

**DOCUMENT REVIEW COMMENT RECORD
OF EPA AND CDH COMMENTS**

FINAL PHASE I RFI/RI WORK PLAN

**ROCKY FLATS PLANT
GOLDEN, COLORADO**

**WALNUT CREEK
(Operable Unit No. 6)**

**U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant
Golden, Colorado**

***EG&G ROCKY FLATS*
ENVIRONMENTAL RESTORATION PROGRAM**

REVIEWED FOR CLASSIFICATION/UCNI

By F. J. Curran *U-UC*

Date 9-16-91

September 1991

ADMIN RECORD

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ENVIRONMENTAL RESTORATION PROGRAM

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By F. J. Curran *(U-W)*

Date 9-10-91

September 1991

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DOCUMENT REVIEWED: OU6 - Phase I RFI/RI Work Plan

DOCUMENT REVIEWER: U.S. Environmental Protection Agency

Date: September 16, 1991

CITATION	COMMENT	DISPOSITION
<u>General Comments</u>		
E-1.1	The Workplan submitted is generally quite good, considerable better than those received previously, particularly in regard to EE portions. The draft will require some substantial revisions, in accordance with the comments below, before it can be approved. In addition, revisions must be coordinated and updated consistent with the latest, ongoing revisions of the SOPs, and the Final EE plan for OU 5.	No response is necessary.
E-1.2	Project planning (as described in Section 5.1) must be completed during preparation of this document. The results of this process and the findings as to what RFI/RI work is required to support a Record of Decision should form the core of this plan, not be developed later, when it will only lead to unproductive revision and review cycles, as is now happening on other plans.	Section I.B.9. <u>Investigatory Phase Documentation</u> (page 6 of the IAG statement of Work) specifically describes the phased approach to investigations at OUs 3 - 16. The IAG explanation of the phased approach as it relates to OU-6 has been added to the Executive Summary and Section 1.0 of the Work Plan for clarification.
E-1.3	The plan presented alludes to use of an iterative approach to completion of the RFI/RI, wherein early information is used to target later investigatory activities. There is nothing wrong with this approach, but this draft plan is not at all clear how, when, or by whom decisions will be made on alternative investigatory activities, or even what some of these activities may be. The final Workplan for OU 6 must lay out what is thought to be the entire scope of investigation needed to support a ROD, based on a thorough review and evaluation of all existing pertinent information. Groundwater screening using hydropunch-type techniques, or similar tactics, can be employed to assist well	Please see the response to the previous comment. It is DOE's understanding of the IAG that the Phase I investigation is not necessarily the last activity before the preparation of a ROD. This RFI/RI Work Plan addresses the requirements of the IAG Table 5 with additions (where appropriate) and modifications as agreed to in the scoping meetings. The field sampling activities proposed in Chapter 7 are thought to provide sufficient data to characterize each IHSS in OU6 if no unexpected conditions are encountered. However, if after completion of the Phase I investigation there are still data gaps present, then additional

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E-1.4	<p>placement and support this approach, as has been proposed in the OU 2 alluvial investigation. However, the decision points, procedures, and alternative actions must be clearly delineated, in their entirety, in this submittal; otherwise, EPA will be unable to grant Workplan approval. The RFI/RI Workplans must be at a minimum implement the activities identified in IAG Table 5: Preliminary RFI/RI Workplan for Previously Identified Inactive Sites. Knowingly leaving important aspects of an investigation to a later date is not justifiable solely because the IAG can accommodate later Phases of investigation.</p> <p>The investigations plan contains two glaring technical weaknesses, which could lead to an inability to adequately evaluate important contaminant migration pathways. First, there is no discussion of air emissions or data, and no plan for monitoring or evaluating this media as an exposure pathway. Second, the plan contains no means of evaluating potential migration through the vadose zone. Since very limited groundwater monitoring is proposed for many of the sites, the RFI/RI should include soil moisture profiling and (where appropriate) vadose zone monitoring.</p>	<p>investigations will be performed as needed. This approach is consistent with the program specified in the IAG.</p>
E-1.5	<p>The baseline risk assessment section describes the risk assessment process in terms so generic as to provide no meaningful plan for assessing baseline risk at this particular site. Specific methods must be evaluated or developed for assessing risk under prevailing conditions at RFP. The substantial existing information regarding this site's important contaminants,</p>	<p>A discussion of the Ambient Air Monitoring Program is included in Section 7.2.8 of the Work Plan. The text in this section has been modified to reference the plant wide program. The proposed and existing air monitoring stations are illustrated on Figure 7-4. Vadose zone investigations are included as part of the Phase I sampling effort described in Section 7.2. This investigation of the vadose zone consists mostly of the collection and analysis of soil samples. Additional investigations including monitoring of the vadose zone will be included in Phase II of the RFI/RI program if appropriate for the IHSSs.</p> <p>Data regarding Operable Unit 6 are limited and some of the data have not been validated. The existing data has been reviewed in the process of preparing the Phase I Work Plan and some of that data has been reproduced in the Work Plan. The data included in the Work Plan provides the information that has been used in developing the Work Plan, in defining data quality</p>

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<p><u>Specific Comments</u></p> <p><u>Section 2.1, Page 2-8</u></p> <p>E-2</p> <p><u>Section 2.2</u></p> <p>E-3</p>	<p>exposure pathways, and potential receptors has apparently not been evaluated, or at least is not discussed here, and must be if this plan is to be adequate.</p> <p>The description of pond B-3 indicates it receives "intercepted groundwater from a seepage area near the Solar Evaporation Ponds." It is not clear if this is a reference to the french drain water. If so, this is not consistent with our understanding that this flow is recirculated to the Solar Ponds. Please clarify this passage to indicate what water is being talked about and confirm its disposition.</p> <p>The site characterizations presented here say very little, if anything, about groundwater. Since potential contaminant</p>	<p>objectives, and in developing the field sampling plan. One point not discussed in the risk assessment text deals with the IAG required technical memoranda. Four technical memoranda must be submitted by DOE and approved by CDH and EPA as part of the risk assessment process. These technical memoranda deal with: (1) selection of indicator chemicals, (2) fate and transport model selection, (3) selection of exposure scenarios and associated assumptions and (4) identification of toxicology information to be used in the risk assessment. Through the technical memoranda details on the risk assessment will be provided and agencies participation in this process should result.</p> <p>This statement is not correct and it has been removed from the text.</p> <p>Available data regarding groundwater has been included in Section 2.2 where available. DOE agrees that characterization</p>

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<p><u>Section 2.2.4, Page 2-16</u></p>	<p>migration via groundwater in valley fill alluvium is and will continue to be a major concern, this seems a serious omission. The data available to characterize this potential pathway must be collected and thoroughly evaluated. Further investigations required to support decisions on possible groundwater control/cleanup actions in this area must be identified in this plan.</p>	<p>of the groundwater pathway is important and has included this in the field sampling plan. The purpose of the Phase I program is to characterize the groundwater. Later phases of investigation may focus on groundwater characterization relative to remedial alternatives.</p>
<p>E-4</p>	<p>The stated basis for evaluation of surface water conditions is data that is two years old and, for unexplained reasons, still unvalidated. The text indicates samples have been taken since 1989, and continue to be taken, including some from new stations. This data apparently gets released to outside parties in periodic reports and meetings. Other groups within EG&G/DOE are evidently using it for decision making. This information must be provided to support the RFI/RI workplan.</p>	<p>Existing sample results for all samples have been evaluated and the field sampling plan has been based on this evaluation (as was the IAG scope of work). The purpose of the tables showing the 1989 sampling results is to present the most recent data available which represents a full sampling year. Since all of the 1990 sample results were not available at the time of Work Plan preparation, the 1989 data were used. These tables have been removed from the final text and replaced with a more complete summary of the existing data. All sample results for the operable unit will be presented and evaluated in more detail in the RFI/RI Report.</p>
<p><u>Section 2.2.5, Page 2-19</u></p>	<p>The "estimated" depth of valley fill alluvium beneath the A series ponds is only a guess unless it is based on something more than the reported thickness in Well 1286. This statement must be substantiated or qualified.</p>	<p>DOE agrees. The statement that the estimated thickness of the alluvium (from well 1286) is similar beneath the A-Series Ponds has been deleted.</p>
<p>E-5</p>		

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<p><u>Table 2-7</u></p> <p>E-6</p>	<p>The units on this table need to be checked against the text and against Table 2-6.</p>	<p>The units reported in Tables 2-6 and 2-7 are those provided in the original document (Paine). The units reported in the text are from the database source. The units may be different due to their age and source.</p>
<p><u>Section 2.3.4, Page 2-31</u></p> <p>E-7</p>	<p>This section does not discuss the sediment data presented. It also makes reference to "all other" radionuclides being "at background levels". It would be useful to discuss the implications of the sediment data, and to specify what radionuclides were analyzed. A negative finding is as important as a positive one; more to the point, EPA is not aware that "background levels" have been adequately defined even now, they certainly were not as of the date of the reference cited. Data must be provided regardless of the state of validation to support statements within the workplan.</p>	<p>The purpose of this section is to provide a summary of previous investigation and results that were used in formulating this Work Plan. The data presented and the results discussed are taken directly from the sources identified for the data. An analysis of the data in regards to what constitutes "background" will be part of the investigation effort. As part of the final work plan, a more extensive review of the existing data has been included. All of the available data for the operable unit will be included in the RFI/RI Report.</p>
<p><u>Section 2.8.2, Page 2-49</u></p> <p>E-8</p>	<p>Given that residues from fires were reportedly stored in this area, the analytical list may need to be expanded to include possible products of combustion and residues, such as dioxins. Failure to do this must be justified in the plan.</p>	<p>The fire waste and residue placed in the triangle area were drummed and stored on site for several years starting in 1969. During this time, several incidences of leaking drums, which were from various sources, were reported. Since it is expected that these areas were already remediated during this period, and it is uncertain if any of the fire water drums leaked, the analysis for</p>

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<p><u>Section 2.8.2, Page 2-50</u></p>	<p>The old triangle area was extensively reworked during construction of the PSZ. No mention is made in this history of when or how this occurred, even though this will affect both the investigation design and the results. An analysis of the disposition of potentially contaminated materials must be provided. This information and an evaluation of what changes in approach it warrants must be added.</p>	<p>dioxins does not seem warranted for this initial work. The other compounds specified in the analytical program are anticipated to be adequate to detect if contamination is present. If contamination areas are detected in this IHSS, then the analytical program can be expanded to include dioxin analysis as needed.</p>
<p><u>Section 2.8.2, Page 2-51</u></p>	<p>The "miscellaneous equipment" stored at the site may have included transformers. Can the nature of this equipment be substantiated? In any case, given recent sediment analysis results from ditches within RFP, expanded investigation of the possible presence of PCBs in the Walnut Creek soils/sediments is appropriate.</p>	<p>The discussion in the first paragraph on page 2-51 is the only information currently available regarding clean-up activities during the construction of the PSZ. Any additional information located regarding the PSZ construction will be included in the RFI/RI Report.</p>
<p>E-9</p>		
<p>E-10</p>		<p>Some of the miscellaneous equipment has been described in the text based on aerial photograph review. Additional photo review is proposed in Section 7.2. The equipment will be described as much as possible in the RFI/RI Report. DOE has added the analysis of PCBs and pesticides to the sediment sampling program in Walnut Creek (see Section 7.1.3).</p>

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<p><u>Section 2.11</u></p> <p>E-11</p>	<p>In general, the conceptual models seem much too anxious to "write off" entire pathways based on very sweeping assumptions and thin reasoning. At this stage, a pathway must be considered potentially complete until proven otherwise. Workplans must be designed to verify or refute the completeness of potential pathways. Inherent in the conceptual model should be a consideration of the likelihood that the IHSS constitutes a "source" in the true sense of the word, an area that is likely to continue releasing contaminants and contributing to their spread into previously unaffected areas. This determination is based on the history of use, specifically the nature of activities conducted and materials deposited at the site. The field sampling plan should then be designed to distinguish "source" from "affected" areas, as they may require different types and degrees of response.</p>	<p>The Work Plan has been modified to present a generic conceptual model showing all pathways of exposure for all of the IHSSs in OU-6. The Phase I investigation will focus on defining the nature and extent of contamination, and the models, including sources and affected areas, will be revised as the data is evaluated.</p>
<p><u>Section 2.11.1,</u> <u>Page 2-65</u></p> <p>E-12</p>	<p>The completely unsubstantiated assertion that precipitation "tends to run off to the drainages, so there is little infiltration", in no way justifies ignoring the groundwater pathway. Unless this "tendency" can be documented and quantified through infiltration or soil moisture measurements, contaminant migration to groundwater must be assumed to be possible and the investigation designed accordingly. Hurr, 1976, indicates high</p>	<p>Please see the response to comment number E-11.</p>

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<p><u>Section 2.11.4,</u> <u>Page 2-66</u></p>	<p>infiltration rates for the Rocky Flats Alluvium, up to 7.35 inches per hour. More direct findings will be required to show that infiltration in the North and South Spray Fields is not also high.</p>	
<p>E-13</p>	<p>Please see comments on Section 2.11.1. The assertion that contaminant migration to groundwater is not of significant concern must be substantiated. This is the purpose of the field investigation.</p>	<p>Please see the response to comment number E-11.</p>
<p><u>Section 2.11.6,</u> <u>Page 2-67</u></p>	<p>Please see comments on Section 2.11.1. The fact that the unit is on a slope doesn't prove anything, least of all that the groundwater pathway can be ignored.</p>	<p>Please see the response to comment number E-11.</p>
<p>E-14</p>	<p>The completion of removals and placement of cover in some areas does not mean the surface is clean. The RI may establish that it is, but that has not been determined. Surface water and air must be considered potential pathways. Similarly, continued migration from residual contamination in subsurface soils cannot simply be assumed to be unlikely. This must be considered a</p>	<p>Please see the response to comment number E-11.</p>
<p><u>Section 2.11.7,</u> <u>Page 2-67</u></p>		
<p>E-15</p>		

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<p><u>Section 2.11.8,</u> <u>Page 2-68</u></p>	<p>potential pathway until reliable information is available to discount it.</p>	
<p>E-16</p>	<p>The groundwater pathway at this site may be of particular importance, as penetration of plutonium into the soil, perhaps facilitated by detergents in the outflow, is indicated by existing information.</p>	<p>Please see the response to comment number E-11.</p>
<p><u>Section 3.2</u></p> <p>E-17</p>	<p>The ARAR analysis process must evaluate chemical specific ARARs, Location Specific ARARs and Action Specific ARARs. A summary of how these various ARARs are evaluated in the RI/FS process is as follows:</p> <ul style="list-style-type: none"> - Chemical specific ARARs are proposed during the draft and final RFI/RI workplan and report and are finalized during the draft and final CMS/FS report. - Location specific ARARs and preliminary remediation goals are proposed during the draft and final RFI/RI report and are finalized during the draft and final CMS/FS. The remediation goals are based on risk assessment, proposed ARARs and the NCP. 	<p>The Work Plan has been rewritten to accommodate this process.</p> <ul style="list-style-type: none"> - This work plan identifies the scope of potential chemical specific ARARs/TBCs. ARARs/TBCs will be proposed when sufficient data is available to adequately determine which parameters are of concern at OU6. - DOE concurs with EPA's comment except that preliminary remediation goals are proposed during the draft and final RFI/RI. DOE plans to address remediation goals during the scoping of the FS as discussed in the preamble to the NCP, 55 FR 8712, third column.

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E-18	<p>- Action specific ARARs are finalized during the draft and final FS.</p> <p>The workplan must be written to accommodate this process. Failure to do so will result in an inadequate RI report.</p> <p>Tables 3-1 and 3-2 are missing SDWA values for Strontium 90 and Tritium. A footnote for gross alpha needs to be added explaining that this excludes uranium. It should be noted that the 4 mrem/yr for gross beta is a screening level. This screening level can be used to calculate the maximum concentrations of the cesium isotopes. It is beneficial to identify the maximum values for the contaminants present in the operable unit in this table.</p>	<p>- DOE concurs.</p> <p>SDWA values for strontium-90 and tritium - There are no specific MCL values for these two radionuclides; rather, the regulation states that "compliance may be assumed without further analysis if the average annual concentration of gross beta particle activity is less than 50 pCi/l and if average annual concentration of tritium is less than 20,000 pCi/l and that of strontium is less than 8 pCi/l provided that, if two or more radionuclides are present, the sum of their annual dose equivalents to bone marrow shall not exceed 4 mrem/yr. This footnote has been added to the tables. A footnote for gross alpha has been added explaining that this standard excludes uranium.</p> <p>Data on maximum values for contaminants present in OU6 are presented in Section 7.0 of the Work Plan.</p>
E-19	<p>Newly promulgated (1/30/91) MCLs and MCLGs are relevant and appropriate and are not TBC. These standards may be considered as applicable on the date they become effective. TBC values in Tables 3-1 and 3-3 must be changed, where appropriate, to meet this rule. Background for a particular</p>	<p>Newly promulgated MCL and MCLG values are in the table as TBCs until the date they become effective.</p> <p>Background levels have not yet been established at Rocky Flats for these parameters.</p>

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E-20	<p>parameter is also considered an ARAR and not TBC until an ACL is established for that parameter.</p> <p>The sampling and analysis plan must be written to allow evaluation of the data in regard to the ARAR values and the 10^{-6} point of departure in the risk assessment. This should also be established as a DQO.</p>	<p>The analytical program is based on EPA approved methods and includes standard techniques used in Superfund. The analytical program includes standard EPA contract laboratory program (CLP) methods (e.g., <u>USEPA Contract Laboratory Program Statement of Work for Organic Analysis, Multi-Media, Multi-Concentration</u>) and other "standard methods." Applying standard EPA analytical methods, as detailed in the Work Plan, is appropriate in a Phase I study such as the OU6 investigation because:</p> <ul style="list-style-type: none"> • The methods are widely used in Superfund (and RCRA) to characterize uncontrolled hazardous waste sites where historical disposal practices are not well known. • The methods typically provide high quality assurance/quality control performance that is widely accepted by both federal and state agencies. • Applying CLP methods is conservative because of the many individual analytes that are reported within a given suite of contaminants. For example, the Volatile Organic suite includes analysis for 34 individual compounds as well as up to 10 tentatively identified compounds (TICs).

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<p><u>Section 3.2.3, Page 3-27</u></p> <p>E-21</p> <p>E-22</p>	<p>The state construction standard for plutonium in soil must be considered as a chemical-specific ARAR.</p> <p>Potential ARAR values for radionuclides need to be revised in Table 3-1 to reflect the effective state standards for groundwater which are the same for the Woman Creek surface water segments. RCRA Appendix 9 constituents need to be listed as potential ARARs.</p>	<p>Standard EPA CLP analytical methods provide detection limits that are reasonable for site characterization, preliminary evaluation of potential health risks, and for screening compliance with ARARs. Comparison of analytical detection limits suggests that lifetime added cancer risks in the range of 1×10^{-4} and 1×10^{-6} can be evaluated. In some instances, method performance may not support an evaluation of the lower end of EPA's acceptable risk range (i.e., 1×10^{-6}) (see Citation E-23). A similar situation could occur with ARARs that have very low numerical values. This artifact of the DQO process is commonly encountered in the Superfund program nationwide. This matter is dealt with in Superfund through application of a phased approach that includes an initial phase to characterize the site and evaluate health risks and ARARs. If, from this assessment, it is determined that further analysis is required to meet program objectives which could include health risk evaluations and ARARs compliance (among others), then alternative sampling and analytical methods can be specified and implemented.</p> <p>The state construction standard for plutonium in soil is not a chemical-specific ARAR but is an action-specific ARAR. A discussion of action-specific ARARs is provided in the text.</p> <p>Table 3-1 has been revised to include state temporary standards for groundwater. Only those Appendix 9 constituents which are included in the OU Field Sampling Program (see Table 7-5) are included on these ARAR tables.</p>

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<p><u>Section 3.2.6, Page 3-29</u></p> <p>E-23</p>	<p>Units within Table 3-1, Table 3-2 and Table 3-3 need to be uniform for comparability. It is beneficial to list maximum concentrations of parameters for all media on the tables (see OU1 Workplan, Section 7).</p> <p>Item (C) in the listing must be changed to read "...in cumulative risk in excess of 10^{-6} and not 10^{-4}." The NCP reference was interpreted incorrectly. The sampling and analysis protocols need to be adjusted for evaluation of the data in regard to the 10^{-6} risk level. It is not required that clean up levels be established in the workplan but it is necessary to establish sampling and analysis protocols that will be sufficient to evaluate the 10^{-6} point of departure.</p>	<p>Units in these tables have been converted to ug/l for comparability. Unlike the OU1 Work Plan, which is Phase III, OU6 is a Phase I Work Plan and maximum concentrations for all parameters are not yet available.</p> <p>The reader is referred to Citation E-20 for a general discussion of the detection limit/risk range issue and application of a phased approach. Consideration of performing chemical analysis to permit assessment of media-specific contributions to a 1×10^{-6} aggregate (i.e., cumulative) lifetime added cancer risk is not required at this phase of the investigation nor technically feasible in many cases.</p> <p>For example consider a hypothetical assessment involving carbon tetrachloride:</p> <p style="text-align: center;">Estimated Detection Limits for Carbon Tetrachloride In Water</p> <p style="text-align: center;">Based on 1×10^{-6}</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">Case</th> <th style="text-align: center;">Target Detection Limit (ug/l)</th> </tr> </thead> <tbody> <tr> <td>1 Compound, 1 Pathway</td> <td style="text-align: center;">0.6</td> </tr> <tr> <td>5 Compounds, 1 Pathway</td> <td style="text-align: center;">0.1</td> </tr> <tr> <td>5 Compounds, 3 Pathways</td> <td style="text-align: center;">0.04</td> </tr> </tbody> </table>	Case	Target Detection Limit (ug/l)	1 Compound, 1 Pathway	0.6	5 Compounds, 1 Pathway	0.1	5 Compounds, 3 Pathways	0.04
Case	Target Detection Limit (ug/l)									
1 Compound, 1 Pathway	0.6									
5 Compounds, 1 Pathway	0.1									
5 Compounds, 3 Pathways	0.04									

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		<p>From this assessment, it is clear that practicable technical limitations exist that limit analytical evaluation of 1×10^{-6} cumulative lifetime added cancer risk. In a case where carbon tetrachloride is the only compound present in water, the required detection limit (0.6 ug/l) (actually the Practicable Quantitation Limit, PQL) can not normally be obtained through routine analytical services (RAS-CLP), but can normally be obtained through special analytical services (SAS) (Note: PQL for Method 502.1 is 0.2 ug/l). However, if the exposure assessment indicates exposure to five potentially carcinogenic substances concurrently in the water, the required target detection limit for carbon tetrachloride would be reduced to approximately 0.1 ug/l. This concentration is not generally achievable with SAS techniques because of the low sensitivity required and potential matrix interferences from other compounds in the sample. Finally, if the exposure assessment indicated concurrent exposure to carbon tetrachloride through three separate pathways each containing the same five compounds (e.g., ingestion, inhalation of vapors, and dermal contact), a target detection limit of 0.04 ug/l would be indicated. Obtaining laboratory performance to a such a detection limit through EPA approved methods is not practicable. It is notable that the RAS-CLP detection limit of 5 ug/l correlates with an approximate 8×10^{-6} lifetime added cancer risk. This lifetime added cancer risk is clearly within the range of 1×10^{-4} 1×10^{-6} which the National Contingency Plan (NCP) requires EPA to evaluate in terms of acceptable risk.</p>

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<p><u>Table 4-1</u></p> <p>E-24</p>	<p>The description of "Data Need" confuses the issue of source characterization with delineation of the nature and extent of contamination emanating from a source. A plume is an effect, not a cause, and therefore not a source. The sampling and analysis efforts should be specifically selected for and targeted at one purpose or the other.</p>	<p>The National Contingency Plan recognizes the problem of technical practicability in several areas, including detection of chemicals at very low concentrations. In their discussion of establishing remediation goals and the "point of departure," the EPA acknowledges that preliminary remediation goals (considering the point of departure) may be revised based on technical factors, including detection/quantification limits for contaminants (see FR/Vol/55, No. 46 pp. 6717).</p> <p>In light of this consideration, and the previous response to Citation E-20, it is appropriate in this phase of study to implement an analytical program based on standard EPA approved RAS-CLP methods as described in the Work Plan. In the event that a second phase of study is required, DQOs that address the concerns of cumulative risk and analytical sensitivities can be specified, as necessary, on a site- and media-specific basis.</p> <p>The identification of contamination emanating from a source is hoped to lead to identification of the sources. DOE and the agencies can not assume that the sources have already been identified. Part of the RI process defined in EPA guidance calls for modification of the conceptual models as additional data are obtained. The Phase I field sampling program has been designed to address both the sources and the contamination such that further investigations can be scoped as necessary to lead to</p>

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<u>Section 4.1.3, Page 4-2</u>	<p>Several probable sources of air contaminants are identified within this OU, and air is shown as a pathway in Figure 4-2. Yet there is no mention of air quality as a data need, and the FSP does not include any provisions for air monitoring. If this data is being obtained from another monitoring program, this must be described, and an evaluation provided to demonstrate adequacy of that program to support the OU6 decision-making process. Otherwise, appropriate air monitoring efforts must be identified and described as part of this plan, and implemented under the OU 6 RI effort.</p>	<p>remediation of the IHSSs or that IHSSs can be eliminated. Thus, the conceptual models will be refined as the RI proceeds.</p> <p>Three proposed Hi-Vol air sampling stations have been included in the FSP for OU6. These stations will become part of the site-wide air monitoring program already established at RFP. The air monitoring program is now discussed in Section 7.2.8 and the proposed locations are illustrated on Figure 7-4.</p>
<u>Section 5.1</u>	<p>As stated in the general comments, the activities described here should be completed during preparation of the subject document. This should include a compilation of information obtained from reviewing the "existing reports" referred to. At some point, the revising and rethinking has to stop and the work has to begin. The plan can incorporate alternative actions, such as installing or skipping a particular well location based on intermediate findings and decision points; but it must lay out the full anticipated scope of activities required to support a Record of Decision.</p>	<p>Please see the response to comment number E-1.2. The existing data from OU6 has already been reviewed during development of this Work Plan. This task is included as part of the Work Plan for completeness so that all the activities specified in the IAG are provided.</p>

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<p><u>Section 5.3, Page 5-2</u></p> <p>E-27</p>	<p>It is also important to note that while IAG milestones for this OU do not extend beyond the Phase I RI, this is not justification for not completing an investigation which can support a find ROD for this OU. Failure to obtain all required data through execution of the program described in this plan is not in DOE's best interest, and may make it impossible to meet DOE clean-up targets.</p>	<p>Please see the response to comment number E-12.</p>
<p><u>Section 5.4, Page 5-4</u></p> <p>E-28</p>	<p>Coordination with laboratories in designing and running the analytical program is paramount. Poor performance in this area is the surest road to a bad RFI/RI. There is considerably more to this job than sending off samples and waiting for results, as described here. Consideration should be given to using an organization structure which assigns certain persons specifically to this responsibility.</p>	<p>DOE concurs.</p>
<p><u>Section 5.5.1, Page 5-5</u></p> <p>E-29</p>	<p>This one short paragraph is the only mention found of modeling. If modeling is really going to be used as extensively as this paragraph would suggest, a much more thorough discussion of the particulars of this effort is required. This must include a description of the models to be used, how they will be applied,</p>	<p>EG&G is currently evaluating several models for use at RFP and for OU6 so it would be pre-mature to provide specifics on a model which has not been selected. After selection of an appropriate model, EG&G will provide EPA/CDH with details in a technical memorandum on how the model will be used and</p>

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<u>Section 5.7, Page 5-9</u>	and how this is being coordinated with similar efforts in other areas of RFP.	applied and how this effort would be coordinated with the other OUs.
E-30	The number of alternatives to be retained for detailed analysis depends on the nature and complexity of the problems they are intended to solve. It is inappropriate to set a limit of 10 before the RFI/RI has started.	The number 10 is used to define the number of alternatives that will be carried past the initial screening step. The referenced paragraph discusses the need for additional studies to define the 10 best alternatives. The limiting number will be re-evaluated when that step of the process is reached.
<u>Section 7.1</u>	During the scoping session for this plan, reductions in sampling density in several areas (old outfall, triangle, and soil dump) from that specified in the IAG Table 5 were generally agreed to be appropriate, but only with the understanding that if "hot spots" were located, the "extra" points would then be used to better identify their extent. Additionally, if DOE does not believe that the RFI/RI Workplan proposed will support a ROD, these inadequacies should be addressed in the RFI/RI Workplan. The rationale stated here does not reflect this understanding, or provide any mechanism for how it would be implemented. The IAG scope of work specifies (Section VI.B) that the work plans should anticipate the need for additional data, and provides a mechanism for amending the plan with a technical memorandum describing the additional efforts to be completed when such need arises. This section must be revised to reflect this procedure,	At all three of these areas (Old Outfall, Triangle Area and Soil Dump Area), additional surface soil samples will be taken to characterize any areas with elevated radionuclides (see Sections 7.2.3, 7.2.4 and 7.2.5). This should provide the "extra points" that were discussed previously. Also please see the response to comment number E-1.2.
E-31		

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<p><u>Section 7.1.3, Page 7-3</u></p> <p>E-32</p>	<p>and provide a means of incorporating reasonably foreseeable needs for additional field efforts within this Phase I RI.</p>	
<p><u>Section 7.1.3, Page 7-4</u></p> <p>E-33</p>	<p>Item (2) indicates composites will not be used for volatile or semi-volatile analytes. This represents a change from our understanding of the SOPs, and must either be changed or explained in an SOPA.</p>	<p>The modification in (2) matches the SOPs and was made to be more consistent with the SOPs.</p>
<p><u>Section 7.2.2, Page 7-11</u></p> <p>E-34</p>	<p>If the analytical list is going to site-specific (contrary to our understanding based on recent discussions) it must be laid out in detail. Simply saying that half the samples will be analyzed for Pesticides/PCBs is not adequate. Which samples these will be and why/how they were or will be selected must be included in the RFI/RI Workplan.</p> <p>It is stated that sediment samples will be collected in the creek</p>	<p>Item (4) in the modifications to the analytical program (Section 7.1.3) describes the addition of pesticide/PCB analyses to the analytical program. The detailed analytical program for each IHSS is laid out in Sections 7.2 and 7.3. The sediment samples collected for pesticide/PCBs analyses will not be selected randomly, but rather all sediment samples (excluding the pond samples) will be analyzed for pesticides/PCBs for the pond sediment samples. The sample collected from the deepest part of the pond and the sample collected 5 feet from the inlet will be analyzed for these analytes.</p> <p>The text has been corrected to refer to Parking Area No. 71. Indiana Street has been added to the figures.</p>

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<u>Section 7.2.4, Page 7-21</u>	from building 118 to Indiana street. Neither of these landmarks is labeled on the referenced figure.	
E-35	The stated purpose of the well located in the Soil Dump Area is to characterize bedrock geology, but it is not shown as a bedrock well on the figure. This discrepancy must be corrected.	The figure does not make a distinction between proposed alluvial wells and proposed bedrock wells. The well will be completed as a bedrock well, as described in Section 7.2.4.
<u>Section 7.3, Page 7-30</u>		
E-36	Recent discussions of subsampling, sample intervals, and compositing techniques (and associated changes in the sampling SOPs) must be reflected in the final plan.	The Work Plan has been modified as necessary to reflect the current SOPs. Some of the modifications in Section 7.1.3 were specifically added to make the planned program more closely match the current sampling techniques.
<u>Section 7.3.2, Page 7-32</u>		
E-37	Several basic questions posed by EPA at recent meetings about the analytical programs at all OUs remain unanswered (like where the analyte list came from and how will TICs be handled). DOE has also proposed a scheme for reducing the analytical list in some areas, and it is not clear if this applies to OU 6. Results of these discussions must be incorporated in the final plan.	The analytical program for OU6 is designed in accordance with the GRRASP (referenced on page 7-32). This analytical program for OU6 is based on the Contract Laboratory Program (CLP) target compound list (TCL) for organics and the target analyte list (TAL) for metals. The TCL and TAL were chosen as the basic for characterizing this OU because of the following: 1) They are used by EPA in characterizing uncontrolled hazardous waste sites where historical waste disposal practices are often unknown; 2) They include associated high quality

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<p><u>Table 7-12</u></p> <p>E-38</p> <p><u>Section 7.3.2, Page 7-40</u></p> <p>E-39</p> <p><u>Section 8.1, Page 8-1</u></p> <p>E-40</p>	<p>This appears to be the same table as 7-8. They are not both necessary.</p> <p>The soil gas analytical parameters for IHSS 165 should include likely breakdown products of TCE, such as 1,2-dichloroethene and vinyl chloride.</p> <p>In the first dot list, a determination is made of which exposure pathways present or contribute to an unacceptable risk. Remediation is then targeted at appropriate media. Exposure pathways are not remediated.</p>	<p>assurance/quality control procedures that are widely accepted by both federal and state agencies, and 3) Applying CLP methods is conservative because of the many individual analytes that are reported within a given suite of contaminants. DOE does not propose to reduce the analytical lists from those shown on Table 7-9.</p> <p>EPA is correct. Table 7-8 should be a table describing the field program for the East Spray Field and has been corrected.</p> <p>The text in Step 2 (page 7-23, Section 7.2.5) states that "Analytical peaks of compounds for which the gas chromatograph (GC) is not calibrated will be noted." Therefore, if peaks occur for vinyl chloride or 1,2 dichloroethane, they will be noted.</p> <p>The text has been modified as suggested.</p>

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<p><u>Section 8.2, Page 8-3</u></p> <p>E-41</p>	<p>The text states that "Existing analytical results taken from other sources will be acceptable as suitable for risk assessment purposes." The indefinite meanings of "other sources" and "as suitable" allow numerous interpretations of this statement. Please understand, data that fails to meet acceptance criteria under the QA/QC protocols established for this program cannot be used in risk assessment.</p>	<p>Comment noted.</p>
<p><u>Section 8.3, Page 8-3</u></p> <p>E-42</p>	<p>The number of TICs is not the only, nor the most important criteria mentioned in EPA guidance for determining how TICs are handled. EPA has requested that a TIC evaluation procedure be developed and incorporated in the SOPs/QAPjP. This document must be revised to be consistent with those procedures, when developed.</p>	<p>DOE is unaware of a SOP for evaluating TICs in the analytical data. TICs will be considered according to standard practices in Superfund as identified in RAGS.</p>
<p><u>Section 8.3.1, Page 8-4</u></p> <p>E-43</p>	<p>Please correct the text to read that exposure scenarios developed in the baseline risk assessment will include current and potential future receptors.</p>	<p>Informational comment acknowledged. The (BRA) will comply with the National Contingency Plan including the requirement to consider potential risks to human health.</p>

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<u>Section 8.4, Page 8-6</u>	Discussion of uncertainty inherent in toxicity assessment seems more appropriate in the uncertainty analysis section, which should come after risk characterization, as it does in practice.	Uncertainties in the toxicology information will be identified in the Toxicology Assessment segment of the BRA. They will be evaluated relative to the characterization of risk in the Uncertainty segment.
<u>Section 8.6, Page 8-7</u>	The meaning of the phrase "reasonable minimum exposure conditions" must be clarified and the use to which this abstraction will be put defined. EPA guidance specifies use of a "reasonable maximum" exposure scenario.	The summed exposure to contaminants will be accomplished as appropriate, and presented. The reasonable minimum exposure (RMinE) condition is analogous to the reasonable maximum exposure (RME) condition. The RME is the approximate upper 95th percentile estimate. RMinE is the approximate lower 5th percentile estimate.
<u>Section 9</u>	It is our understanding that the EE plan presented here has been superseded by subsequent revisions to the approach to EE's as reflected in EE plans for OUs 1, 2, and 5 submitted 12 June 1991. Thus no specific comments are made here. In making revisions, please refer to comments provided in the ongoing EE review meetings, and those submitted 03 July 1991 on the Phase I Work Plan/EE Plan for OU 5.	Comment noted.

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<p><u>QAA Comments</u> <u>Section 3.1.3, Page 8</u></p>	<p>The target for completeness is 100%, the minimum acceptable is 90%.</p>	<p>Agree. The text has been clarified as such.</p>
<p><u>Table 2, Page 16</u></p>	<p>Equipment rinsate blanks are required at the rate of 1 per 20 samples or 1 per day, whichever is greater.</p>	<p>This specification - 1 per 20 or 1 per day - has been added to Table 2.</p>
<p><u>Section 5.0, Page 20</u></p>	<p>In this and all other areas, references to the site-wide QAPjP should include specific section numbers.</p>	<p>The references to the QAPjP in this section are to all QA requirements of the QAPjP. Therefore, each section would need to be referenced since all sections contain potentially applicable requirements.</p>
<p><u>Table 3, Page 24</u></p>	<p>Please check the list of metals shown for GFAA analysis. What is Pg?</p>	<p>"Pg" has been changed to "Pb."</p>
<p><u>Section 12.1, Page 25</u></p>	<p>Specifications for types of field measurement equipment in the QAA should be consistent with the SOPs (4.2), which these are not.</p>	<p>Model numbers have been added as well as additional equipment to be consistent with the requirements of SOP 4.2.</p>
<p><u>Appendix A, Pages 31-33</u></p>	<p>Please check units and chemical names, several of them contain errors.</p>	<p>Appendix A has been rechecked, and the corrections have been made.</p>

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<p><u>General Comment</u></p> <p>C-1</p>	<p>All figures in Section 2 and Section 7 should incorporate the surface geological contacts depicted on Figure 1-5. Overlying the geology facilitates the Division's understanding of the site characteristics and investigations plans and objectives. The following figures should be updated: Figures 2-2, 2-7, 2-10, 2-11, 2-12, 7-1, 7-2, 7-3, 7-4, 7-5 and 7-6.</p>	<p>The figures in Section 2.0 illustrate the boundaries of each IHSS and locations of monitoring locations. The figures in Section 7.0 illustrate proposed sampling and well locations proposed in the FSP. Adding the surficial geologic contacts as depicted on Figure 1-5 would only impede the primary features being illustrated in each of the figures. The geologic contacts will therefore not be added to the figures as the surficial geologic map (Figure 1-5) can be referenced.</p>
<p><u>Executive Summary</u></p> <p>C-2</p>	<p>In the first paragraph, page ES-1, it is stated that "the presence or absence of contamination at (IHSSs)" will be investigated. Although the IHSSs constitute the focus of the investigations, the effort cannot be limited to these discrete units if contiguous or upstream contamination is suspected. For example, the work plan properly provides for the investigation of stream drainages between the A and B series ponds. It must also provide, more fully, for the investigation of stream channels from contaminate release points to the unit (i.e. Old Outfall). The specific comments will expound on overlooked issues. The summary, however, should acknowledge that the investigation will be thorough and not limited merely to designated IHSSs.</p>	<p>The Phase I investigation will begin with the investigations of the IHSSs as these are identified areas of potential contamination. The Work Plan provides for samples in Walnut Creek downgradient of the Old Outfall in Section 7.2.2. The results of the Phase I investigation will be used to design investigations of other areas of the operable unit if it appears that other areas of the operable unit should be investigated.</p>

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<p>C-3</p>	<p>In the fourth paragraph, page ES-2, the requirements of the Field Sampling Plan, i.e. screening activities, sampling of soils etc. are described. Characterization of the IHSSs and associated areas or drainages will not be complete, nor adequate, if the vadose zone is ignored. The importance of the vadose zone is discussed beginning in the last paragraph of page 2-8 of "Volume 1, Interim Final RCRA Facility Investigation Guidance, Development of an RFI Work Plan and General Considerations for RCRA Facility Investigations", May 1989 (EPA 530/SW-89-031). The FSP should be amended to provide for vadose zone monitoring and sampling where the Conceptual Models anticipate ground water contamination.</p>	<p>Vadose zone sampling is provided for in the FSP through the sampling of borings and wells during the Phase I investigations. Monitoring of the vadose zone will be proposed as a Phase II activity if appropriate for an IHSS.</p>
<p><u>Section 1.0</u></p> <p>C-4</p>	<p>In the first paragraph it states that the FSP is presented to assess the "nature and extent" of contamination of the IHSSs. As presented in this document, the FSP is essentially a screening survey. Much more will be necessary to define nature and extent of contamination. Extent, for example, cannot be fully determined from one or two down gradient monitoring wells. As written, the general public might assume, incorrectly, that the current version of the FSP will be comprehensive. Although an RFI work plan may need to be performed in stages, it should be the intent of the plan to be as comprehensive as practical to expedite remediation. The introduction should acknowledge that a staged approach is envisioned and the FSP should clearly</p>	<p>DOE agrees that the FSP may not provide complete characterization of the IHSSs in OU6 especially if significant anomalies or contamination is encountered. Section I.B.9, <u>Investigatory Phase Documentation</u> (page 6 of the IAG Statement of Work) specifically describes the phased approach to investigations at OUs 3 - 16. The IAG explanation of the phased approach as it relates to OU-6 has been added to the Executive Summary and Section 1.0 of the Work Plan for clarification.</p>

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C-5	<p>describe the possible stages of the investigation, and alternatives, in a decision-tree.</p> <p>Relative to foregoing observations, the Division is concerned that IAG, Statement of Work, Table 5 is perceived as meeting the screening and sampling requirements necessary to define nature and extent of contamination. However, the SOW specifically states that "The FSP shall incorporate the sampling objectives of Table 5, and shall anticipate investigations beyond the work specified in this Attachment" (SOW, page 25, Section VI.B). Please propose an FSP that will reasonably define nature and extent and diminish the need for additional stages.</p>	<p>The Field Sampling Plan (FSP) has been developed using the IAG Scope of Work and additional investigations, as necessary, to provide a framework for the Phase I RFI/RI Report as defined in Section I.B.9 of the IAG scope of work. DOE does not believe that the FSP will provide for complete characterization of the nature and extent of contamination, or its fate and transport, if contamination is encountered or if there are significant heterogeneities. If these situations are present then additional investigation will probably be needed. Please see the response to the previous comment.</p>
C-6	<p>The reference to the "RFI Guidance" should be 1989a not 1989b. Please correct.</p>	<p>The reference to the RFI Guidance has been corrected.</p>
<u>Section 13.3.1</u>	<p>The discussion on topography, page 1-4, is very weak. Both the gentler eastward slopes and topographic dissection play an important role in the exposure or subcropping of bedrock at, and in the vicinity of, Rocky Flats. Topographic relief, although seemingly inconsequential, may increase the potential for contamination of stratigraphically lower units (like the Laramie Formation). The Division believes that the interrelationship of geologic structure and topography have not been fully considered</p>	<p>DOE agrees that the topography is important in the characterization of the IHSSs. The discussion on topography in Section 1.0 is intended to provide an overview of the operable unit. The topography of each of the IHSS's is discussed in the appropriate parts of Section 2.0 of the Work Plan. Interpretation of the affects of the topography and geology on the potential for contaminant migration will be evaluated in the RFI/RI Report.</p>

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<p><u>Section 13.3.2</u></p> <p>C-8</p>	<p>in the determination of potentially contaminated strata. An insightful discussion, not merely acknowledgement of regional slope and the general elevation, should help foster a better understanding of site geology and associated contamination.</p> <p>The location of the Broomfield Diversion Ditch, page 1-7, should be shown and identified on Figure 1-2.</p>	<p>The location of the ditch has been added to the figure as suggested.</p>
<p><u>Section 13.6</u></p> <p>C-9</p>	<p>On page 1-10, "deeper bedrock sandstones under confined conditions" are discussed. Are these the mappable sandstones of the Arapahoe Formation or the Laramie/Fox Hills Formations?</p>	<p>The text has been revised to indicate that the deep bedrock sandstones are referring to the Laramie/Fox Hill Formation.</p>
<p>C-10</p>	<p>It is stated in this section that geologic interpretations are based on information from Hurr (1976) and the Geologic Characterization Report (EG&G, 1990e). The Hurr report was aimed at the hydrology of Rocky Flats. The geology sections of that report were not the main emphasis; they merely suggest the general geologic setting or context of his work. Consequently, it would be better to extract more definitive geologic information from Weimer, 1973 (referenced in Hurr) and comparable geologic studies. This is not merely a matter of preference or bias but of substance.</p>	<p>DOE agrees with Dr. Weimer's geologic and regional model and Cretaceous stratigraphy. However, Hurr has been referenced under the Regional and Local Hydrogeology Section as Hurr's report uses the Weimer models and as this reference is more recent and is site specific to Rocky Flats.</p>

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<u>Section 1.3.6.1</u>		
C-11	On page 1-10, "pediment drainages in the top of the bedrock" are discussed. A bedrock surface "structure" map is needed to depict the drainages. The data of Table 2-1 should be mapped pending additional data from RFI activities. It is difficult to see a conceptually adequate FSP without the concept this map would provide.	Very little data exists in OU6 to produce a meaningful bedrock surface structure map (or a realistic potentiometric surface map, or an isopach map of the surficial deposits). Geologic studies are ongoing, and a more complete discussion of the geologic conditions at OU6 will be included in the RFI/RI Report. In addition, five bedrock characterization wells from the site-wide program have been added to this OU6 program (see Section 7.2.2).
<u>Section 1.3.6.2</u>		
C-12	On page 1-16, "younger terrace deposits including the Verdos..." are discussed. However, occurrences of Verdos Alluvium are absent from Figure 1-5. If the Verdos is absent within the Walnut Creek Operating Unit please state in the text.	The Verdos Alluvium has been deleted from the Explanation of Figure 1-5 and the text.
C-13	The section also describes the Verdos, Slocum and Louviers alluvial deposits as "terrace" alluvium. Figure 1-6 shows the Louviers, but not the Slocum, as Terrace alluvium. Which is correct? Also, the legend to Figure 1-5 shows the Terrace alluvium; is this solely the Louviers alluvium. Please modify Figures 1-5, 1-6 and the narrative to establish consistency and clarity.	Figures 1-5 and 1-6 have been corrected and the text is now consistent with the figures.

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<u>Section 13.6.3</u>		
C-14	This narrative states that sandstones of the upper Arapahoe Formation were deposited by meandering streams. It is the Division's understanding that the upper portion of the Arapahoe Formation, at RFP, was eroded prior to the deposition of the Rocky Flats Alluvium. Reference to the upper Arapahoe should include a statement that the section has been eroded. Also, please state the basis for the interpretation that the "claystones represent overbank deposits". Why are they predominant?	The geology of the Arapahoe Formation has been revised to be consistent with the OU2 report. The statement that the Upper Arapahoe Formation was deposited by meandering streams has been deleted. This narrative no longer distinguishes between the Upper and Lower Arapahoe. The current geologic model states that the Arapahoe Formation underlies the Rocky Flats Alluvium beneath the Rocky Flats Plant. The statement that claystones represent overbank deposits is the current geologic interpretation and will be revised, if needed, from the ongoing investigations at the Plant. This will be presented in the RFI/RI report.
C-15	The Division is still under the impression that it is distinctly possible that <u>all</u> of the Arapahoe Formation beneath RFP was removed by erosion. The basis of the interpretation that it is present, or partially present, must be clearly set forth since RFP has shown reluctance in releasing the Geologic Characterization report.	According to the Hurr 1976 report, the Arapahoe Formation beneath the Rocky Flats Plant is about 270 feet. This is illustrated in the local stratigraphic section of the Rocky Flats Plant (Figure 1-4 of section 1 of the Work Plan). This is the current geologic interpretation and will be revised and modified if necessary based on the ongoing geologic characterization study.
C-16	On this issue, the statement is made that the Arapahoe Formation, beneath the Rocky Flats Plant, contains more clay and silt than typical to the formation and is similar to the Laramie Formation. Perhaps it is the Laramie Formation! The Division wishes to know the basis for RFP geologic correlations; a low and possibly rolling dip, topographic relief, and a possible deltaic environment exposed along McCaslin Blvd suggest that the Laramie is at a shallow depth beneath RFP. For example,	Stratigraphic correlations made during the Phase II geologic Characterization Surface Geologic Mapping at RFP and the surrounding area reveal that the stratigraphy has been represented correctly in this Work Plan. The statement that the Arapahoe Formation deposited by braided streams has been deleted and the text is now consistent with the OU2 Work Plan on the discussion of the Arapahoe Formation. Figure 1-4 has

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<p><u>Section 1.3.6.4</u></p> <p>C-17</p> <p>C-18</p> <p>C-19</p>	<p>if the McCaslin Blvd exposures are lower Arapahoe sediments deposited by braided streams, as the narrative suggests, where are the sands typical of braided deposits? To say that the lower Arapahoe was the result of braided streams then state that it contains more clay and silt than typical must be supported by causes for the variation. Note, Figure 1-4 depicts these lenticular sandstones as being continuous.</p> <p>This discussion should be subdivided. The upper Laramie is more than a "thick upper claystone unit" and should not be lumped with the lower Laramie/Fox Hills aquifer. The depositional setting may be better described than "continental" as borrowed from Hurr, 1976. Again, we refer to Weimer, 1973 and comparable studies for more detailed geologic information.</p> <p>The Division also takes exception to Hurr's description of a greater than 700 feet thick claystone with very low hydraulic conductivity. Unless these claystones are prodelta muds there is, in all likelihood, laterally contemporaneous silts and sands that may transmit contaminants laterally and possibly, through interconnection, downward.</p> <p>The Division believes that the need for deeper stratigraphic tests are indicated and warranted to define the subsurface formations, the depositional environments that define them, and the potential</p>	<p>been replaced to reflect the lenticularity of the Arapahoe sandstones.</p> <p>The text has been revised and the discussion on the Upper Laramie Formation and the Lower Laramie and Fox Hill sandstones has been separated. The term "continental deposit" has been deleted. As additional site-specific geological data beneath the OU6 area is acquired from the ongoing investigations, the geologic characterization section will be amended and presented in the RFI/RI report.</p> <p>The thickness of the claystone has been changed from 700 feet to 400 feet. Other equivalent time stratigraphic units of the claystones (i.e., other facies such as silts and sands) may exist beneath the Rocky Flats Plant; however, further characterization of the Laramie Formation is needed before revisions are made to the current regional geologic interpretations of the area.</p> <p>Comment noted. Characterization of the geology of the Rocky Flats Plant is an ongoing investigation. The OU6 investigation and RFI/RI Report will evaluate the data collected by the</p>

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CITATION	COMMENT	DISPOSITION
<p><u>Figure 2-1</u></p> <p>C-20</p>	<p>impacts on contaminate transport and fate. Limited outcrop exposures are just that, "limited".</p> <p>On Figure 2-1 a discontinuous stream segment is shown between the Existing Radioactive Ambient Air Monitoring Program Locations S-3 and S-4. If this stream segment connects to North Walnut Creek via a culvert, please show the trace of the culvert. This is important due to the potential for leakage of contaminants from culverts into groundwater. (Note: if any contaminate releases occurred on this stream segment, both the stream and culvert will need to be investigated.)</p>	<p>ongoing investigations and incorporate this information as appropriate.</p> <p>The trace of the culvert is now on Figure 2-1.</p>
<p><u>Section 2.1</u></p> <p>C-21</p>	<p>On page 2-7, North and South Walnut Creek are referred to as intermittent streams; however, Figures 2-1 and 2-2 use a perennial symbol to depict the streams. Figure 2-2 shows a short dotted sediment with the legend indicating it to be an intermittent stream. The narrative and maps are inconsistent; are North and South Walnut Creek intermittent or perennial? Please clarify this inconsistency and properly indicate the streams on the maps.</p>	<p>All figures have been corrected to show the streams as intermittent.</p>

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CITATION	COMMENT	DISPOSITION
C-22	The second paragraph, page 2-8, discusses the A-1 Bypass. Whether flow is through a culvert or open channel, please show and identify this structure on Figure 2-1.	The A-1 Bypass has been added to Figure 2-1.
C-23	Also relative to this second paragraph and Figure 2-1, does the unnamed drainage situated southwest of Pond A-1 flow into the pond or is it diverted to Pond A-3 via the A-1 Bypass? If flow is through a culvert, please show the trace of the culvert. Again, this information is important due to the potential for contaminant leakage.	The unnamed drainage southwest of Pond A-1 flows into Pond A-3 through the A-1 bypass.
<u>Section 2.2.2</u>		
C-24	The co-solvation, if any, of contaminants (page 2-9), as they affect individual or collective transport into environmental media, should be discussed. Screening and sampling programs should reflect a basic model of how contaminants may move and to which environmental media. This should help focus the FSP.	Co-solvation has not been evaluated in Walnut Creek up to this point. The FSP will evaluate the contaminants present in the creek and ponds and will consider co-solvation as appropriate for the contaminants present.
C-25	The point(s) of discharge into North Walnut Creek of laundry wastewater from the northern production facilities and from process liquid waste, cooling tower blowdown, etc. (page 2-9) must be disclosed. This information is critical in the Division's review of FSP adequacy. Just as contaminants in the vadose zone feed groundwater, contaminants upstream can feed the detention ponds.	The historic discharge points for these facilities are not well known. The investigations for the Historic Releases Report, which is currently being prepared, may provide additional data regarding discharge points and will be used as needed in the OU6 investigation. The FSP has been developed to evaluate Walnut Creek from west of the facilities to the eastern boundary of the RFP. Thus, the potential discharges into Walnut Creek should be initially characterized by this program.

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CITATION	COMMENT	DISPOSITION
C-26	The pathway of spray evaporation (page 2-9) and potential contamination of soil in the vicinity of each pond where spraying was employed must be screened. Specifically and historically, where was this spraying practiced, over the pond or on the ground?	Spraying has been and is being practiced over the ponds. The potential exists to wet the soil adjacent to the pond.
C-27	On page 2-11, first paragraph, pumping of water from Pond B-2 to Pond A-2 is discussed. Please indicate on the appropriate figure(s) the route of the pipeline. This is of interest due to the potential for leakage from the pipeline and resulting contamination.	The underground pipeline has been added to Figure 2-1.
C-28	Also the route of the B-5 to A-4 transfer line, third paragraph, should be disclosed.	The route of the B-5 to A-4 transfer line has been added to Figure 2-1.
<u>Section 2.2.5</u>		
C-29	On page 2-19, third paragraph, reference is made to well B208489 on Figure 2-2. Well B208289 is shown on Figure 2-2 while B208489 is shown on Figure 2-1. Table 2-1 data indicate a depth to bedrock of less than one foot for well B208289. Which is correct? Please amend.	The reference to well B208489 has been revised to say Figure 2-1.
C-30	Are the lenticular sandstone bodies sufficiently correlated as to identify the No. 4 Sandstone as the bedrock beneath the fill? If so, the Division should be supplied with the cross sections demonstrating this knowledge. Figure 2-6 is inadequate, it is schematic and does not verify correlation. Please submit a cross	Yes, the No. 4 sandstone has been identified in the bedrock beneath the fill. This is based on our current understanding of the geology, and Figure 2-6 is based on available data from nearby borings. As additional information is acquired from ongoing investigations at RFP, geologic interpretations will be changed as appropriate and presented in the RI report for this

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CITATION	COMMENT	DISPOSITION
C-31	<p>section that will allow a true assessment of the geologic setting and thus FSP adequacy.</p> <p>The discussion of the No. 4 sandstone, page 2-22, suggests that this specific sandstone is present "immediately beneath" the A-Series ponds. Figure 2-6 shows it immediately beneath ponds A-3 and A-4. However, given the narrow stratigraphic range of the numbered Arapahoe sandstones, it is possible that the No. 3 or No. 5 may be "immediately beneath" ponds A-1 and A-2. This is not inconsequential; the entire transport and fate of contaminants, and a reasonable model, are affected. These considerations must be reconciled within the FSP and/or the interpretation of results from the FSP.</p>	<p>OU and will probably include more detailed cross sections of this area.</p> <p>DOE agrees. The text has been revised to indicate that the No. 4 sandstone is present beneath Ponds A-3 and A-4 and not the entire A-series ponds. Further geologic characterization beneath the ponds is needed and will be revised as appropriate as information is acquired from the ongoing investigations.</p>
C-32	<p>The relationship of the sandstones to a bedrock surface map would be a worthy endeavor. (See comments to Section 1.3.6.1.) Subcroppings, even of a cursory nature, would aid the investigation. The potential for transport from alluvium into a sandstone unit, then back into alluvium or colluvium, must be considered.</p>	<p>DOE agrees. Please see the response to comment C-11.</p>
<u>Section 2.3.4</u>	<p>On page 2-25, third paragraph, vertical distribution of plutonium in pond sediment is discussed. This data should be presented to support the proposed sediment sampling plan.</p>	<p>The specific analytical data are not necessary in the Work Plan since the data are referenced in the text. Table 2-7, taken from the Paine report, shows the vertical distribution of plutonium in the ponds in a summary form.</p>
C-33		

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<u>Section 2.3.5</u>		
C-34	<p>On page 2-31, it is stated that the Arapahoe Formation is present beneath the B-Series ponds. Have the numbered Arapahoe sandstones cropped out or are they present at greater depth, i.e. what is the geologic setting? To say that the Arapahoe Formation is present says little.</p>	<p>This is the current geologic interpretation at this time. Further characterization of the lithology of the Arapahoe Formation beneath the B-series Ponds is needed and will be revised in light of the ongoing geologic investigations, currently being conducted at RFP, if appropriate. This will be presented in the RI report.</p>
<u>Section 2.4.2</u>		
C-35	<p>On page 2-35, the Pond Area Spray Field is discussed. The managers for OU-7, Present Landfill, are planning to incorporate the pond and this spray field into OU-7. How is this change being coordinated between OUs.</p>	<p>The Pond Area Spray Field will be investigated as part of the OU6 program. A separate spray field on the north and south banks of the landfill pond is currently in use with this spray field to be investigated under OU7. The data from each OU will be evaluated during the preparation of the RFI/RI Report.</p>
C-36	<p>Screening surveys or sampling of the South Spray Field should extend to Walnut Creek, and downstream, given the fact that runoff from the surface was prevalent (see page 2-35, first paragraph).</p>	<p>Sampling of Walnut Creek is discussed in Section 7.2.2. The field sampling program for the South Area Spray Field, described in Section 7.2.7, calls for sampling in the drainage downstream of this IHSS. These samples will be in addition to the existing sediment and surface locations downstream from the South Area Spray Field. If warranted by the results of Phase I, however, additional sampling may be proposed for the Phase II investigation.</p>
C-37	<p>The Division's inspectors have reported that spraying has been conducted on the north bank of the pond in addition to the area known as the Pond Area Spray Field. Why has this spray area</p>	<p>The spray area currently in use (refer to this comment) is the spray field discussed in comment C-35 that will be part of OU7.</p>

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<u>Section 2.4.5</u>	not been defined as an IHSS nor included in the FSP? Will this issue be addressed in OU-7? In not, where?	Figure 2-10 illustrates IHSS and monitoring locations (groundwater wells, surface water and sediment locations), and adding the geologic contacts to this figure would impede the primary features of this figure. Figure 1-5, illustrating the geologic contacts of this area, has been referenced in this Work Plan.
C-38	On page 2-42, second paragraph, the extent of the Rocky Flats Alluvium relative to the North & South Spray Fields is discussed. Overlaying the geologic contacts of Figure 1-5 would better illustrate this information. Please add the contacts to Figure 2-10.	The text has been revised to clarify the geologic description.
C-39	Also, please amend the text to clarify that all, not merely the western half of IHSS 167.3, is underlain by the Rocky Flats Alluvium. As the text is structured, it is easily misconstrued that only the western halves of IHSSs 167.1 and 167.3 are underlain by the alluvium. The value of showing the geologic contours on Figure 2-10 is apparent.	The term "near" has been replaced with "in the area of." The trenches were likely excavated through the alluvium. DOE could not find a discussion of effects on the aquifer in this section.
<u>Section 2.6.5</u>	The statement on page 2-45, third paragraph, regarding the "aquifer near the trenches" should be amended. The term "near" suggests that the alluvium is present laterally; in this geologic setting it could only be upgradient, and therefore not affected by contaminants. However, referring to Figure 1-5, the trenches apparently were excavated within the alluvium. This changes the potential effect upon the aquifer from a "doubtful" to a	
C-40		

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<u>Section 2.7.2</u>	"probable". Please amend the text and acknowledge the above observations.	
C-41	On page 2-47, reference is made to sludge drying beds visible in a 1964 aerial photograph. This statement suggests that the drying beds are no longer operating. Please comment on the status of these beds and demonstrate why they should not be handled as an IHSS.	A building has been built over the drying beds to reduce the potential for airborne transport of the sludge. The IHSS defined in OU6 is the area where the sludge was dispersed by the air. The drying beds in the building are operating and are covered under RCRA permitting.
<u>Section 2.7.5</u>		
C-42	The description of the Arapahoe #1 Sandstone on page 2-47 is incomplete. Although it is 3.5 feet thick there is no indication of its depth below the surface either in narrative or cross-sectional format. Table 2-1 does not provide such information. This information is needed to support FSP adequacy.	The text has been revised.
<u>Section 2.8.2</u>		
C-43	In the fourth paragraph of page 2-49, the removal of soil from an "area of about 200 square feet" is discussed. If the specific sites of soil removal are known, they should be shown on Figure 2-11. Any and all other known soil removal sites for this and other IHSSs should be mapped. Additionally, the depths, if known, to which soils were excavated should be reported.	The specific areas of soil removal are not known. The data that are available have been reviewed and reported in the Work Plan. If additional data is located during the investigation, it will be reported in the RFI/RI Report.

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CITATION	COMMENT	DISPOSITION
<p><u>Section 2.8.5</u></p> <p>C-44</p>	<p>In the fourth paragraph, page 2-52, the draft geologic characterization report (EG&G 1990e) is referenced. Please utilize the report to depict the geologic framework of the IHSS. For example, the thickness of the Rocky Flats Alluvium could, and should, be mapped or cross-sectioned and presented in this workplan. The IAG mandated sampling and monitoring requirements do not preclude the potential for more appropriate investigation measures. The requested information will allow a better analysis of FSP adequacy.</p>	<p>The available data from the internal Draft Geologic Characterization Report and other sources has been utilized to prepare the text on page 2-52. Analysis of the geologic conditions and evaluation of the data collected for the FSP will be part of the RFI/RI investigation.</p>
<p><u>Figure 2-13</u></p> <p>C-45</p>	<p>The legend for this figure shows "Concentrations of Soil Samples In d/m/gm" These are plutonium concentrations in soil samples. Please amend the legend to read "Plutonium Concentrations in Soil Samples In d/m/gm". Please also see comments to Section 2.9.4.</p>	<p>The legend has been amended.</p>
<p>C-46</p>	<p>After reviewing Figures 1-2 and 1-5 the course of McKay Ditch relative to this figure is unclear. Figure 1-2 shows the ditch running through the northern end of the PSZ; however, Figure 1-5 shows it passing north of the Present Landfill. This figure, 2-13, shows it comparable to Figure 1-2. Which figures are correct? Please amend the maps as necessary.</p>	<p>Figure 1-2 has been amended as requested.</p>

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<p><u>Section 2.9.4</u></p> <p>C-47</p>	<p>This section, page 2-60, contains three different formats for stating disintegrations per minute per gram data. Please use a consistent format within this section and throughout the workplan. Workplans are public documents, they should inform rather than confuse the reader.</p>	<p>The text has been corrected.</p>
<p><u>Section 2.11</u></p> <p>C-48</p>	<p>The following comment is applicable to all of the conceptual models. The potential sources of contamination, i.e. Air Pathway, Surface Water Pathway etc. represent current and future sources of secondary contamination. However, the models must include identification of the initial contamination sources, i.e. buildings, processes, etc., the point(s) of release, the suspected chemicals or radionuclides, and the pathways into the environment. To discuss only the pathways from the affected environment into other environmental media or to receptors diminishes the potential for an effective FSP.</p>	<p>For the purpose of the OU6 Work Plan, the sources of contamination in OU6 are assumed to be within the IHSS's. The buildings or processes are not part of this OU. These areas, if appropriate, are being investigated in other operable units.</p>
<p>C-49</p>	<p>The discussion of pathways should summarize what is known about rates of migration. The discussion of receptors should include types, sensitivities, time of exposure, concentrations, and numbers for the receptor populations. The conceptual models presented are in some instances flawed or incomplete, and in most cases, not fully developed. The following comments to Section 2.11 reflect the findings of the Division.</p>	<p>Information regarding the rates of migration and receptor populations are not known for OU6. The purpose of this Work Plan is to collect these types of data. All of the conceptual models have been modified to present a generic conceptual model showing all pathways of exposure for all of the IHSS's.</p>

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<u>Section 2.11.1</u>	On page 2-63, regarding the Air Pathway, the streams between the ponds are contaminated and they are dry when water is not being discharged. Consequently, contaminated particles would be available to the air pathway. The conceptual model must reflect these observations. In addition to on-site workers and animals, the air pathway must include off-site receptors as part of the exposed populations.	All of the conceptual models have been modified to present a generic conceptual model showing all pathways of exposure for all of the IHSS's.
C-50		
<u>Section 2.11.2</u>	See comment to Section 2.11.1.	Please see the response to comment number C-50.
C-51		
<u>Section 2.11.6</u>	Regarding the "Groundwater Pathway" on page 2-67, the statement that ground water is not a pathway because the IHSS is located on a slope is not valid. Recharge of ground water occurs on slopes as well as flat ground. With a depth to ground water of only three feet, it must be considered a potential pathway and appropriate planning should be reflected in the FSP.	Please see the response to comment number C-50.
C-52		
<u>Section 2.11.7</u>	Regarding the "Surface Waters and Air Pathways" on page 2-67, it has not been indicated in Section 2.8 that soils from the entire IHSS have been removed nor is there any discussion of a	Please see the response to comment number C-50.
C-53		

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<p><u>Section 2.11.8</u></p> <p>C-54</p>	<p>covering; therefore, neither of the pathways can be ruled out. In fact, soil from two small hot spots were apparently never removed (see page 2-50). The FSP must reflect these issues.</p>	
<p><u>Section 2.11.9</u></p> <p>C-55</p>	<p>See comment to Section 2.11.7. Some areas of the unit may not have been covered with fill.</p>	<p>Please see the response to comment number C-50.</p>
<p><u>Section 2.11.9</u></p> <p>C-55</p>	<p>Regarding the "Groundwater Pathway" on page 2-68, the geology discussion on page 2-62 indicates that no monitoring wells have been completed beneath the unit. Until sufficient data are collected to demonstrate otherwise, the ground water pathway cannot be ruled out. Consequently, the FSP must reflect this issue.</p>	<p>Please see the response to comment number C-50.</p>
<p><u>Section 3.0 - General Comment</u></p> <p>C-56</p>	<p>Tables 3-1, 3-2, and 3-3 appear, with some exceptions, to be <u>comprehensive site-wide</u> lists of potential chemical specific ARARS. The Target Analyte List and Target Compound List (Table 7-9) appear to represent subset lists appropriate to OU-6. If this is DOE's intent, please indicate it in the text. The Division could then ascertain the thought process that DOE and EG&G are using to screen the various standards and chemicals.</p>	<p>While this is not a site-wide list, it is comprehensive and can be used largely as the basis for a site-wide list.</p>

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C-57	The workplan should clearly and specifically state that RCRA Health Based Standards are potential ARARs even though numerical standards typically have not been established, to date.	The following text has been inserted into section 3.3. "In this way, remediation goals that define the contaminant clean-up objectives for remedial actions at RFP will comply with CERCLA ARARs and protectiveness requirements as well as other EPA and Colorado protectiveness performance requirements which may be ARAR, such as the RCRA corrective action requirements of 40 CFR 264.101 (6 CCR 264.101) or the RCRA Closure Performance Standard of 40 CFR 264.111 (6 CCR 264.111)."
<u>Section 3.1</u>		
C-58	Colorado Water Quality Control Commission ground water standards for the Rocky Flats area became effective on April 30, 1991. The ground water standards are now potential ARARs and no longer TBCS. Please revise the text to reflect this change.	These standards are listed as TBC since they are not of general applicability and there is no enforcement mechanism currently in effect.
C-59	Section 3.11.5.C.4 (5 CCR 1002-8), which is the "Basic Standards for Ground Water," states "Whenever the current detection level (PQL) for a pollutant is higher (less stringent) than a standard listed in Subsection 2 or 3 above [radioactive, Table A, and Table B constituents], the detection level shall be used as the performance standard in regulating specific activities. The detection levels (PQL's) identified in Tables A and B shall apply, unless and until they are modified as the result of a subsequent rulemaking hearing." Therefore, in contrast to the surface water regulations, the Division has identified several constituents in	Both standards and PQLs are now listed in the Tables. PQLs will be used as the performance standard where PQLs are higher (less stringent) than standards for radioactive, Table A, and Table B constituents. Standards will be used, where they are higher (less stringent) than PQLs.

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<u>Table 3-1</u>	Table 3-1 (Groundwater Quality Standards) of the text that currently have the standard, instead of the less stringent detection limit, listed as the potential ARAR. This can be changed in the ARAR tables.													
C-60	<p>The section of the CCR that became effective April 30, 1991 (Section 3.12.0; 5 CCR 1002-8) includes a "Table 6" that outlines the new radionuclide standards that will be applied to all ground water that is hydraulically connected to Walnut and Woman Creeks. Please replace the radionuclide standards that currently appear in Table 3-1 of the text with these new standards:</p> <table data-bbox="576 1001 970 1191"> <tbody> <tr> <td>Gross Alpha</td> <td>7 pCi/l</td> </tr> <tr> <td>Gross Beta</td> <td>5 pCi/l</td> </tr> <tr> <td>Plutonium</td> <td>.05 pCi/l</td> </tr> <tr> <td>Americium</td> <td>.05 pCi/l</td> </tr> <tr> <td>Tritium</td> <td>500 pCi/l</td> </tr> <tr> <td>Uranium</td> <td>5 pCi/l</td> </tr> </tbody> </table>	Gross Alpha	7 pCi/l	Gross Beta	5 pCi/l	Plutonium	.05 pCi/l	Americium	.05 pCi/l	Tritium	500 pCi/l	Uranium	5 pCi/l	The new radionuclide standards have been added.
Gross Alpha	7 pCi/l													
Gross Beta	5 pCi/l													
Plutonium	.05 pCi/l													
Americium	.05 pCi/l													
Tritium	500 pCi/l													
Uranium	5 pCi/l													

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CITATION	COMMENT	DISPOSITION																				
C-61	<p>Please add the following standards that are missing from the "Tables A and B - Statewide" column:</p> <table data-bbox="558 634 1045 821"> <tr> <td>Benzene</td> <td>5 ug/l</td> </tr> <tr> <td>Chloroform</td> <td>100 ug/l</td> </tr> <tr> <td>2,4,6-Trichlorophenol</td> <td>10 ug/l</td> </tr> <tr> <td>Benzidine</td> <td>50 ug/l</td> </tr> <tr> <td>Dieldrin</td> <td>10 ug/l</td> </tr> <tr> <td>Pentachlorophenol</td> <td>200 ug/l</td> </tr> </table>	Benzene	5 ug/l	Chloroform	100 ug/l	2,4,6-Trichlorophenol	10 ug/l	Benzidine	50 ug/l	Dieldrin	10 ug/l	Pentachlorophenol	200 ug/l	<p>The standards and PQLs for each of these compounds have been added to the table. The standard stated for dieldrin, however, appears to be incorrect; the standard should be 0.1 ug/l.</p>								
Benzene	5 ug/l																					
Chloroform	100 ug/l																					
2,4,6-Trichlorophenol	10 ug/l																					
Benzidine	50 ug/l																					
Dieldrin	10 ug/l																					
Pentachlorophenol	200 ug/l																					
C-62	<p>Please replace the following standards with the detection limits in the "Tables A and B - Statewide" column:</p> <table data-bbox="558 954 1045 1271"> <tr> <td>bis (2-Chloroethyl) ether</td> <td>10 ug/l</td> </tr> <tr> <td>Chlorodane</td> <td>10 ug/l</td> </tr> <tr> <td>DDT</td> <td>10 ug/l</td> </tr> <tr> <td>Dieldrin</td> <td>10 ug/l</td> </tr> <tr> <td>Dioxin</td> <td>3 ug/l</td> </tr> <tr> <td>Heptachlor</td> <td>100 ng/l</td> </tr> <tr> <td>Heptachlor Epoxide</td> <td>100 ng/l</td> </tr> <tr> <td>Hexachlorobenzene</td> <td>10 ug/l</td> </tr> <tr> <td>Nitrobenzene</td> <td>10 ug/l</td> </tr> <tr> <td>PCB's</td> <td>500 ng/l</td> </tr> </table>	bis (2-Chloroethyl) ether	10 ug/l	Chlorodane	10 ug/l	DDT	10 ug/l	Dieldrin	10 ug/l	Dioxin	3 ug/l	Heptachlor	100 ng/l	Heptachlor Epoxide	100 ng/l	Hexachlorobenzene	10 ug/l	Nitrobenzene	10 ug/l	PCB's	500 ng/l	<p>DLs (PQLs) will be listed along with the standards. The detection limits listed in this comment by the State appear to be incorrect for chlordane (10 ug/l), DDT (10 ug/l), and Dieldrin (10 ug/l); the correct value is 0.1 ug/l for each of these parameters.</p>
bis (2-Chloroethyl) ether	10 ug/l																					
Chlorodane	10 ug/l																					
DDT	10 ug/l																					
Dieldrin	10 ug/l																					
Dioxin	3 ug/l																					
Heptachlor	100 ng/l																					
Heptachlor Epoxide	100 ng/l																					
Hexachlorobenzene	10 ug/l																					
Nitrobenzene	10 ug/l																					
PCB's	500 ng/l																					
C-63	<p>In addition, the values for Atrazine and Dichlorobenzidine presented in Table 3-1 could not be located in Tables A or B. Please remove them from the table.</p>	<p>These values (typos) have been removed.</p>																				

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C-64	A standard of 10 ug/l appears in Table 1 (Human Health), but was omitted from Table 3-1. Please add this value to Table 3-1. In addition, standards are promulgated in Table 1 for Lindane, 2,4-D, and 2,4,5-TP Silvex. Please include these chemicals and their standards in Table 3-1.	Comment is not clear. The only value of 10 mg/l on Table 1 (Human Health) is for nitrate, which is already on Table 3-1. All standards from Table 1 (Human Health) are currently included on Table 3-1.
C-65	A standard of 0.2 ug/l for Endrin, 100 ug/l for Methoxychlor, and 5 ug/l for Toxaphene appear in RCRA subpart F regulations, but were omitted from Table 3-1. Please add these values to Table 3-1. In addition, standards are promulgated in RCRA Subpart F for Lindane, 2,4-D, and 2,4,5-TP Silvex. Please include these chemicals and their standards in Table 3-1.	These standards have been added.
C-66	Standards for Boron and Lithium appear in Table 3 (Agricultural Standards) but have been omitted from Table 3-1. Please include these chemicals and their standards in Table 3-1.	These chemicals and their standards have been added.
C-67	Standards for Diphenylhydrazine 1,2 and Ethylene Dibromide are promulgated in Table A (Carcinogenic Organic Chemicals) but have been omitted from Table 3-1. Please include these chemicals and their standards in Table 3-1.	These chemicals and their standards have been added.
C-68	Standards for Aldicarb, Carbofuran, 2,4-D, Ethylene Glycol, Pentachlorobenzene, 1,2,4,5 Tetrachlorobenzene, and 2,4,5-TP are promulgated in Table B (Non-carcinogenic Organic Chemicals) but have been omitted from Table 3-1. Please include these chemicals and their standards in Table 3-1.	These chemicals and their standards have been added to the Tables.

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<u>Section 3.2</u>		
C-69	<p>This section, page 3-2, indicates that ARARs will be derived from federal and state regulations including "Colorado Department of Health (CDH) <u>surface water</u> standards for Woman Creek and Walnut Creek (5 CCR 1002-8, Section 3.8.29, Final Rule Effective March 30, 1990) - applied to surface water". The Division finds that the domestic water supply standards listed in TABLES I, II and III of "The Basic Standards and Methodologies for Surface Water 3.1.0 (5 CCR 1002-8)" must also be listed as potential ARARS. Section 3.8.29 specifically provides that "water supply standards are met at the point of discharge" and the action "will provide an extra layer of protection of downstream water supplies from the two reservoirs, each of which (Great Western and Standley) are already classified as domestic water supplies". For example, a standard for Fecal Coliform has been established for Domestic Water Supply where no such standard applies to warm water biota. Please amend Table 3-3 to include the Domestic Water Supply standards.</p>	Domestic water supply standards are now included in Table 3-3.
C-70	<p>The last paragraph of Section 3.8.29 states that "For the organic pollutants contained in Tables A and B, the practical quantitation limits (PQLs) listed as "detection levels" are to be used as the compliance thresholds". The Division finds, in Table 3-3, that the "Standard(s)" rather than the "Detection Levels" were listed as potential ARARS. Please amend the two "Table A & B" columns of Table 3-3.</p>	<p>PQLs and MDLs (Minimum Detection Levels for radionuclides) have been added to the table. Text will be added to clarify that for the organic pollutants listed in Tables A and B, PQLs are to be used as compliance thresholds when WQCC standards are below the PQL.</p>

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<p>C-71</p> <p><u>Table 3.3</u></p>	<p>Section 3.8.29 also states that "For any organic pollutants listed in Table A or B, the Commission intends that these standards be applied in accordance with PQLs determined appropriate by the Colorado Department of Health laboratory". Please determine the applicable PQLs.</p>	<p>The applicable PQLs and methods, as determined by Rocky Flats, have been added to the Tables.</p>
<p>C-72</p>	<p>The following chemicals are identified in Tables A, B and C of "The Basic Standards and Methodologies for Surface Water 3.1.0 (5 CCR 1002-8)" but are absent from Table 3-3. Where these intentionally omitted? If so, provide the rationale. If inadvertently omitted, please list.</p>	<p>The following chemicals and their standards have been added to the Tables:</p> <ul style="list-style-type: none"> Aldicarb Carbofuran 2,4-D Pentachlorobenzene 1,2,4,5 - Tetrachlorobenzene 2,4,5-TP 1,2-Diphenylhydrazine Chloropyrifos Demeton Guthion Malathion Mirex Parathion <p>The following chemicals and their standards were already listed on the Tables:</p> <ul style="list-style-type: none"> Benzene Phenol

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	<p><u>TABLE A:</u></p> <p>1,2 Diphenylhydrazine</p> <p><u>TABLE B:</u></p> <p>Aldicarb Carbofuran Dichlorophenoxyacetic Acid (2,4-D) Pentachlorobenzene Tetrachlorobenzene 1,2,4,5 Trichlorophenoxypropionic Acid (2,4,5-TP)</p> <p><u>TABLE C:</u></p> <p>Benzene BHC Hexachlorocyclohexane Chloro-4 Methyl-3 Phenol Chlorophenol 2 Chlorpyrifos Demeton</p>	<p>Dichloropropene Dinitrotoluene 2-Chlorophenol BHC Hexachlorocyclohexane 4-Chloro 3-methyl phenol 2,4-Dimethylphenol</p>

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CITATION	COMMENT	DISPOSITION
C-73	<p>Dichloropropene Dimethylphenol 2,4 Dinitrotoluene Diphenylhydrazine 1,2 Guthion Malathion Mirex Parathion Phenol</p> <p>The following additional errors and omissions have been found in the standards of Table 3-3. Typically the errors represent unit conversion errors. Some of the errors listed may be moot due to the application of the Section 3.8.29 requirements that "detection levels" be listed as possible ARARs. (See the comments to Section 3.2, second paragraph, above.)</p>	Please see response to the following comments.
C-74	<p>Table 3-3 contains thirteen (13) columns in which numerical standards are identified beginning with the column for Tables A & B. To simplify these comments, errors and omissions will be identified in respect to a column number, page number and the compound. For example, under the Statewide Standards, Table C, Acute column, page 3-24, Chlordane should be 2.4 ug/l not ng/l. The "Acute" column is the number 2 column. The 13th column is for Walnut Creek.</p>	Please see response to the following comments.

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C-75	The standards for Fecal Coliform, Ammonia, Sulfur, Boron and Chlorine (not just Chloride) should be listed in columns 10 and 11, page 3-19, as derived from the Stream Segment Table.	The standard for fecal coliform will be added to the surface water ARARs list (Tables 3-2 and 3-3). Total coliform will be added to Table 3-1 for groundwater. Standards for Ammonia, sulfur, and boron will be added to the tables. Standards for chlorine have also been included.
C-76	A Chloroform standard, Tot THM, is listed in columns 1 and 7, page 3-21. This standard is not listed in either Table A or Table B. Please state where this standard is documented. Please explain the acronym THM in the footnotes to Table 3-3.	The chloroform standard is listed in Tables A and B of the state standards as total trihalomethanes (tot THM) which includes chloroform as stated in footnote (4) on Table 3-3 and footnote (2) on Table 3-2. THM will be added to the list of acronyms.
C-77	Trichlorophenol 2,4,6, 1.2 ug/l, was omitted from column 11 of page 3-21.	The standard for 2,4,6-Trichlorophenol was included on Table 3-3, p. 3-23, col. 11.
C-78	The standard for tetrachloroethane, 0.8 ug/l, was omitted from column 11 of page 3-22. Note that 1,1,2,2 Tetrachlorethane, 170 ng/l, was included in column 11 of page 3-21.	The standard for tetrachloroethane (0.8 ug/l) has been included.
C-79	The standard for Acrylonitrile, page 3-23, column 11, should be 58 ng/l not 58 mg/l.	The standard for acrylonitrile (58 ng/l) has been corrected.
C-80	To repeat, the standard for Chlordane, column 2, page 3-24 should be 2.4 ug/l not ng/l.	The standard for chlordane (2.4 ug/l) has been corrected.
C-81	The standard for Hexachlorobutadiene, column 11, page 3-25, should be 0.45 ug/l not 0.45 ng/l.	The standard for hexachlorobutadiene (0.45 ug/l) has been corrected.

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C-82	The standard for Hexachloroethane, column 2, page 3-25 should be 980 ug/l (or .98 mg/l) not 0.98 ug/l.	The standard for hexachloroethane (0.98 mg/l) has been corrected.
C-83	The standards for Toxaphene, columns 3 and 4, page 3-26, belong in columns 2 and 3 respectively.	The standards for toxaphene have been corrected.
<u>Section 4.1.4</u>		
C-84	The last sentence of this section states "It is important to recognize that additional phases of investigation and risk assessment may be required at some IHSSs." DOE must recognize that further phases are not scheduled in the IAG and that the Final ROD date is set. Failure to meet the ROD delivery date will likely result in stipulated penalties being assessed against DOE.	Please see the response to comment number C-4. DOE understands that a date for the ROD was stated in an earlier version of the IAG but is not included in the Final IAG.
C-85	To the extent practical, the objectives outlined on page 4-3 should be met through implementation of a comprehensive work plan rather than being deferred to later phases (stages). Any unavoidable "staged" investigations should be clearly described in a decision tree within the context of the IAG schedule.	Please see the response to comment number C-4.
<u>Table 4-1</u>		
C-86	Regarding the Data Need "Characterize and Delineate contaminate Sources" plumes are considered by the Division to be secondary sources resulting from unplanned releases from a unit, improper disposal of a substance, or physical relocation of	The identification of plumes is hoped to lead to the identification of the sources of those plumes, if the sources still exist. Without removing an entire IHSS at this time, the identification of plumes

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	contaminated material. The investigation must, to the fullest extent possible, determine the initial source or waste management practice that resulted in a plume. Plume development may then be better ascertained.	provides a very effective and efficient method of identifying and characterizing any potential sources that may be present.
C-87	The reliance on a soil gas survey to identify plumes is of concern. The table suggests that boreholes or wells will be used if plumes are identified (presumably from soil gas). The Division believes that boreholes or wells may be appropriate even if soil gas results are negative. Please clarify this issue; are no wells to be drilled if all soil gas results are negative? The Division will not support this position. We also question reliance on IAG, SOW, Table 5, minimums. The Division will support minimums only when it is apparent that a more comprehensive sampling and analysis effort is unwarranted.	Borings specified in Section 7.2 to be drilled in plume areas will not be drilled if plumes are not identified. Other borings or wells specified in the FSP will be completed regardless of the results of the soil gas surveys. The results of the Phase I investigations will be used to evaluate the need for further investigations, which may include additional borings, as needed.
C-88	Regarding characterization of radiative materials at the Old Outfall, page 4-7, infilling of the site may render negative results on field screens. Please refer to the comments on Section 7.2.3 and amend this table as needed.	Please refer to responses to comments regarding Section 7.2.3.
<u>Section 4.2.4</u> C-89	This section clearly demonstrates the lack of understanding of the RFI/RI process. Although Table 5 of the IAG Statement of Work specifies the minimum quantities, the IAG also specifies that RFP "anticipate" investigative needs. Phase I data (there is only one IAG Phase for this OU) evaluation is not a discrete	Please see the response to comment number C-4. Also, DOE thinks it is premature to speculate on what the possible result of the Phase I investigation will be, which will need to be followed by further speculation on what the appropriate follow up work will consist of. DOE believes that it is more appropriate to

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<u>Section 5.3</u>	<p>IAG step that focuses a subsequent round of RFI activities requiring approval of the additional steps. It is in this workplan that subsequent steps should be defined by a decision tree. In other words, if we (RFP) find "A", we will next do "Y", but if we find "B", we'll next do "Z". It is through this approach that RFP must "anticipate" data needs beyond the minimums specified in Table 5. The Division will not concur with workplan approval until these details are included!</p>	<p>review the data as its received and then evaluate what the next step should be.</p>
C-90	<p>Regarding the last sentence of the first paragraph of this section, see the comment to Section 4.2.4.</p>	<p>Please see the response to comment number C-4.</p>
<u>Section 5.3.2</u>	<p>Is it an objective of this work plan to collect, and report, background surface and sediment samples (page 5-3) or are these samples to be incorporated with the ongoing "Background Geochemical Characterization Report"? Please clarify.</p>	<p>The reference to these samples have been removed from the Work Plan since these samples will be collected as part of the background characterization work.</p>
C-91	<p>Is it an objective of this work plan to collect, and report, background surface and sediment samples (page 5-3) or are these samples to be incorporated with the ongoing "Background Geochemical Characterization Report"? Please clarify.</p>	<p>The reference to these samples have been removed from the Work Plan since these samples will be collected as part of the background characterization work.</p>
<u>Section 5.5.1</u>	<p>In the first paragraph of page 5-5, it is indicated that geologic data will be used to characterize the stratigraphy. Since the proposed drilling of the Old Outfall (section 5.3.3) is limited to collecting soil samples two feet below the original (buried) surface, it is difficult to envision an adequate characterization of</p>	<p>The drilling at the Old Outfall will provide information for the characterization of the units encountered during drilling. The text states that the drilling will be used to characterize the depth of the Old Outfall. Please see the last sentence of CDH's comment number C-108 regarding adequacy of the borings for</p>
C-92	<p>In the first paragraph of page 5-5, it is indicated that geologic data will be used to characterize the stratigraphy. Since the proposed drilling of the Old Outfall (section 5.3.3) is limited to collecting soil samples two feet below the original (buried) surface, it is difficult to envision an adequate characterization of</p>	<p>The drilling at the Old Outfall will provide information for the characterization of the units encountered during drilling. The text states that the drilling will be used to characterize the depth of the Old Outfall. Please see the last sentence of CDH's comment number C-108 regarding adequacy of the borings for</p>

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C-93	<p>the underlying stratigraphy. Please specify how this will be accomplished; if necessary amend the FSP to achieve this objective.</p>	<p>the purpose of the Work Plan. DOE agrees that the Phase I investigation may not provide complete characterization of an IHSS if significant heterogeneities or contaminants are encountered.</p>
<u>Section 5.7</u>	<p>In the third paragraph, it is stated that surface water and sediment sampling will be used to characterize the ponds. Characterization must include groundwater beneath the ponds; however, the few proposed wells appear to be inadequate for this purpose. Please specify how a full and complete characterization will be accomplished or amend the FSP.</p>	<p>DOE agrees that the characterization may not be complete based on the Phase I investigation. However, the field program will provide information for a Phase I level of site characterization. The initial sampling of the ponds is intended to determine if contaminants are present in the pond sediment. These sediments should act as traps for contaminants, especially for the radionuclides and metals. Thus these sediments will act as indicators for the presence of contaminants in the ponds. If contaminants are present in the sediment, then additional characterization and monitoring (including groundwater wells) will be performed as needed.</p>
C-94	<p>On page 5-12, a discussion of "Detailed Analysis of Remedial Alternatives" is introduced. Although data may be insufficient to determine alternatives, the workplan should be expansive enough to fully characterize the IHSSs. A reoccurring theme appears to be the intent of RFP to defer data collection to later phases. This is not an acceptable management alternative. To the extent resources are responsibly used, the design and implementation of this work plan should reflect full IHSS characterizations as soon as possible to expedite corrective action.</p>	<p>Please see the response to comment number C-4.</p>

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<u>Section 7.1.3</u>	Please explain the basis for modification of IAG sampling and analytical activities listed on pages 7-3 through 7-6. If a result of an EPA and DOE scoping meeting held March 15, 1991, please state. Also explain how reducing grid sizes, i. e. collecting fewer data, will lead to a better evaluation of the IHSSs (See paragraph 1, page 7-3).	Many of the modifications resulted from the scoping meetings held between DOE, EPA, and CDH. Other modifications have been added to provide better characterization of the IHSS's. The rationale for each of the modifications is contained in Section 7.1.3. The changes that were made for items 3 and 7 in the sampling program modifications Section 7.1.3 were the result of the discussions held in the March 15, 1991 meeting. The reduction in the grid size for the soil gas survey, was made so that more attention could be directed in defining any elevated and/or anomalous readings that are detected from the initial grid locations. Secondly, the spacing for surface and subsurface soil sampling program for the North, Pond and South Area Spray Fields (IHSS 167.1, 167.2, and 167.3) was increased to a 100 foot grid system because of the characteristics of these IHSSs. This sampling density is believed to be adequate for these IHSS's since fairly homogeneous liquids were sprayed across these spray fields with any contaminants being well dispersed on this unit. Thus the larger sampling grid should be adequate to identify if any contaminants are present. Additional soil borings and surface soil sampling may be added at these spray fields depending on the results of this initial sampling.
C-95	The Division understands that grid patterns were discussed and reductions considered in the March 15, 1991 meeting. The IAG SOW and the work plans are not specific on the type of grid to be used. Reductions in both block-centered and mesh-centered	The reductions in the grid spacings were discussed in the May 15 scoping meeting. The specific sampling locations for the soil borings are shown on Figure 7-6 and listed in Table 7-8. The amount of sampling points specified (36, 13, and 8 for the North

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C-97	<p>grids result in greater reductions in the number of samples or sites than may be anticipated. For example, under theoretical conditions, changing a block-centered grid from 50-foot to 100-foot results in a 75% sample reduction. Changing a mesh-centered grid from 50-foot to 100-foot depends on the size of the area being investigated, but range from a 55% sample decrease for a 100' x 100' area versus a 70% decrease for a 500' x 500' area. Regardless of the grid type used, significant losses in sample coverage may result. The Division understands that 30-50% grid reductions were proposed at the March 15, 1991 meeting. Does this equate to reductions in the number of samples/sites or to the grid spacing? This issue and the proposed impacts must be clarified.</p> <p>The following comment is relative to Item 10, page 7-5, and the proposed 150-foot grid for surface and subsurface sampling. The IAG requires a 50-foot grid for sampling and a 25-foot grid for radiation screening. Is it the intent of RFP to maintain the 25-foot grid for screening or use a 150-foot grid for both screening and sampling? (See the comments to Section 7.2.4, below.)</p>	<p>Pond, and South Area Spray Fields, respectively) are believed to be adequate to identify if any contaminants are present since, any wastes sprayed on these units should have been fairly uniformly spread over these units. Please see above comment C-95. Additional sampling of this area will be performed in later phases of this investigation, as needed.</p> <p>The field sampling program for the Soil Dump Area is described in Section 7.2.4. A germanium radiation survey, similar to what was performed at the Old Landfill, has been added to the Soil Dump Area. This survey should provide essentially 100 percent ground coverage since the measuring points will be established so that there is an overlap between locations. Secondly, for the soil borings the IAG specifies a 50-foot grid around the perimeter of the Soil Dump Area not across the whole IHSS. We have modified this plan to sample within this IHSS (instead of around the perimeter) since this should provide better data on the contaminants that may be present. Based on the results of this initial field work, more sampling may be specified in the future work.</p>

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<u>Section 7.2</u>		
C-98	The screening and sampling requirements, including any proposed modifications, should be included and discussed in the appropriate Investigation Program subsections. The sampling rationale, particularly for proposed modifications, should be documented. How the Investigation Program will achieve all of the objectives listed in Section 7.1.1, in a timely manner, should be discussed.	The items discussed in Section 7.1.3 (modifications to the IAG) are discussed in the specific sections for each IHSS as requested. The rationale for the modifications are documented and discussed in Section 7.1.3. The schedule for OU6 is presented in Section 6.0. The Phase I RFI/RI objectives will be met by the soil and surface water sampling program and by borings, and wells that will be installed at each IHSS. This sampling program was designed so that representative samples of the wastes disposed in these areas are collected from surface samples and soil borings with borings and groundwater wells placed where needed to define and characterize the subsurface.
<u>Section 7.2.1</u>		
C-99	Will the radiation survey, Step 1, page 7-6, be conducted on the same 25-foot grid shown on Figure 7-1 as "Proposed Surface Sampling Locations"? If so, please reference Figure 7-1 and amend the legend to specify that the radiation survey <u>and</u> the sampling will occur at the same site.	The figure has been referenced and amended.
C-100	Relative to Step 3, a proposed well is shown on Figure 7-1 in contradiction to the narrative which states that it will be located after the completion of Step 2. If the well location is an initial site pending the completion of Step 2 activities, please specify or remove the well spot from Figure 7-1.	The text has been modified to indicate that the well location shown on Figure 7-1 is preliminary.

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C-101	Regarding "Step 3 - Monitoring Wells" on page 7-6, the Division believes that the groundwater monitoring wells should be sampled for longer than one year.	DOE will sample the wells quarterly for a minimum of four quarters. The data collected will be evaluated and presented in the RFI/RI Report. DOE will make a recommendation in the Phase I RFI/RI Report regarding further sampling, analytical parameters and frequency, if warranted by the data.
<u>Section 7.2.2</u>		
C-102	Relative to Step 1, page 7-8, it is appropriate that the surface water monitoring report be submitted with the workplan. The Division wishes to review the document in conjunction with its review of the workplan. Please submit along with the revised workplan.	This report will be submitted to the Division during the implementation of the work plan. It has been summarized in section two of this work plan, where needed, to support the field sampling program for OU6. The Division currently gets the surface water data from the site-wide monitoring program in the "Monthly Environmental Monitoring Report" for the Rocky Flats Plant.
C-103	Relative to the collection of sediment samples, paragraph 3, page 7-11, the IAG calls for analysis of HSL volatiles and semi-volatiles etc. How does this FSP address these requirements?	As stated in the text, the samples will be analyzed for the chemicals presented in Section 7.3 of the Work Plan. Table 7-10 shows that the samples will be analyzed for the TCL volatile and semi-volatile compounds shown in Table 7-9. The TCL and HSL compound lists contain essentially the same compounds.
C-104	Relative to the list of sediment samples (page 7-11), Building 118 is not depicted on Figure 7-4. Please show the building's location.	The text has been changed to refer to Parking Lot No. 71 which has been added to the Figure 7-4.

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C-105	Also relative to the list, until the point(s) of discharge into North Walnut Creek are disclosed it is impossible to determine the adequacy of the sediment sampling sites. (See Section 2.2.2).	Please see response to comment C-25.
C-106	Regarding "Step 3 - Monitoring Wells" on page 7-16, the Division believes that the groundwater monitoring wells should be sampled for longer than one year.	DOE will sample the wells quarterly for a minimum of four quarters. The data collected will be evaluated and presented in the RFI/RI Report. DOE will make a recommendation in the Phase I RFI/RI Report regarding further sampling, analytical parameters and frequency, if warranted by the data.
<u>Figure 7-4</u>	The figure shows two proposed sediment sampling sites on a branch of the unnamed tributary to North Walnut Creek adjacent to OU-7. Please specify their inclusion on this map and their purpose. Also justify why additional sites, under the requirements of the new sitewide SOPS, are not proposed on the downstream length of the unnamed tributary. (There are no guarantees that older data are reliable unless they have been validated.)	The two referenced sediment sampling locations are discussed in Section 7.2.7.
<u>Section 7.2.3</u>	Table 5 in the IAG Statement of Work specifies that a radiation and soil sampling survey be performed at the Old Outfall. The IAG does not reflect the fact that fill dirt, up to 10 feet thick, has been placed at the site. Consequently, it is the Division's recommendation that the radiation survey (Step 1) and the	Modifications to the sampling program, made to reflect the fact that the Old Outfall has been filled in, are discussed in 1) of Section 7.1.3. The borings and associated soil sampling program should be sufficient to characterize this area and sample the
C-108		

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<p>C-109</p>	<p>"surface" soil samples (of Step 2) be restricted to only those areas of the IHSS, if any, where fill has not been placed. If fill areas cannot be readily delineated, it will be necessary to extend surface screening and sampling activities into known "fill" areas. (The soil borings proposed in the last paragraph of Step 2 should be adequate for this workplan activity.)</p> <p>The Division is also concerned about releases from the Old Outfall into North Walnut Creek during the active phase of the IHSS. The sediment sampling sites proposed for North Walnut Creek should provide initial information on plutonium releases from the unit. Pending these results, the culvert that connects the old outfall to the creek may require investigation to determine if leakage has contaminated the groundwater beneath the culvert.</p>	<p>pre-existing surface. There are no areas where fill has not been placed.</p> <p>DOE agrees and will propose additional Phase II characterization of the creek and groundwater if appropriate pending the results of Phase I.</p>
<p><u>Section 7.2.4</u></p> <p>C-110</p>	<p>This section, page 7-18, fails to provide for a radiation survey. The IAG, Statement of Work, Table 5 (page 50 of 56) specifically states that a radiation survey be conducted on a 25-foot grid for IHSS 156.2. The work plan (see Table 7-4) does not provide for a radiation survey on any grid spacing. Although the Division recognizes that the soil in this area has been moved twice and any original surface contamination may have become mixed and/or covered, radiation screening on a narrow grid may detect radiation. A grid of 150', as proposed for surface samples and borings, would be less likely to detect radiation given the</p>	<p>A germanium surface radiation survey has been added to the Soil Dump Area. This survey will be performed such that overlapping coverage (essential 100 percent coverage) is obtained for this unit. This type of radiation survey should thus be superior to the FIDLER radiation survey which was proposed in the IAG.</p>

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C-111	<p>history of the IHSS. The 25-foot grid specified in the IAG should be adopted unless the adequacy of a wider grid can be verified.</p>	<p>The text states that surface samples will be collected to a depth of 2 inches on a 150-foot grid over the area of the IHSS and does not specify undisturbed material only. It is the intent of this sampling effort is to sample the piles themselves. Soil borings will be sampled continuously through the piles and into the undisturbed material below.</p>
C-112	<p>Although specified in IAG, SOW, Table 5, the collection of surface scrapings of undisturbed soil (it has been disturbed twice) and borings into undisturbed soil beneath the soil piles is inadequate. The mixing and burying of contaminated soil necessitates that the soil piles themselves be sampled and analyzed. Failure to fully investigate the piles would result in an inadequate characterization of extent and nature of contamination.</p>	<p>Table 7-4 has been revised to show 14 sites. The IAG specifies that borings on 50 foot centers be placed around the perimeter of the Soil Dump Area. We have modified this program so that the borings are drilled in the Soil Dump Areas themselves thus collecting data directly on the wastes that may be present. Depending on these sampling results, additional borings may be placed in this area.</p>
C-113	<p>The modification of grid size from 50 to 150-foot is of concern. Figure 7-1 shows 14 "Proposed Boring and Surface Sampling Locations" (Note that Table 7-4 states there will be 12 sites). In respect to a mesh-centered grid, this means approximately 84% fewer sample points. By comparison, a 75-foot grid would be approximately 49% fewer sample points than that provided by the original 50-foot grid. The Division believes that a 84% reduction in sample points is too great. The Division recommends that reductions be limited to the 30-50% range.</p>	<p>Regarding "Step 3 - Monitoring Wells" on page 7-21, the Division believes that the groundwater monitoring wells should be sampled for longer than one year.</p>
		<p>DOE will sample the wells quarterly for a minimum of four quarters. The data collected will be evaluated and presented in the RFI/RI Report. DOE will make a recommendation in the</p>

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<u>Section 7.2.5</u>		
C-114	Regarding Step 2, page 7-21, the Division is of the understanding that the PSZ was not present when the Triangle Area was operational. Since the fence area is potentially contaminated, special security provisions should be made to allow cleared entry into the area and to conduct full radiation and soil gas surveys. Soil cores (Step 3) should also be collected within the fence area.	As stated in the text, DOE does not intend to sample the PSZ area during Phase I. If warranted by the results of Phase I, investigation of the PSZ area may be proposed in Phase II.
C-115	The modification of the grid size from 50 to 100-foot is noted. Since drums were stored at the site, the potential exists for single drum releases that may not be detectable even with a tighter grid. Rather than suggest a tighter pattern, the Division recommends that darkened or discolored soils, even in areas where soils have been removed, be surveyed as an added approach to complement a 100-foot grid. Air photos and other remote sensing techniques should be considered in searching for such soils.	Contaminated soils have been removed and moved from the site on several occasions. Historic aerial photos will not show removals or moved soils. Additional sampling will be conducted at locations where elevated or anomalous concentrations are detected.
C-116	Regarding Step 3, page 7-23, only two soil cores would be taken with the proposed 100-foot grid; this is not adequate. Since the 1 in 25 soil-core to soil-gas sample ratio is based on a 50-foot grid, the relative coverage afforded by the tighter grid should be maintained.	DOE agrees and will collect one random soil core for every 15 soil gas samples. This will result in the collection of approximately 4 soil cores.
C-117	Regarding "Step 4 - Monitoring Wells" on page 7-28, the Division believes that the groundwater monitoring wells should be sampled for longer than one year.	DOE will sample the wells quarterly for a minimum of four quarters. The data collected will be evaluated and presented in the RFI/RI Report. DOE will make a recommendation in the

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<p><u>Section 7.2.7</u></p> <p>C-118</p>	<p>Step 2, page 7-28, provides for two stream sediment samples relative to the North Area Spray Field (Figure 7-4). An additional sediment sample is needed downstream of the South Area Spray Field to complement site SED-06 and to determine potential contamination upstream, closer to, the south spray field. The Division believes that the sample sites should be placed close to the point where the streams would initially receive contaminates. Consequently, the proposed sample point nearest the North Area Spray Field should be moved up stream near surface water sampling station SW-96. The complement to SED-06, likewise, should be placed close to the runoff point from the surface into the stream.</p>	<p>Phase I RFI/RI Report regarding further sampling, analytical parameters and frequency, if warranted by the data.</p> <p>As suggested, an additional sampling station has been added downslope of IHSS 167.3. In addition, one of the two sediment sampling stations downstream of IHSS 167.1 has been eliminated with the remaining locations moved closer to IHSS 167.1 as suggested.</p>
<p>C-119</p>	<p>Since the proposed sample sites are specific to the FSP for the spray fields and not North Walnut Creek, they should be shown on Figure 7-6, not Figure 7-4. If necessary extend the map coverage of Figure 7-6 to the east to allow their inclusion. (Please see the comment to Figure 7-4.)</p>	<p>All the sediment sampling locations proposed in this Work Plan for OU6 are illustrated on Figure 7-4, and not on individual IHSS maps.</p>
<p>C-120</p>	<p>Regarding "Step 3 - Monitoring Wells" on page 7-30, the Division believes that the groundwater monitoring wells should be sampled for longer than one year.</p>	<p>DOE will sample the wells quarterly for a minimum of four quarters. The data collected will be evaluated and presented in the RFI/RI Report. DOE will make a recommendation in the Phase I RFI/RI Report regarding further sampling, analytical parameters and frequency, if warranted by the data.</p>

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<u>Section 7.2.8</u>		
C-121	The modification of grid size from 50 to 200-foot, Step 2, page 7-30, is noted. Since area spraying was conducted at the site a less stringent grid pattern is reasonable; however, Figure 7-3 indicates that this will result in only six sites. The Division recommends a 100-foot grid as an initial investigative approach to provide for additional sites.	The IAG in Table 5 does not specify any soil sampling for IHSS 216.1. The 200 foot spacing for this IHSS is thought to be appropriate because 1) this spray field was only operated for a short period in 1989 and only water from pond B-3 which had low levels of radionuclides and metals were sprayed on this field, and 2) the homogeneity of the spraying operations should result in uniform distribution of water on this unit. Thus, because of uniform application of water on this unit the 200 foot spacing is deemed appropriate.
<u>Section 7.3.1</u>		
C-122	Regarding sample designations on page 7-30, how will non-sampled sites, i.e. girded radiation survey stations, be designated for future reference? Will radiation stations of the grids be surveyed prior to or following the investigation?	Radiation survey points will be surveyed following the investigations. Areas with elevated radionuclide concentrations will also be noted during the surveying.
<u>Section 8.0</u>		
C-123	The following comments on the Baseline Health Risk Assessment Plan are applicable to both the OU-5 and OU-6 workplans sections. (The Division's comments to the OU-5 workplan refer to the following comments.)	Both sets of comments for OU5 and OU6 have been addressed in the final work plan.

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C-124	There appear to be inconsistencies in the use of terminology with regard to "chemicals of concern" versus "contaminants of concern". As chemicals are only a subset of "contaminants of concern" (i.e. metals or radionuclides) this latter phrase is more appropriate. (See reworded section, attached.)	The text to Chapter 8 has been modified as suggested.
C-125	For consistency and clarity, the Division suggests that the tasks of the Baseline Health Risk Assessment be identified numerically, comparable to Section 9.0.	The text has been modified as suggested.
C-126	The "Background Geochemical Characterization Report" referenced on page 8-2, the Division believes, ignored the potential for wind dispersal of contaminants to the west of the plant. Some of the data from ground surface samples may, therefore, represent contamination. Until this issue is resolved the subject report should not be relied on as background data.	Comment noted.
<u>Section 8.1</u>		
C-127	In the first sentence of the second paragraph of this section, please remove the phrase "... confirm the presence or absence of contamination at OU6 and ..." The Baseline Risk Assessment does not confirm contamination. It assesses the risk of contamination that has already been confirmed.	This change has been incorporated into Section 8.0.

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<u>Section 8.2</u>		
C-128	The IAG, in Section VII.D.1.a states that when selecting indicator chemicals, "DOE shall also consider the additive or synergistic effect of risks, to the extent possible." Known synergistic effects should be considered in selecting the final list of contaminants of concern. Please add to the second bulleted item as shown on the reworded section (attached).	This change has been incorporated into Section 8.0.
<u>Section 8.3</u>		
C-129	Several items need to be added to either Section 8.3.1 or Section 8.3.2 based on Section VII.D.1.b of the IAG and should be included as part of any exposure assessment discussion. The items are: an estimate of the current number of people at the exposure point, a characterization of the sensitive and exposed populations, a consideration of present and future use, and a consideration of current and maximum reasonable use scenarios.	Additional text has been added to Section 8.3.1 in response to this comment.
<u>Section 8.3.2</u>		
C-130	The second sentence in the first paragraph of this section seems to contradict text on the previous page. One of the bullets on the previous page states that one of the criteria for choosing chemicals of concern is their concentrations relative to background levels. However, this sentence in Section 8.3.2 says that only sites where the chemicals of concern are <u>significantly</u>	The text has been modified as suggested.

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<p><u>Section 9.0</u></p> <p>C-131</p> <p><u>General Comments to the Revised EE of OU-5 (June, 1991)</u></p>	<p><u>above</u> background levels will be considered sources of chemical release. Please clarify this apparent contradiction.</p> <p>A revised Environmental Evaluation section indicated by EG&G to be forthcoming at the time of Workplan delivery (April 6, 1991) was not received in a timely manner. The Division understands that the EEs for OU-5 and OU-6 will be highly comparable; therefore, the following comments developed from the OU-5 EE should be addressed. The Division will respond to the revised OU-6 EE section, at a later date, if site specific concerns warrant a separate response.</p>	<p>Comment noted.</p>
<p>C-132</p>	<p>1. The process of selecting a sampling plan for any site needs to take all questions and data needs into consideration. In selecting the aquatic sampling locations, physical, chemical (radionuclides included), and biological data needs should be considered concurrently.</p>	<p>The methodology for the selection of surface water sampling locations is presented in the Surface Water Management Plan (SWMP), EG&G/DOE, 1990. The initial sampling locations were not necessarily based on biological data needs; rather the Task 3 ecological field sampling locations were selected to coincide to the extent practicable with the collection of surface water and sediment data as well as sampling activities at other operable units. Based on results of the Task 3 ecological survey and the Task 6 Preliminary Contamination Characterization, the</p>

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C-133	<p>2. The sampling stations selected and the data to be generated for OU 5 need to be evaluated further. Basic transport considerations would dictate some reconsideration or modifications as to where chemical and flow rate measurements can be located for better tracking of surface and sub-surface loads. The development of conceptual and more definitive models of the system as well as the identification of causal relationships depend on the ability to relate the data over time and space. Therefore, as was indicated in the June 25, 1991 meeting on Environmental Evaluations at RFP, Jeb Love of the Rocky Flats Program Unit will present the State's preferred approach, applying it to the Woman Creek basin at the next EE meeting. He will also give examples of interpretations and potential uses of the information in the decision making process.</p>	<p>Task 9 ecotoxicological field sampling locations may be modified with respect to physical, chemical, and biological data needs.</p> <p>As noted above, the methodology for surface water sampling is presented in the Surface Water Management Plan. We agree that data from the water quality or fate and transport models are important to determining any causal relationships among contaminants and the biological characteristics of the stream. Sampling locations for biota were located at the same locations designated in the surface water sampling plan in order to provide for the integration of abiotic and biotic data. While data from the water quality assessment model are important to the ecological risk assessment, development of the abiotic portions of the fate and transport model are not part of this ecological risk assessment. The process as outlined in the Environmental Evaluation Work Plan, however, allows for the integration of such fate and transport data at a later phase. Likewise, biological/ ecological information may be incorporated into the water quality assessment methodology as data from the preliminary ecological field surveys become available.</p>
C-134	<p>3. A fundamental issue when examining data is the uncertainties in the data and the interpretations along the way. The methodology for quantifying the uncertainties in the EE should be included in the Workplan. This effort should be integrated with the selection of the models to be used. The methodology for quantifying the uncertainties is not presently in the final version of this EE.</p>	<p>Monte Carlo techniques or the equivalent will most likely be conducted on the food web component of the pathways analysis model. Details regarding the uncertainties analyses will be developed and presented as part of the Work Plan revision that addresses the exposure assessment and pathways model.</p>

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C-135	4. <u>An Approach for Selecting and Using Indicator Species to Monitor Ecological Effects Resulting From Chemical Changes in Soil and Water</u> , by Reagan, D.P. and C.L. is cited as the framework for examining the food web and other exercises that will be carried out during the implementation of this workplan. Please provide the State (specifically Jeb Love) a copy of this reference for our information and review.	An unofficial copy has been provided. A formal copy cannot be provided until the final editing has been completed. This should occur by October, prior to the planned publication in December 1991.
C-136	5. The workplan should state DOE will be building a reference collection of benthic organisms as part of the EE work.	A statement has been added to the Final Work Plan (Field Sampling Plan) that voucher specimens of benthic organisms are being collected as part of the ecological field survey.
C-137	6. Part of an EE is a Use Attainment Assessment (UAA) of the aquatic uses in Woman Creek. The methodology for this assessment should be spelled out in an SOP (see CDH comments to the Ecology SOP's). The intent is to determine the limitations in the use and the factors contributing to the limitations. The factors can be tonics, flow, nutrients, etc.	A UAA is not a required part of an Environmental Evaluation according to EPA CERCLA Environmental Risk Assessment guidance, nor is it part of the IAG. The objective of a Use Attainment Assessment (UAA) is to determine the highest actual and potential uses of the waters and to identify any limiting factors in the use of such waters. The objective of the ecological assessment is to adequately characterize the nature and extent of environmental effects to biota under the "no action" scenario. While the objectives of these two assessments are somewhat different, the methods employed and data collected as part of these assessments are complimentary. Factors such as flow, nutrient loading, and other factors contributing to limitations in stream use will be measured and evaluated as part of the ecological risk assessment. Biosurveys, biomonitoring, and toxicity testing are each proposed in this

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C-138	7. Any aquatic station where biology and chemistry data are collected need to include flow measurements. Without flow measurement, evaluation of habitat suitability and loading to the system can not be determined. This is particularly critical for habitat and fate and transport assessments.	<p>Work Plan. Information from these biotic surveys will be integrated with information from the abiotic water quality assessment in the characterization of contamination and the identification of factors which limit use of Woman Creek by biota.</p> <p>Flow measurements are being collected along Walnut Creek at select sampling locations.</p>
<p><u>Section 9.1.2.1</u></p> <p>C-139</p>	Screening data against the EPA National Ambient Criteria Documents should be done for organics, inorganics, radionuclides, as well as heavy metals. Please revise this discussion in the text to indicate that this important task will be done for all of these classes of compounds.	Organic, inorganic, metals, and radionuclides data will be screened against EPA National Ambient Water Quality Criteria during the contaminant of concern selection process. The limited available data on metals (Section 9.1.2.1.) and organics (Section 9.1.2.3) were compared to these criteria in the respective sections to provide a preliminary assessment of potential contaminants of concern to biota. Forthcoming data will also be evaluated with respect to this determination. Section 9.1.2.2 of the Work Plan has been revised to state that some maximum radionuclide values (gross alpha, gross beta, and plutonium-239) exceed state water quality standards and are therefore more likely to be potential contaminants of concern to biota.

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<p><u>Section 9.1.2.2</u></p> <p>C-140</p>	<p>The screening process for selection of COC's should be done before the conclusions on page 13 and 60 (radionuclide examination of tissue) are drawn. Conclusions should be drawn from the data when presented. Until the review of existing data is complete, with attendant agreement on the conclusions and gaps in the information, conclusions are inappropriate.</p> <p>Plutonium and Americium have such a significance to this site, obtaining body burden data in selected organisms is paramount.</p>	<p>The text has been revised to state that at the low dose levels reported, it may be difficult to distinguish adverse biological response due to radionuclides from background "noise..." While it is agreed that plutonium and americium are significant to this site, their analysis in biota will be depend on the selection process for contaminants of concern, key receptor species, and assessment and measurement endpoints.</p>
<p><u>Section 9.2.1.3</u></p> <p>C-141</p>	<p>Regarding item 2, page 9-25, how will reference areas be determined, or proven, to be unaffected by windblown radionuclides or chemical contaminants? Upstream areas have potentially been affected by diurnal winds at RFP.</p>	<p>Reference areas will only be selected and used where appropriate. Criteria for the selection of reference areas will be evaluated in discussions of the Risk Assessment Technical Working Group. Reference areas will not be selected or evaluated until the type of injury or measurable ecological endpoints are determined. If the contaminant of concern, for example, is a volatile organic, the absence of windblown contamination need not be a selection criterion and upstream reference areas could therefore be used. If windblown contamination is a concern, reference area(s) would need to be selected at an appropriate distance.</p>

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<u>Section 9.2.3.5</u>	Regarding the last paragraph, page 9-32, a SOP must be referenced, or established, for the collection of "flora from a measured area".	The SOP for the collection of periphyton is appropriately referenced in the Field Sampling Plan, Section 9.3.4, Field Survey and Inventory Sampling Methods.
<u>Figure 9-4</u>	Specific dates are needed in line with the approval of Ecology SOPS.	The schedule presented in the OU6 Work Plan was designed to meet the deliverable dates of April 19, 1991 (Draft Work Plan) and September 16, 1991 (Final Work Plan). The months indicated in the schedule reflect the timeframe in which the activity will occur and not necessarily the amount of time necessary to complete the task. The schedule is flexible so that similar activities at different OUs can be coordinated.

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<p><u>Figure 9-6</u> C-144</p>	<p>In the revised EE submitted to the Division on June 7, 1991, please make sure that Figure 9-6 includes all of the sampling locations for aquatic biota that are included in OU 1, OU 2, and OU 5. The Division suggests that the sampling locations be color coded to match their association with the different OU's. A comparison of the equivalent figures in the revised EE's for OU 1 and OU 2 showed that some of the sampling locations are duplicated and some of the locations overlap areas that are being covered in another OU. By presenting all of the sampling locations in different colors on all of the maps, confusion by reviewers and readers can be substantially reduced. In addition, it would give the reviewers more confidence that a comprehensive, but not duplicating, sampling plan is proposed for the entire Woman Creek drainage which includes portions of OU 1, OU 2, and OU 5.</p>	<p>Although sampling locations may be duplicated in different work plans, such locations will only be sampled once and the data will be used in each of the Work Plans. As part of the implementation of this Work Plan, a comprehensive sampling location map is currently being developed.</p>