, addresses problems which were identified in specific sections of the workplan. The third section is a technical review of the document by consultants to EPA. Also enclosed for your consideration are the comments of the Rocky Flats Cleanup Commission (Enclosure 2). The Colorado Department of Health (CDH) has transmitted their review comments separately.

In general, we found the document to be well organized and a good attempt at summarizing the available OU 3 information. However, we believe that the workplan must be revised before the workplan can be approved. We are most concerned about what we believe to be a very limited soils investigation program. DOE has apparently concluded that the contaminants of concern are limited to plutonium and americium in the soils and that the areas of concern are limited to those which are directly east of Indiana Street. The rationale presented in the draft workplan to support these conclusions is weak. The proposed RFI/RI program must be expanded to include additional analytes and additional areas of investigation so that the resulting RFI/RI report will be sufficient to support remediation decisions. For the same reason, we believe that the proposed RFI/RI program must be based on specific performance measures and must be statistically designed to meet these measures. Our general comments elaborate on these two main issues.

Also of concern is the lack of coordination between the workplan and the Option B project. As we have stated previously

ADMIN RECORD

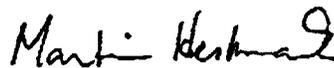
A-OU03-000034

in our June 26, 1991, letter to DOE, we believe it is DOE's responsibility to ensure that any construction activity within OU 3 does not exacerbate the threat to human health or the environment by spreading the existing contamination, does not otherwise interfere with ongoing Comprehensive Environmental Response Compensation and Liability Act response activities, and does not result in increased response costs. The workplan should demonstrate that the RFI/RI and the Option B project will be sufficiently coordinated so that these concerns are addressed.

Finally, we encourage DOE to meet with representatives of EPA and CDH soon to discuss the review comments and to agree on the necessary revisions. The meetings and discussions which were held during our review of the draft RFI/RI workplan were productive and helpful in our understanding of the approach DOE is taking in this investigation. A continuation of these exchanges would further the OU 3 program.

If you have questions about the enclosed comments or wish to arrange a meeting to discuss them, please contact Bonita Lavelle of my staff at (303) 294-1067.

Sincerely,



Martin Hestmark, Manager
Rocky Flats Project

Enclosures

cc: Gary Baughman, CDH
Barbara Barry, CDH/REFU
Joe Schieffelin, CDH
Robert Birk, DOE
Paul Bunge, EG&G
Michael Guillaume, EG&G

DRAFT RFI/RI WORKPLAN FOR
OPERABLE UNIT 3

GENERAL COMMENTS:

I. COMMENTS ON THE FIELD SAMPLING PLAN AS RELATED TO THE
SITE CONCEPTUAL MODEL

A. IHSS 199 CONCEPTUAL MODEL

1. Discussion. References to numbered exposure pathways correspond to the pathways in Table 2-5 (attached). DOE acknowledges in Section 2.1.4, Nature of Contamination, that there is a gap in the available information about the nature of the contamination in IHSS 199. Past studies have focused on characterization of plutonium contamination in the off site soils as a result of airborne plant releases. The workplan further cites numerous studies which have conclusively demonstrated that the major source of the existing off site plutonium contamination was the leaking drums from the 903 Pad area. With this premise, the workplan is then designed to validate existing plutonium in soils data in order to make some firm quantitative conclusions about the potential health risks associated with the off site plutonium and its decay product, americium. The approach taken to meet this narrow objective appears technically justified. However, EPA believes that the workplan concept is flawed because it is too narrow and not designed to address contaminants other than a few select radionuclides in the soils and in the air.

2. Specific Comments:

a. The second paragraph on page 2-18 recognizes the following additional potential sources of off site contamination:

(1). "...the on site burning of wastes, including waste oils contaminated with trace amounts of uranium."

(2). "A fire which breached the exhaust filters of a beryllium-machining building, possibly releasing airborne beryllium to the environment.."

(3). "...wind stripping of waste water from the solar evaporation ponds.."

EPA's comments on how these possible contaminants are or are not addressed in the workplan are as follows:

(1). Uranium: The text recognizes that airborne transport of uranium to off site soils could occur. However, there is no specific discussion (i.e. characterization data, historical release data, etc.) anywhere in the workplan about a

possible source of uranium and no discussion about the fate and transport properties of uranium. Apparently, DOE intends to investigate surficial soil uranium contamination as evidenced by the details in the field sampling plan and discussion with DOE representatives over the last several weeks. However, it is our understanding that the investigations of vertical migration will not include uranium. EPA can not approve the OU 3 RFI/RI workplan until uranium is included in the studies of vertical migration and until the discussions in the text on fate and transport properties (Section 2.5.1.3, Release Mechanisms and Transport Media) include uranium. These items are crucial to the investigation of the nature and extent of OU-3 contamination and are necessary to address exposure pathways 1, 2, 8, and 9.

(2). Beryllium: Beryllium is dismissed as a possible IHSS 199 contaminant based on 2 studies by the Colorado Department of Health conducted in 1971 and 1989. However, there is no reference listed in Section 12.0 of the workplan for these studies. With no data useability evaluation of these studies, it is incumbent on DOE to further investigate beryllium contamination in IHSS 199 if for no other reason than to validate the previous results. Since beryllium is apparently a potential contamination source, its fate and transport properties must also be included in the discussions in Section 2.5.1.3 and the it must be included in the analytical program for soils in OU 3. This information is necessary in order to address all exposure pathways identified in the site conceptual model for IHSS 199 except exposure pathway 8.

(3). Contaminants Originating in Solar Ponds: DOE recognizes the possibility of nonradioactive metal contamination and inorganic ion contamination resulting from wind stripping of the solar ponds in Section 2.1.4.1, RFP Contamination Sources. However, the conceptual model ignores these contaminants with the general statement on page 2-47, "Few potential airborne pathway sources appear to exist on the RFP for metals other than beryllium." In addition, EPA believes DOE must also recognize spray evaporators as potential sources of both radioactive and non-radioactive metals. EPA can not approve the OU 3 RI workplan until the fate and transport properties of metals are fully considered and the TAL metals analysis is included in the analytical program for soil samples. This analysis is necessary to address all exposure pathways identified in the site conceptual model for IHSS 199 except exposure pathway 8. This information is also necessary in order to address exposure pathway 29 (resuspension of unsaturated sediments near reservoir shorelines and subsequent deposition onto soils) which was identified in the site conceptual model for IHSSs 200-202. The sediments are being investigated for metal contamination. Unless the soils are also analyzed, this pathway cannot be completely evaluated.

b. The soils conceptual model summary on page 2-55 of the workplan recognizes that water erosion is a potentially significant release mechanism yet the field sampling plan and the associated analytical program are not sufficient to address exposure pathways 6 and 7, surface runoff into surface water and subsequent deposition for all the creeks and ditches within OU 3. The surface water sampling program is designed to only characterize the drainages from RFP and the reservoirs. This results in not only an inadequate characterization of the above mentioned pathways, but also exposure pathway 5, fugitive dust deposition onto surface water. DOE must either include all of the surface water components within OU 3 in the field sampling plan for OU 3, or alternatively, provide details in the RFI/RI workplan on how soil sampling results will be used to estimate surface water and sediment concentrations in all the components within OU 3, i.e., what exposure assessment modelling efforts will be employed and what model calibration/validation efforts will be implemented.

c. The field sampling plan and the associated analytical program are not sufficient to address exposure pathway #2, resuspension of contaminated soils into air. The existence of contaminants other than plutonium and americium in air needs to be investigated. DOE must either expand the analytical program to include TAL metals, and add appropriate monitoring stations to address the 199 contamination (not just the sediment contamination) or alternatively, DOE must specify the modelling effort including model calibration and validation which is intended to be used to address this pathway.

d. In discussions on the fate and transport of plutonium in the environment, it is noted that plutonium speciation is heavily influenced by pH and oxidation-reduction capacity (Eh). For this reason, Eh needs to be included in the parameters measured for the soil samples. This information is needed to adequately address exposure pathways 1 through 10 as the contaminant source for these pathways is the IHSS 199 soils.

e. Summary discussion concerning the conceptual model for IHSS 199 indicates that inhalation and plant ingestion are the most plausible exposure routes. This discussion is premature and appears to bias the proposed field sampling program. DOE must recognize that direct soil ingestion is also a plausible exposure route and may be a significant one. The discussion on exposure routes may be true for plutonium and americium, however, DOE must characterize other contaminants which may have different fate and transport properties and which may cause a different conclusion to be drawn.

Conclusion. On site sources of contamination have not been fully characterized yet. Remedial investigation work has just recently begun. For this reason, the conclusive statements that plutonium

and americium are the only contaminants likely to exist in off site soils is premature. The site conceptual model can not be limited to the fate and transport of plutonium and americium. The model must consider all potential releases from Rocky Flats and the resulting contamination of the OU 3 soils. The subsequent remedial investigation of OU 3 must be designed to address the pathways of contaminant transport and exposure identified by the conceptual model.

B. IHSS's 200-202, CONCEPTUAL MODEL

1. Discussion: References to numbered exposure pathways correspond to Table 3.1 (attached). DOE's discussion in Section 2.5.2.2.2, Sediment and Water Characteristics, neglects sediment transport. This leads to a discussion of contaminant fate and transport which ignores the potential for past contamination resulting from Rocky Flats Plant activity to affect the sediment media within OU 3. The result is a lack of understanding about the potential for certain classes of contaminants to be found in the sediments of 200-202 and consequently, a lack of understanding about what is considered to be the current contamination source. EPA considers this to be a flaw in the conceptual model and in the resulting field sampling plan. EPA recommends that a discussion be included in the workplan about the fate and transport properties of every class of contaminant in every environmental medium identified by the conceptual model. Where information is lacking to support eliminating a certain class from the analyte list for a certain medium, the field sampling plan must be designed to collect the necessary information. A technically complete workplan will address every potential exposure pathway identified in the conceptual model.

2. Specific Comments: The following specific comments address exposure pathways for which data will need to be collected in order to completely characterize the IHSS's and to complete a quantitative risk assessment:

a. DOE recognizes in Section 2.5.2.2.1, Contaminant Characteristics, that radionuclides, metals, VOCs, semi-volatile organics, inorganic ions, and herbicides could all have feasibly been transported to off site drainages and reservoirs. The workplan discusses all these contaminant classes except the semi-volatiles and the field sampling plan is not designed to look for semi-volatiles in the reservoirs. No explanation is given. Due to the varying mobility of the particular compounds of this class, semi-volatiles must be included in the analytical program for surface water, and saturated and unsaturated sediment. This will address exposure pathways 11 through 33.

b. DOE characterizes the sediment and water in the drainages of OU 3 as being erosional. However, there is no quantification of sediment transport to support this assumption.

This is important because it affects the field sampling plan for the drainages which is designed to define the source term. DOE must first recognize sediment transport as a release mechanism and then design the field sampling plan to address all possible sediment contamination.

c. As is the case for IHSS 199, the field sampling plan and the associated analytical program are not sufficient to address resuspension of contaminants from the identified source (contaminated sediment in the case of IHSSs 200-202) into air. The existence of contaminants other than plutonium and americium in air needs to be investigated, particularly since DOE recognizes the transport of these contaminants via sediment. This addresses exposure pathways 27-30 in the conceptual model. DOE must either expand the air analytical program to include uranium, TAL metals, and TCL semi-volatiles or alternatively, DOE must specify the modelling effort including calibration and validation which are intended to be used to address this pathway. Appropriate models which may be considered are discussed in the Superfund Exposure Assessment Manual (EPA/540/1-88/001, April 1988).

d. As discussed for IHSS 199, the oxidation-reduction potential is important to the understanding of plutonium fate and transport. This parameter must be included in the field analytical plan for sediments.

e. The recent detections of tritium in Standley Lake surface water samples indicate that tritium must be characterized in the surface water and sediments of Standley Lake, Great Western Reservoir, and Mower Reservoir.

II. COMMENTS ON THE STATISTICAL BASIS FOR THE FIELD SAMPLING PLAN

EPA believes that the field sampling plan for OU 3 must be statistically designed to meet specific performance measures. This is true for all media within the OU. EPA's Guidance for Data Useability in Risk Assessment (EPA/540/G-90/008) discusses this concept in Chapter 4, Steps for Planning for the Acquisition of Environmental Data in Baseline Risk Assessments. DOE has attempted to use statistics in the choice of the number of sampling locations for sediment within the drainages of each reservoir and also in the sampling grid for the soil samples. We believe this effort falls short of what is necessary. EPA guidance specifies that the minimum recommended performance standards for risk assessment purposes are 80% confidence and 90% power. For all media other than sediments, the confidence and power of the proposed OU 3 program are not indicated and in no case are the statistical details included to support the number of samples proposed by DOE.

EPA believes that a statistical justification of the OU 3 program is essential. This is particularly true because of DOE's indicated intent to use the data collected in the RFI/RI program to verify existing data. Recognizing the effort involved, we propose that representatives of DOE, EG&G, EPA, and CDH cooperate in this effort. EPA has some particular expertise that can be utilized in this effort. We suggest that the regulatory agencies and DOE/EG&G meet soon to outline specific tasks that will be required and to agree on the responsibilities and schedule for accomplishing those tasks. We envision those tasks to generally include the establishment of a database of existing environmental data which was relied on for the OU 3 RFI/RI workplan, statistical analysis of the existing data by media to determine the statistical distribution of the existing data and trends, agreement on the statistical basis for design of a new sampling program, agreement on how existing data will be verified, and continued maintenance of the database as new information becomes available.

If DOE chooses not to approach the statistical design of the sampling plan cooperatively, the RFI/RI workplan must still be based on at least an 80% confidence and a 90% power to be considered acceptable and the details of the statistical justification must be included in the workplan.

TABLE 2-5
GENERAL CONCEPTUAL MODEL FOR IHSS 199

Contaminant Source	Release Mechanism	Transport Medium	Secondary Release Mechanism	Exposure Route	Receptor	Pathway #
Offsite Surface Soils	None	None	None	Ingestion Dermal Contact	Humans Biota	①
	Fugitive Dust (wind erosion)	Air	None	Inhalation	Humans Biota	②
	Fugitive Dust (wind erosion)	Air	Settled Dust-Plants Settled Dust-Soil Settled Dust-Water	Ingestion Dermal Contact	Humans Biota	③ ④ ⑤
	Surface Runoff (sediment load)	Surface Water	None	Ingestion Dermal Contact	Humans Biota	⑥
	Surface Runoff (sediment load)	Surface Water	Deposition/ Precipitation	Ingestion Dermal Contact	Humans Biota	⑦
	Infiltration/ Leaching	Groundwater	Pumpage	Ingestion Dermal Contact	Humans Biota	⑧
	Bioconcentration/ Bioaccumulation	Biota	None	Ingestion Dermal Contact	Humans Biota	⑨
	Tracking	Biota	None	Ingestion Dermal Contact	Humans Biota	⑩

DRAFT

TABLE 3.1
GENERAL CONCEPTUAL MODEL FOR SITES 200-202

Contaminant Source	PATHWAY #	Release Mechanism	Transport Medium	Secondary Release Mechanism	Exposure Route	Receptor
Sediments (saturated)	11	None	None	None	Ingestion Dermal Contact	Visitors
	12	Wind Stripping of Water	Air	None	Inhalation	Residents Visitors
	13	Wind Stripping of Water	Air	Settled Dust-Plants Settled Dust-Soil Settled Dust-Water	Ingestion Dermal Contact	Residents Visitors
	14	Reservoir Discharge	Surface Water	None	Ingestion Dermal Contact	Residents Visitors
	15	Reservoir Discharge	Surface Water	Deposition/ Precipitation	Ingestion Dermal Contact	Residents Visitors
	16	Infiltration/ Percolation	Ground Water	Seepage Pumpage	Ingestion Dermal Contact	Residents Visitors
	17	Bioconcentration/ Bioaccumulation	Biota	None	Ingestion Dermal Contact	Residents Visitors
Water	18	None	None	None	Ingestion Dermal Contact	Residents Visitors
	19	Wind Stripping of Water	Air	None	Inhalation	Residents Visitors
	20	Wind Stripping of Water	Air	Settled Dust-Plants Settled Dust-Soil Settled Dust-Water	Ingestion Dermal Contact	Residents Visitors
	21					
	22					
23	Reservoir Discharge	Surface Water	Deposition/ Precipitation	Ingestion Dermal Contact	Residents Visitors	

TABLE 3.1
GENERAL CONCEPTUAL MODEL FOR SITES 200-202
 (Continued)

Contaminant Source	Release Mechanism	Transport Medium	Secondary Release Mechanism	Exposure Route	Receptor	
Water (cont.)	(24) Infiltration/Percolation	Ground Water	Seepage Pumpage	Ingestion Dermal Contact	Residents Visitors	
	(25) Bioconcentration/Bioaccumulation	Biota	None	Ingestion Dermal Contact	Residents Visitors	
Sediments (dry)	(26) None	None	None	Ingestion Dermal Contact	Residents Visitors	
	(27) Resuspension	Air	None	Inhalation	Residents Visitors	
	(28) (29) (30)	Resuspension	Air	Settled Dust-Plants	Ingestion Dermal Contact	Residents Visitors
				Settled Dust-Soil		
				Settled Dust-Water		
	(31) Leaching/Percolation	Ground Water	Seepage Pumpage	Ingestion Dermal Contact	Residents Visitors	
	(32) Bioconcentration/Bioaccumulation	Biota	None	Ingestion Dermal contact	Residents Visitors	
(33) Tracking	Biota	None	Ingestion Dermal Contact	Residents Visitors		

SPECIFIC COMMENTS:

Executive Summary, page ES-2: The objectives stated here are biased. Characterization of contamination within OU 3 cannot be limited to plutonium and americium. Revise the text here to indicate that the objective of the investigation of OU 3 is to characterize the nature and extent of all contamination, either resulting from Rocky Flats Plant releases or co-mingled with Rocky Flats Plant releases. Unless modified, the objectives as stated here and in other sections of the workplan (Section 5.1.4) are inconsistent with the conclusions and recommendations contained in the approved final Past Remedy Report.

Figure 1-3, Downstream Surface Water Features: The RFI/RI Workplan for OU 3 must anticipate the proposed Option B project and demonstrate that the respective activities will be coordinated. This includes not only the diversion of Woman Creek around the Standley Lake Reservoir, but all components of Option B which may affect OU 3.

Page 1-12, second paragraph: Elaborate on the discussion of groundwater recharge. For example, provide the details about the extent of recharge to the upper and lower hydrostratigraphic units and if the recharge is local or regional. This becomes important to the understanding of the potential for RFP to affect groundwater quality and will provide support to the proposed groundwater sampling program for OU 3. Since the lower hydrostratigraphic unit has the potential to transport contamination all the way to the South Platte River, more information on what is currently known about groundwater transport and what information is still unknown needs to be provided in the workplan.

Page 2-28, Section 2.2.3: Elaborate on the chemical composition of the "decontaminated process and laundry effluent" that was discharged into the South Walnut Creek drainage.

Page 2-47, Nonradioactive Contaminants: The last sentence in this paragraph is not supported. Table 6-2 which lists fate and transport properties of various contaminants does not include inorganic compounds. Revise the text to include fate and transport information on inorganic compounds in Table 6-2.

Page 2-50, Nonradioactive Contaminants: The CDH reference which seems to be the basis for conclusions about beryllium is missing from section 12.0 of the workplan.

Page 2-55, Section 2.5.2.1: It is also reasonable to assume that on site contamination can migrate off site via sediment transport. This needs to be indicated in the text and the

remedial investigation should be designed to investigate this pathway.

Page 3-2, last bullet: The Colorado Water Quality Control Commission's statewide and classified groundwater area standards have been finalized. Modify this section of the workplan to reflect this.

Page 3 3, first paragraph: The sentence in the tenth line of this paragraph indicates that ARARs which are below PQLs will not be considered as ARARs by DOE. This is incorrect. ARARs below PQLs are still ARARs. However, in such situations, it may be appropriate for EPA to waive the ARAR on the basis of technical impracticability in accordance with Section 300.430(f)(1)(ii)(C)(3) of the National Contingency Plan.

Page 4-6, Section 4.7: Delete the sentence, "Based on the data collected and evaluated to date, it is unlikely treatability studies will be necessary." The statement is biased and pre-decisional.

Pages 4-10 and 4-11: Delete Section 4.9 and Section 4.10 from the workplan. These tasks are strictly feasibility study tasks which will not be performed during the remedial investigation phase of OU 3. This workplan is intended to describe the remedial investigation tasks.

Page 5-1, first paragraph: Change this paragraph to read, "Information from the human health risk assessment and the environmental evaluation is one factor that is considered when determining the need for remediation of the site. If a decision is made that remediation is necessary, the risk assessment information and the RFI/RI site characterization data is used to evaluate remedial alternatives during the feasibility study."

Page 5-1, last paragraph: Modify the second sentence of this paragraph to read, "Previous data collection activities focused on site characterization and not on source characterization and contaminant fate and transport which are both necessary to perform a quantitative human health risk assessment and an environmental evaluation."

Page 5-3, Section 5.1.3, Develop Conceptual Model: Modify the second sentence in this paragraph to read, "The potential pathways identified are those associated with soil, surface water, groundwater, aquatic and terrestrial biota, and air/wind." The sentence is incorrect as written because it refers to environmental media as exposure pathways.

Page 5-11, first paragraph: In order to increase the credibility of the workplan, DOE must describe how data collected from other OUs will be considered and how decisions will be made to expand

the OU 3 program. Such information is most easily presented in a decision tree diagram.

Page 6-28, Section 6.2.2.1.1: Modify the last sentence in this paragraph to read, "If VOAs are identified as a problem in the surface water or sediments, VOAs for groundwater will be incorporated into the sampling program." Also, indicate exactly what criteria will be used by DOE to determine when a concentration of a particular contaminant is a "problem". EPA emphasizes that additivity of effects due to exposure to multiple contaminants must be considered in any screen of contaminants.

Page 6-28, Section 6.2.2 1.2: The statement that semivolatiles have been dropped from the groundwater program for OU 1 and OU 2 is incorrect. These compounds are still included in the OU 1 and OU 2 groundwater programs. There are numerous erroneous statements throughout the workplan about the analytical programs for groundwater, surface water, and sediment in the on-site operable units. DOE must go through the OU 3 workplan and verify all statements made about other operable units and correct the OU 3 workplan as required.

Page 6-30, Section 6.2.2.1.5: Modify the eighth sentence in this paragraph to read, "If metals are determined to be a problem in surface water or sediments at OU 3, metals will be added to the analyte list." As indicated above, explain what is considered to be a "problem".

Page 6-35: Here and in other sections of the workplan, DOE refers to SOPs which are currently under development. The workplan will not be considered complete until those SOPs have been prepared, submitted, and approved.

Page 6-37, last paragraph: EPA has serious concerns about how DOE plans to use the randomly collected soil samples from various land uses as described in the workplan. We believe it is incorrect to combine data which was collected randomly as described here in the workplan with the data collected based on the soil sampling grid described in earlier sections of the workplan. At a minimum, DOE must include all details of how this randomly collected land use data will be interpreted and subsequently used.

Page 6-47, Section 6.3.4. Is the lower hydrostratigraphic unit being monitored? If so, where? This is important information to include in this section of the workplan to give the reader an understanding of the groundwater system in the vicinity of Rocky Flats.

Page 7-5, first paragraph: The generic risk assessment in the final Past Remedy Report considered two hypothetical land use scenarios, recreational use and residential use. In the

residential use scenario, the range of plutonium concentrations considered resulted in a range of risks of 2.2E-05 to 2.2E-07. In the recreational use scenario, the range of plutonium concentrations considered resulted in a range of risks of 7.0E-06 to 7.0E-08. Correct the OU 3 workplan to reflect all the information in the Past Remedy Report.

Page 7-15, Section 7.3, Exposure Assessment: Nowhere in the discussion on exposure assessment does DOE recognize that a reasonable maximum exposure will be considered in the baseline risk assessment for OU 3. The preamble to the National Contingency Plan indicates that in the Superfund program, the exposure assessment involves developing reasonable maximum estimates for both current land use conditions and future land use conditions. In general, the baseline risk assessment will look at a future land use that is both reasonable from land use development patterns, and may be associated with the highest (most significant) risk, in order to be protective. These considerations will lead to the assumption of residential use as the future land use in many cases. An assumption of future residential land use may not be justifiable if the probability that the site will support residential use in the future is small. DOE has not presented any information to support a low probability of residential use at OU 3, yet has not indicated in the workplan that a residential use will be considered. On the contrary, DOE has indicated that a "light industrial setting" and a "research biologist setting" will be considered with no justification for these choices. This is inconsistent with the National Contingency Plan and with the requirements of the Interagency Agreement. Section VII.D.1.b of the Statement of Work requires DOE to submit for review and approval a technical memorandum describing the present, future, potential and reasonable use exposure scenarios with a description of the assumptions made and the use of data. Given these factors, DOE must delete reference to exposure scenarios which will be considered in the baseline risk assessment for OU 3 and instead, describe the process required by the Interagency Agreement and DOE's plans for accomplishing the requirements, including descriptions of the deliverables and schedules.

Page 8-1, Section 8.0, Environmental Evaluation: The approach described in this section of the workplan for conducting an environmental evaluation is inconsistent with the approach which has been developed through discussions of the Risk Assessment Technical Working Group for the Rocky Flats. EPA believes that the differences in approach are extensive enough that the studies from different operable units will not be comparable. The OU 3 Environmental Evaluation workplan must be revised to be consistent with the approach taken for OU 1, OU 2 and OU 5. During the revision, the following specific comments must be addressed:

a. The workplan emphasizes small mammals to the exclusion of birds, reptiles, and insects. No explanation is given. If DOE follows the iterative process described in OU 5, surveys for birds, reptiles, and insects will be required for the terrestrial ecosystem characterization.

b. The workplan seems to make an issue of gaining access for terrestrial work but not for aquatic work. No explanation is given. The revised workplan must detail any anticipated access problems and provide a means of handling those problems.

Appendix A: DOE has constructed a semivariogram to support the proposed soil sampling plan for OU 3. However, not all soil sampling results which are available were used in this construction. Also, Indiana Street was chosen as the cut-off boundary for this analysis, i.e., no consideration is given to sampling results from samples taken south and north of Rocky Flats. Obviously, some screening criteria was applied to the available studies, however, the details are not provided. This analysis must be revised to include areas north and south of Rocky Flats and all available studies must be utilized unless some justification can be provided for dismissing certain available information.

**ROCKY FLATS PLANT
JEFFERSON COUNTY, COLORADO**

**DRAFT
TECHNICAL REVIEW OF
RERA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NUMBER 3**

Prepared for

**U.S. ENVIRONMENTAL PROTECTION AGENCY
Region 8 Federal Remedial Branch
Denver, Colorado**

Work Assignment No	:	C08056
EPA Region	:	8
Site No.	:	C0789001526
Date Prepared	:	September 19, 1991
Contract No.	:	68-W9-0009
PRC No.	:	012-C08056
Prepared by	:	PRC Environmental Management, Inc. (Lorraine Alcott, Susan Meadows, Gary Miller, and Randy Fox)
Telephone No.	:	303/295-1101
EPA Primary Contact	:	Bonnie Lavelle
Telephone No.	:	303/294-1067

TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE</u>
1 0 INTRODUCTION	1
2.0 GENERAL COMMENTS	1
3.0 SPECIFIC COMMENTS	3
4 0 REFERENCE LIST	9

1.0 INTRODUCTION

PRC Environmental Management, Inc (PRC) reviewed the Final Draft Work Plan - Resource Conservation and Recovery Act (RCRA) facility investigation/remedial investigation (RFI/RI) Work Plan for operable unit 3 (OU3), for the U S. Environmental Protection Agency (EPA) under contract number 68-W9-0009 (Technical Enforcement Support (TES) 12), work assignment number C08056 for the Rocky Flats off-site areas. This report addresses the various problems and inconsistencies noted in the work plan. No comments were made on the environmental evaluation as PRC was advised that this section is under revision

These technical review comments have been divided into two sections general comments and specific comments. The general comments relate to the entire work plan, while the specific comments correspond to specific sections of the work plan. Specific comments are keyed to the page, section, and paragraph number of the work plan or page and figure/table number where appropriate.

2.0 GENERAL COMMENTS

1. Data presented during the negotiations and development of the OU5 (Woman Creek priority drainage) work plan indicated the presence and persistence of a variety of contaminants (including volatile organics, radionuclides, base neutrals, and acids) at two sediment stations at the southern boundary of OU5. These sediment stations, designated SED-18 and SED-19, are located at seeps at the headwaters of southern tributary of Woman Creek. Sediment sampling station, SED-19, has exhibited contaminant concentrations exceeding background over the last few years and may indicate ground water contamination in this area. The final Phase I RFI/RI work plan for OU5 indicates the operable unit boundary for OU5 does not extend south of these stations, therefore DOE's contractor does not intend to sample sediments and seepage south of these points. Therefore, to determine the extent of contamination in this area, seepage and sediment samples must be collected in drainages south of the OU5 boundary during the OU3 investigation. This must include, but is not limited to, any seeps and sediments occurring in reentrant valleys south of these sites to the boundary of the buffer zone, with the head of the Smart Ditch drainage especially targeted. The analyte list must be the same as the finalized OU5 sediment and surface water analyte list to facilitate data comparison

Rationale The nature of contamination on-site must be fully examined to understand what type of contamination may be present in off-site areas

- 2 The proposed sampling plan does not address all the exposure pathways listed in the conceptual models. Specifically, the ground water analysis does not include all the analytes to be sampled for in sediments even though leaching, infiltration, and percolation of contaminants from sediments to ground water may occur. Another pathway identified in the conceptual models but not addressed in the field work is movement of contaminants (such as metals) through resuspended soil. These problems could be addressed by adding additional analytes to the sampling list or preparing models illustrating methods of transport

Rationale: To identify which media pose a significant health risk and require remediation, all exposure pathways listed on the conceptual models must be addressed in the field sampling activities of the work plan.

3. The few radionuclides proposed as analytes for the OU3 investigation appear to be inadequate based on the historical data (Section 6.2, DOE, 1991) and the methods proposed in the work plan for choosing analytes (Section 6.3, DOE, 1991). Strontium, radium, and tritium were all detected in ground water, surface water, and sediments at the Indiana Street Rocky Flats Plant (RFP) boundary (Section 6.2; DOE, 1991) and yet none of these radionuclides are proposed analytes in the off-site areas downgradient (with the exception of tritium in surface water only). The only radionuclides proposed as analytes are "plutonium, americium, and uranium identified as site wide chemicals of concern" (p.6-34; DOE, 1991) Selection of chemicals of concern prior to the investigation is premature. The public concern regarding these off-site areas in OU3 is high, especially with respect to radionuclide contamination

Rationale: The risk assessment should address all the radionuclide contaminants present at OU3, which may include more than the six radionuclides detected historically at the boundary (as shown in Tables 6-3 to 6-5), because historical data analyses may have also been performed selectively

3.0 SPECIFIC COMMENTS

- 1 Page 2-48, Section 2.5. 1, Paragraph 2 The off-site surface soils conceptual model discussion does not include any information on the fate and mobility of uranium in the environment. This information should be added to the report.

Rationale Uranium is a contaminant of concern on-site. As such, its fate and mobility in the environment should be discussed to identify significant exposure pathways. This is especially important because uranium and plutonium do not behave similarly in the environment.

- 2 Page 2-48, Section 2.5.1.2.1 Paragraph 3. This paragraph states that plutonium primarily exists as plutonium 239 and 240, and then references Table 2-5. However, Table 2-5 is a conceptual model for IHSS-199 and does not include any information on the forms of plutonium at OU3. Table 2-5 should be modified to provide the supporting information referenced in this paragraph.

Rationale: Referenced tables and figures in the report should illustrate the appropriate information for purposes of clarity.

- 3 Page 2-60, Section 2.5.2.3. No discussion of the nonradioactive contaminants fate and mobility in air, ground water, or biota is included in this section. This information should be added to the work plan.

Rationale: To identify significant exposure pathways, the fate and mobility of all contaminants of concerns should be discussed for every potential transport media.

- 4 Page 3-1, Section 3.0. This discussion provides information on chemical-specific applicable and/or relevant and appropriate requirements (ARARs) for soil, surface water, and ground water. No chemical-specific ARARs for air are given. This information should be added.

Rationale ARARs or to-be-considered (TBC) standards for all media of concern should be included in the work plan.

- 5 Page 3-14, Section 3.2.3, Paragraph 2. This text states that the introductory paragraph of Section 3 2 3 explained that detailed, location-specific ARARs will be proposed in RFI/RI report and action-specific ARARs will be addressed in the corrective measures study/feasibility study (CMS/FS) report. However, the introduction does not clearly state this information. The language from this paragraph should be directly incorporated into the introduction, so that the reader immediately knows why all three of the ARAR types are not being discussed in the report.

Rationale The main text of the work plan should accurately reference other portions of the work plan for purposes of clarity

- 6 Page 6-7, Table 6-1. This table does not state that sediments collected along Walnut Creek will also be analyzed for tritium. This analysis should be added to the table.

Rationale Consistent reporting of proposed analyses in both the text and tables will prevent confusion

- 7 Page 6-25, Section 6.2, Paragraph 1 This paragraph states that data collected from 1987 to 1990 were utilized to determine the analytes of interest in various OU3 media. However, during a September 9, 1991 meeting, EG&G stated that only data from 1988 to the present were used. The correct time frame of data collection should be listed in this paragraph. Additionally, this paragraph does not explain how many samples were collected from the alluvial wells, Walnut and Woman Creeks or why these data are of sufficient quality to determine the chemical analyses for water sampling locations within OU3. Further explanation of the data quality should be added to this section

Rationale The quality of previous data has been suspect and difficult to validate. Therefore, this work plan should completely describe why data collected in alluvial wells and along Woman and Walnut Creeks are believed to be of sufficient quality for comparability purposes

- 8 Pages 6-28 and 6-30, Table 6-1 Pages 6-28 and 6-30 state that if volatile organic compounds (VOCs) or metals are detected in surface water or sediment samples, these analytes will be added to the ground water sampling program. This information should be listed on Table 6-1 (page 6-9)

Rationale: Table 6-1 should list all the field sampling activities for ground water, including those analyses that will be done only if detected first in other media.

- 9 Page 6-28, Sections 6.2.2.1.1-6.2.2.1.5. These sections describe how data collected from four alluvial wells were used to determine which analytes would be sampled for in the OU3 monitoring wells. However, the OU3 ground water monitoring program will also sample the bedrock aquifer system. Because the alluvial and bedrock ground water systems are two separate systems, it is not appropriate to utilize data from existing alluvial wells to eliminate analytes in bedrock ground water samples. Either data from existing bedrock wells should be referenced, or an explanation of why alluvial well data are applicable to bedrock wells at OU3 should be included in this section.

Rationale: The method of reviewing existing data for the purposes of eliminating analytes from the proposed field sampling program will only work if data from similar media are compared. In this case, although two ground water flow systems are identified, only data from the alluvial well systems are utilized.

10. Page 6-41, Table 6-1, and Table 6-10 Page 6-41 states that 20 percent of the sediment samples will be analyzed for TOC, bulk density, and grain size. Table 6-1 (page 6-14) states that only 10 percent of the sediment samples will be analyzed for these parameters, whereas Table 6-10 (page 6-76) again states that 20 percent of the sediment samples will be analyzed for these parameters. These inconsistencies should be corrected and the correct percentage listed consistently.

Rationale: Clarification and consistent reporting is needed to minimize the potential for confusion.

- 11 Page 6-41, Section 6.3.2.1, Paragraph 1 Further explanation of the statistical method utilized is needed to determine that collecting seven sediment samples provides a 99-percent confidence level and collection of three samples provides an 85-percent confidence level. Specifically, it should be explained why the referenced method (Conover, 1980) is considered the appropriate method for OU3.

Rationale: In order to understand the proposed sampling plan, it is important to understand the rationale behind the sampling plan.

12. Page 6-41, Section 6.3.2.1, Paragraph 2. To assess fate and transport, 10 percent of the sediment samples will be analyzed for total organic carbon, bulk density, and grain size. To fully understand the mineralogy of the sediment samples, it is suggested that x-ray diffraction also be performed on 10 percent of the sediment samples

Rationale: X-ray diffraction will yield a better picture of the sediment samples mineralogy, therefore, providing additional information useful in assessing the fate and transport of contaminants in OU3 sediments.

13. Page 6-44, Section 6.3.3.2, Paragraph 1 This paragraph states that alkalinity (pH) measurements will be taken according to standard operating procedure (SOP) 4.8. However, SOP 4.8 is not on the list provided in Section 11, Standard Operating Procedures and Procedure Change Notices, of this work plan.

Rationale: All SOPs utilized during OU3 field work should be listed in the introduction of Section 11.

14. Page 6-47, Second Paragraph. There appears to be a typographical error in this paragraph. Great Mower Reservoir should be changed to Great Western Reservoir.

Rationale: Errors and inconsistencies in the report should be corrected to avoid confusion

15. Page 6-49, Section 6.3.5, Paragraph 3. This paragraph states that both the data collected from the existing air monitoring program and the proposed OU3 air monitoring program will be used for the human health risk assessment. However, it is not clear whether the data collected from these two programs consistently reports the same information, or if the data were collected in the same manner. Air samples collected during the OU3 air program will be analyzed for isotopic plutonium and isotopic uranium. Some of the air samplers currently on-site report gross alpha (α) and beta (β) only. In addition, the data for the OU3 air sampling will be collected during three discrete 8-hour sampling events. Although an 8-hour sampling period is commonly used for risk assessment data collection, an 8-hour air sample

collection period in this case will not provide an adequate concentration of samples to meet the laboratory analytical requirements. The collected data will therefore indicate no detections, thereby providing a very biased result. This sampling method is also inconsistent with air samplers currently in use which collect samples for a longer period of time. Further explanation is needed regarding which existing air monitoring locations will be used, what is analyzed for at these locations, and the manner in which the sample is collected.

Rationale. Combining new air quality data with existing air quality data will be of no use if the manner in which the data are collected and the analyte reporting is not done in a similar fashion. The risk assessment should attempt to adequately address the long-term cumulative risk from exposure to plutonium (and other contaminants) in air; therefore, the air sampling program should be organized to achieve this goal. This is a major public concern.

16. Page 6-49, Section 6.3.5, Paragraph 5 Air samplers in the OU3 air sampling program will collect radionuclide particulate matter whose diameter is 10 microns (μm) or less (PM10). This size range will not detect plutonium particles whose diameter is larger than 10 μm . Specifically, attached plutonium particles in the 30- μm to 100- μm diameter range will not be collected.

Rationale: Plutonium is alleged to exist in two forms: dispersed and attached (Rowles, 1991). Collecting air samples in only the PM10 range will not detect the larger attached form of plutonium. It should be noted that the larger plutonium particles could be resuspended and broken into smaller sized particles.

17. Page 6-72 through 6-75, Table 6-9 The herbicides atrazine and simazine are not listed on Table 6-9, Soil, Sediment, and Water Sampling Parameters. These herbicides should be added to the table.

Rationale Atrazine and simazine will be analyzed for in surface water samples, and therefore should be included on Table 6-9 for consistency in reporting.

- 18 Page 6-79, Table 6-11 Table 6-11, Sample Containers, Sample Preservation, and Sample Holding Times For Water Samples OU3, includes sulfide and total dissolved solids (TDS) However, neither of these parameters are listed in the text of the work plan Therefore, sulfide and TDS should be removed from the table

Rationale Tables in the work plan should accurately reflect the analytical parameters described in the text of the work plan.

19. Page 6-81, Table 6-12 Table 6-12, Sample Containers, Sample Preservation, and Sample Holding Times for Soil Samples OU3, includes sulfide. However, this parameter is not listed in the text of the work plan, and therefore, should be removed from the table

Rationale See rationale for comment 18.

20. Page 7-14, Section 7.3.4 A reasonable minimum exposure (RMinE) is proposed to be calculated along with the reasonable maximum exposure (RMaxE). This is good, but no method for deriving a RMinE is given The method used should be provided in this section

Rationale: The purpose of the work plan is to provide a blueprint for the risk assessment All methods should be described

- 21 Pages 7-15 to 7-16, Section 7.3.5 Only two future exposure scenarios are proposed a light industrial setting and a research biologist setting. No residential setting is proposed for analysis of risks No justification for this omission is provided. A residential scenario should be included

Rationale The off-site areas are on county lands not controlled by the U S Department of Energy The currently proposed land use is recreational However, the proximity of the RFP off-site areas to the Denver metropolitan area could create future development pressure The heightened public concern regarding these areas also suggests the need for a complete evaluation of risks associated with all possible future uses

22. Page 9-2, Figure 9-1 The conceptual schedule for the phase I RFI/RI activities groups all the field activities together. Because ground water wells will be sampled for some analytes only

if they are detected in sediment and surface water samples, the text should explain whether ground water wells will be sampled last, or if the wells will be resampled if these contaminants are discovered in other media.

Rationale Because the ground water analyses are contingent on the findings of sampling in other media, the field investigations must be timed so that data from surface water and sediment samples can be reviewed prior to completing the ground water sampling investigation.

4.0 REFERENCE LIST

- DOE, 1991. U S. Department of Energy, "Final Draft RFI/RI Work Plan, Operable Unit 3," U S U S Department of Energy, Rocky Flats Plant, Environmental Restoration Program, Golden, Colorado, July 3, 1991.
- Bowles, 1991. Rocky Flats Site Visit Report, U S Department of Energy, Presentation by Dr. Gale Biggs, August 29, 1991.

Rocky Flats Cleanup Commission

1738 Wynkoop Street Suite 302
Denver Colorado 80202
(303) 295-3800

COMMENTS ON THE OUS WORKPLAN PREPARED FOR THE TECHNICAL REVIEW GROUP

September 20, 1991

GENERAL COMMENTS

- 1) Why is the CDH special construction standard for plutonium in soil (0.09 pCi/g) used as a basis in this workplan. Understandably it was the level set by the court for the 1985 lawsuit, but why not set the standard to reflect background values? What are the differences in health/environmental risk? Perhaps more discussion of the January 1976, CDH study, "A Risk Evaluation for the Colorado Plutonium-in-Soil Standard," should be added to both this workplan and the Past Remedy Report.
- 2) The Cleanup Commission has reservations about the efficacy of the tilling program on the remediated lands, as well as continued recreational activities on Standley Lake which could disturb the sediments. Perhaps as interim measures, the soil tilling activities and shoreline recreational activities should be curtailed.
- 3) What effect will possible new radionuclide standards that will be determined by the Colorado Water Quality Control Commission in February have on this plan?
- 4) Limnological studies are not mentioned as being integral to this evaluation. Page 8-9 mentions that the USGS limnological study is ongoing. The Cleanup Commission strongly urges that these studies be completed and incorporated as soon as possible. Is there current understanding of all morphological features of the lakes? Is there an understanding of the frequency of turnover events that would help in determining the periods of stratification in the lakes? In addition, has rechanneling been considered as a possible mechanism for sediment dispersion as tributaries, especially during high flow periods, enter the lakes?
- 5) This plan does not adequately address synergistic effects in its determination of risk. Chapter 8 discusses synergistic/antagonistic effects in relation to the environmental evaluation, but no mention is made for the human health risk assessment.

RFCC COMMENTS TRG OU3 WORKPLAN

PAGE TWO

- 6) The Cleanup Commission adamantly requests that any discussions or determinations of incremental risk be related to the cumulative risk of all exposures from the plant. The off-site soils are not the only contribution to cumulative risk to the public. A new risk accounting system must be developed that can provide a "total" risk to the public from all sources related to RFP operations. This risk must then be added to, not just merely compared with, the already elevated risk of living in Colorado.
- 7) There are no discussions in this plan of how the exact boundaries of OU3 will be determined. Is the soil sampling protocol extensive enough to be used in defining the boundaries? We request that all areas surrounding the plant at least be investigated for possible contamination before they are ruled out for inclusion in OU 3 remediation. We are particularly concerned that areas directly south of the buffer zone are being excluded for consideration.

SPECIFIC COMMENTS

- P. 1-16: Why are only 117 IHSS's mentioned when there are 178?
- P. 1-17: The figures representing populations and households near the plant are confusing. There is no indication of direction. Assuming that "A" is north, the numbers for what one would assume to be the area around Leyden are too low.
- P. 2-41: Would it be beneficial to have the cities of Westminster, Northglenn and Thornton test their filter backwash sludge?
- P. 4-6: The statement at the bottom of the page that, "based on the data collected and evaluated to date, it is unlikely treatability studies will be necessary," should be stricken. Members of the general public "might" react strongly to such a premature declaration.

Chapter 6:

- 1) One vertical sediment sampling along the shorelines of the lakes is not adequate.
- 2) Are the protocols for testing of analytes other than radionuclides adequate?
- 3) How much redundancy is there between the routine monitoring program and any special tests required for this study. We would encourage that all studies be combined as much as possible. What are the management plans to do so?
- 4) Why are residential wells going to be excluded from analysis? Would they not serve a valuable purpose in this study?