DOCUMENT REVIEW COMMENT RECORD OF EPA AND CDH COMMENTS

FINAL PHASE I RFI/RI WORK PLAN

ROCKY FLATS PLANT
GOLDEN, COLORADO

WOMAN CREEK
(Operable Unit No. 5)

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

EG&G ROCKY FLATS
ENVIRONMENTAL RESTORATION PROGRAM

Augus 1

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ENVIRONMENTAL RESTORATION PROGRAM

REVIEWED FOR DECLASSIFICATION/SUNI
By
Date 5/30/91

August 1991

DOCUMENT REVIEWED: OU5 - Phase I RFI/RI Work Plan

DOCUMENT REVIEWER: Environmental Protection Agency Region VIII **Date:** August 30, 1991

CITATION	COMMENT	DISPOSITION
General Comments		
E-1.1	The text does not provide analytical data for all the sample locations in the operable unit and therefore lacks a thorough evaluation of existing data. Air data and associated interpretation is missing completely. Review of all existing data is a necessary part of the RFI/RI process. The review should take place prior to writing the workplan in order to develop a meaningful workplan that covers data gaps and does not duplicate previous efforts. Review of previous data is necessary to further define data quality objectives and to develop an adequate field sampling plan. The data validation process must be accelerated in order to evaluate data in a timely manner.	Data regarding Operable Unit 5 are limited and some of the data have not been validated. DOE agrees that the review of the existing data is a necessary part of the RFI/RI process and intends to include this review as part of the data evaluation and RI report preparation process. In this way, all of the data regarding OU-5 will be summarized and included in the Phase I RI Report. The existing data have 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 provide the information that has been used in developing the Work Plan, in defining data quality objectives, and in developing the field sampling plan.
E-1.2	It is inappropriate to disqualify pathways of exposure prior to accumulating and evaluating any sample data. Until initial investigations are completed, all pathways are to be considered.	The Work Plan has been modified to present a generic conceptual model showing all pathways of exposure for all of the IHSSs in OU-5.
E-1.3	The air monitoring stations for monitoring possible releases from the old landfill which were recommended by EPA and agreed to by DOE during previous OU5 scoping meetings must be included in the field sampling plan. This data is also needed for completion of the baseline risk assessment.	Three proposed Hi-Vol air sampling stations have ben included in the FSP for OU-5. These stations will become part of the site-wide air monitoring program already established at RFP. The air monitoring program is discussed in Section 7.2.5 and the proposed locations are illustrated in Figure 7-2.

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E-1.4	Characterization of the geohydrology would greatly benefit with the addition of a geophysical investigation. Based on the results of the investigation, appropriately located bedrock monitoring wells would further aid development and refinement of the site hydrogeologic conceptual model. This type of information will be necessary for characterization of the operable unit. A sample and analysis plan is necessary for investigation of contaminant fate and transport in the vadose zone.	Geophysical investigations are not planned during Phase I for OU-5 because of 1) their limited success at other areas of the site, 2) their application to the ash pits may be limited since these IHSSs may not be dissimilar enough to the adjacent hillside where numerous slides occurred, and 3) there is usually too much clay present in the adjacent alluvium which limits the effectiveness of ground penetrating radar to identify subsurface features. Surface geophysical techniques may be tried after the initial investigation when additional data is available on each area. Additional investigation of the geohydrology of the IHSSs will be proposed as a Phase II activity if warranted by the results of the Phase I Investigation. Sampling of the vadose zone is included as part of the Phase I sampling effort (see Section 7.0 of the Work Plan). Additional investigations regarding fate and transport in the vadose zone will be included in later Phases of the RFI/RI program if appropriate for the IHSSs.
E-1.5	Because parts of OU5 and OU1 are overlapping and OU1 surface water drains into OU5, the findings from the separate investigations are not mutually exclusive. OU3 investigation results will also be of benefit to OU5. Results from each of the OU investigations will enhance each other. The RFI/RI workplan and reports must discuss the overlapping data. It is important to evaluate the data and think through the remedial processes of these OUs simultaneously to adequately interpret	DOE agrees. The text in several sections has been modified to indicate that results and ongoing investigations at overlapping OUs will be reviewed during implementation of the field program and during the analysis and report preparation process.

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	fate and transport of contaminants and properly coordinate the remedial activities of each.	
E-1.6	As addressed in the scoping meetings, the radiological survey at the old landfill was to be summarized and included in the workplan. Other types of radiological surveys were to be investigated and summarized for applicability to remedial activities. The workplan text indicates that a summary of the survey will be included in the RFI/RI report.	The results of the radiological survey were not available at the time of printing of this Work Plan. The results of the survey have now been provided to the agencies and included in the Work Plan as text in Section 2.2.4 and as Appendix B. The results of the survey will be used to locate areas with elevated radionuclide concentrations, as described in the Work Plan.
E-1.7	Also, during the scoping meetings, it was decided that a summary of the 1985 study on the old landfill would be included in the workplan. The workplan indicates that only a Fiddler survey will be completed for other IHSSs within the OUs.	Since the results of the 1990 survey are now available and included in the Work Plan, a summary of the 1985 radiologic survey will not be included in the Work Plan. Given the results of the Germanium detector survey, DOE intends to use this method 2Xplace of the Fiddler surveys for the Ash Pits. The Fiddler surveys were proposed in the Work Plan since they were specified in the IAG.
E-1.8	Requirements in the Plan for Prevention of Contaminant Dispersion must be included in the workplan.	The requirements of the Plan for Prevention of Contaminant Dispersion are addressed in the SOPs referenced in the Work Plan.
E-1.9	In several locations within the body of the text, a phased approached to investigation of the operable unit is presented. A phased approach in which multiple workplans are submitted is not acceptable. The workplan must be comprehensive as is considered the road map for complete characterization of the	Section I.B.9. Investigatory Phase Documentation (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-5 has

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	operable unit in order to arrive at an acceptable CAD/ROD. It is acceptable to apply a staged approach in which decision points are identified during field analyses directing the next appropriate investigative action. The decision points are to be documented with technical memoranda, approved by the regulatory agencies, and attached to the workplan. The staged approach could allow for adjustment to the field investigation in order to obtain necessary data to adequately meet the requirements of an RFI/RI report (i.e. characterize the nature and extent of contamination and complete a baseline risk assessment). The workplan fails to address on what basis future field investigative decisions will be made and how this will occur without impacting the IAG schedules and planning documents.	been added to the Executive Summary and Section 1.0 of the Work Plan for clarification.
Executive Summary		
E-2	The FSP must be amended to reflect discussions at the scoping meetings held in December, 1990 and February, 1991.	References to the discussions in the scoping meetings are discussed in the responses to the specific comments below.
E-3	The outline of work activity for the ash pits, must include a reevaluation of the extent of the disposal areas in light of the air photos as stated in the IAG, Statement of Work, Table 5.	The reevaluation of the aerial photographs has been added to the outline of the work activities. This activity was already included in the Field Sampling Plan in Section 7.0 of the Work Plan.

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Section 1.3.3.2 Surface Water Hydrology		
E-4	The section must reference the diversion systems on the Woman and Walnut Creeks, illustrate on a map, and refer to the Surface Water Management Plan.	The diversion systems have been added to Figure 1-2. An explanation of the current (August 1991) diversion system has been added to Section 2.1 of the Work Plan. Reference to the Surface Water Management Plan has also been added to Section 2.1.
Section 1.3.5 Ecology		
E-5	The section can be updated with information gained from the Environmental Evaluation study.	Information gained from the Environmental Evaluation study is not yet available. The information will be included in the RFI/RI Report.
Section 1.3.6.3 Arapahoe Formation		
E-6	This section will need to be updated with information gained from the sitewide seismic study. The current characterization is generalized and does not adequately define the lithology and hydrology underlying the IHSSs in the operable unit and how the lithology and hydrology may vary from this operable unit to elsewhere on plantsite. The hydrogeologic conceptual model has changed from previous reports. Additional supporting information must be submitted.	DOE agrees that the current geologic characterization is not complete. The geology will continue to be evaluated throughout the RFI/RI investigation and updated in the RFI/RI Report.

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Section 1.3.6.4 Laramie Formation and Fox Hills Sandstone		
E-7	The thicknesses described for the upper and lower Laramie Formation are not consistent with those in Figure 1-4.	The text in Section 1.3.6.4 addressing the Laramie Formation and Fox Hill Sandstone has been revised to indicate that the Laramie Formation is approximately 700 feet thick (692 feet). A revised Figure 1-4 has been added to the Work Plan. This figure corresponds to the same figure in the OU-2 Work Plan.
Section 2.0 Preliminary Site Characterization		
E-8	A area of disturbed ground south of the interceptor ditch and approximately 1,600 feet west of IHSS 209 must also be investigated.	Investigation of this disturbed area has been added to Section 7.2. This area appears to be the location of a radio tower installation in the 1955 aerial photograph.
Section 2.1 Woman Creek		
E-9	Figure 2-2 must show the diversion structure from Pond C-2.	Figure 2-2 concerns the Original Landfill and does not show Pond C-2. However, the diversion structure has been added to Figure 1-2.

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E-10	A summary of the parameters regulated under the NPDES permit needs to be presented.	The discussion of the NPDES program has been expanded in Section 2.1 of the Work Plan. The analytical parameters are presented in the Surface Water Monitoring Plan and are referenced in the Work Plan text.
E-11	See comments under section 2.4.2.	Please see the comment responses under Section 2.4.2 (Specific Comment number E-28 and E-29).
Section 2.2 Original Landfill (IHSS 115)		
E-12	Field investigation by EPA and CDH personnel verified the presence of waste south of the South Interceptor Ditch and up to Woman Creek in some areas. Additionally, the landfill appeared to extend farther to the east than depicted in figure 2-2. This may be the surface area disturbance depicted east of the landfill in figure 2-2. This area will also need to be investigated as part of the landfill. Figures 2-2 and 2-3 will need to be modified to reflect an accurate representation of the extent of debris. The square footage stated in the text also will need to be amended. The 1971 air photo shows disturbed ground extending northeast of the landfill's currently depicted western extension. The description of elevation is not consistent with figure 2-3.	The investigation of the expanded area is included in the field sampling plan (Section 7.2.1 of the Work Plan). The general area of potential impact from the landfill has been added to Figure 2-2 to represent the potential extent of debris. The square footage and elevations in the text have been revised in light of the expanded landfill boundary.
E-13	Two ponds were present in the vicinity of the landfill. The one depicted in Figure 2-1 and another which was in a north-south drainage in the central part of the landfill. The text describes	Both ponds are now described in the text, and the field sampling plan has been modified to also investigate the second pond.

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	only one pond and attributes characteristics of both the ponds to the description. The revised workplan must describe both ponds accurately and the field sampling plan must be written to investigate both ponds.	
E-14	The locations of the hot spots from which material was removed need to be identified in the RFI/RI workplan. Additionally, the method(s) of detecting and locating these areas must be identified. The field sampling plan must apply information from the previous removal to the current investigation.	This section of the Work Plan presents the available information as completely as is possible at the current time, including the locations of the areas with detectable radionuclides and the method of locating them where known. If additional data are located regarding these items they will be included in the RI Report.
E-15	Drawings showing the piping connections and sources to the two outfalls must be provided. Any sample events and results of seep water from the landfill or the outfalls must be provided.	The information discussed in this comment will be collected as part of the field sampling plan discussed in Section 7.1.2 of the Work Plan. Drawings and sample results will be included in the RFI/RI Report.
Section 2.2.4 Nature of Contamination and Previous Investigations		
E-16	It is not clear if table 2-2 is a listing of contaminants found above detection limit or of contaminants analyzed. Clarification is needed. The parameters listed as potential contaminants (i.e. plutonium, beryllium, uranium-234 and pesticides) were not listed in the table and need to be. Basically, all sample results must be provided. Additionally, sample results from wells 57-86 and 4-81	Table 2-2 has been deleted and replaced with a more complete evaluation of the existing data that consists of a tables listing the maximum concentration for analytes detected above CRQLs. These sample results have been evaluated and used in the development of the field sampling plan (as was the IAG scope of work). All sample results for

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	and surface water stations SW-38, SW-37 and SW-36 must be evaluated and presented. The field sampling plan must be based on results from all data and not just a selected subgroup.	the operable unit will be presented and evaluated in the RFI/RI Report.
E-17	Sample results show that the unfiltered gross beta value is less than the filtered sample. This indicates that the sensitivity for gross beta analyses must be improved.	The results are for two different sampling events.
E-18	The methods and results of the in-situ radiological survey performed in 1990 must be reported. Results of other previous investigations must also be submitted. This information is necessary to develop the field sampling plan and the baseline risk assessment.	The results of the 1990 radiological survey were not available at the time of preparation of this work plan. These results of the survey have been added to the Work Plan as a discussion in Section 2.2.4 and as Appendix B. Results of other previous investigations, where available, have been reviewed and used in the development of the field sampling plan. All available data will be included in the RFI/RI Report, and will be available for use in the baseline risk assessment.
Section 2.2.5 Geology and Hydrology		
E-19	The isopach map shown in Figure 2-4 is based on 5 data points. Based on this limited amount of information, all the contours need to be dashed. The map indicates that the colluvium and Rocky Flats Alluvium are of homogenous thickness and display uniform tapering in thickness southward. It is known from current plant-wide evaluations, that the geology of the Rocky Flats plant site is inhomogeneous. To better understand the nature of the underlying geologic units, geophysical methods	The figure has been corrected and the lines are now dashed. DOE agrees that further characterization of the geology and hydrogeology is needed, and presents the FSP, including further characterization, in Section 7 of the Work Plan. The reference to the hydrologic conductivity has been deleted.

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	need to be applied. It is not informative nor supported to state that the hydrologic conductivity of the Arapahoe Formation as "fairly impermeable" . Further characterization is needed.	
E-20	The potentiometric surface map shown in Figure 2-5 is also based on limited data and therefore, all the contour lines need to be dashed. Potentiometric surface lines incorrectly cross topographic lines. The map does not account for the southern drainage of Woman Creek. Further investigative work is necessary to properly characterize the alluvial aquifer.	The figure has been revised and the lines are now dashed. The locations of the potentiometric surface contour lines have been adjusted. The figure is included in the Work Plan to provide the available data and as a basis for development of the field sampling plan. DOE recognizes that the data currently available are not sufficient to properly characterize the alluvial aquifer. Subsequent data will be collected in Phase I to further characterize this area.
Section 2.3.1 Location and Description (Ash Pits)		
E-21	Aerial photographs indicate additional areas of disturbed ground where ash pits could be located. The location of ash pits in the text must be compared further with the air photos for revisions and additions.	The aerial photographs were evaluated to prepare Section 2.3. Additional re-evaluation of the aerial photographs is Step 1 of the Field Sampling plan for the Ash Pits (see Section 7.2.2). Prior to initiating field work at these IHSSs, the locations of the ash pits will be scaled off the photos and surveyed on the ground so that they can be properly located in the field.

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Section 2.3.3 Surface Drainage		
E-22	The ditch mentioned needs to be shown on figure 2-6. The time during which the ditch was installed must be stated. Prior to construction of the ditch, surface-runoff was likely much higher which could allow for considerable transport of contaminants. This must be considered for revision of the FSP.	The date of construction of the drainage ditch along the West Access Road is unknown but likely corresponds to the time when the road was built. The West Access Road is present on the 1953 photo, which means the ditch was present prior to waste disposal activities at the ash pits.
Section 2.3.4 Nature of Contamination and Previous Investigations		
E-23	The amount of depleted uranium that is stated to have been incinerated, is 100 grams. This is inconsistent with the landfill section which states that 60 kg of depleted uranium were inadvertently burned at the incinerator. The inconsistency must be corrected in the revised workplan.	The two quantities of uranium referenced in the comment are from two different sources (references), probably referring to two different events. The 100 grams is in reference to the incinerator and ash pits (IHSS 133), while the 60 kg refers to material reportedly buried in the landfill.
E-24	The analyses of the rayscope investigation and an explanation of the rayscope survey must be provided.	No further information could be located concerning the rayscope survey. Additional information will be provided in the RFI/RI Report if it is located.
E-25	Table 2-3: See comments Section 2.2.4. Surface water and sediment data must be submitted for review.	See response to comments of Section 2.2.4 (Comment E-16). Sediment and surface water data have been more fully presented in this work plan. These data are included in Section 2.4.4 and are presented in Appendixes D and E of the

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		work plan. Additional data will be included in the RFI/RI Report.
Section 2.3.5 Table 2-3		
E-26	The cesium isotope must be identified.	Table 2-3 has been deleted. (See response to Comment E-16)
Section 2.4.1 Location and Description		
E-27	It might provide some clarification to mention that while C-1 is located on Woman Creek, C-2 is an off-channel pond, with Woman Creek routed around it.	Pond C-2 is on the original Woman Creek channel. The discussion of the Woman Creek flow being diverted around Pond C-2 is in Section 2.1 and shown on the figures.
Section 2.4.2 History		
E-28	The text needs to contain an explanation of the treatment process that was undertaken for C-2 water. The activated carbon treatment was provided by pumping C-2 water to Pond A-4 for a period of time due to high concentrations of atrazine, but the activated carbon treatment has stopped and will not be resumed unless necessary. The water diverted around Great Western Reservoir via the diversion ditch goes into Walnut Creek, which is a tributary of Big Dry Creek. The plans underway to pump water from Pond C-2 to the cooling tower water supply system at the plant site needs to be described. Pond C-2 water was	The text now includes a discussion of the treatment system that was used at Pond C-2 and briefly describes the new plans currently underway by the Clean Water Act group at EG&G to discharge the water in Pond C-2 (See Section 2.1).

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	bypassed into the diversion ditch starting in mid June, 1991. The text needs to be updated with this information.	
E-29	An apparent pipeline or diversion structures exists in the 1980 air photos. The presence or absence of these structures must be researched and investigated if necessary.	The 1980 air photo shows the diversions at Pond C-2 for Woman Creek and the SID. These diversions are shown on all appropriate figures. A pipeline also exists in this area and is still present but has been disconnected and is not used for the pumping of any water.
Section 2.3.3 Surface Drainage		
E-30	The South Interceptor Ditch drains into pond C-2 and is thus considered part of the IHSS.	The South Interceptor Ditch (SID) is a part of the Operable Unit, and sampling of the SID is included in the sampling program for the ponds. The discussion of Woman Creek and the SID was included in Section 2.1.
Section 2.4.4 Nature of Contamination and Previous Investigations		
E-31	The Discharge Monitoring Reports (DMRS) and other pertinent information collected as part of the NPDES permit must be researched and summarized in the workplan.	The Discharge Monitoring Reports were reviewed to assist in preparation of the Field Sampling Plan. They are not summarized in this Work Plan since EPA and CDH receive these reports on a regular basis. Reference to the reports has been added to Section 2.4.4.

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E-32	The value for gross alpha must equal that of total alpha radiation as these are the same parameters. The text needs to be clarified. The units for sediment samples is ug/g and not ug/l.	The values reported are from the referenced report. No attempt has been made in the Work Plan to validate previous investigations. The data will be evaluated for validity during the RFI/RI investigation. All of the data will be provided in the RFI/RI Report. The units for sediment samples have been revised.
E-33	The Paine (1980) report appears to contain valuable information pertaining to the transport of radionuclides. This information may be useful in development of the risk assessment. Analytical data from this report should be provided for review in the workplan. The evaluation provided in the current text needs to acknowledge the elevated concentrations of plutonium in the sediment and water collected from Pond C-1. The statement that the plutonium levels are relatively lower in the C-1 sediments is not meaningful given the high counting error for the C-1 sample.	The specific analytical data are not necessary in the Work Plan. The tables from the Paine report summarizing the data are included for informational purposes. This report can be referenced as needed by the reader. The statements made concerning the relative plutonium values are taken from the report. Analysis of the validity of the data with regard to the issue of counting errors will be part of the RFI/RI investigation and data analysis.
E-34	A list of the parameters sampled and the associated results must be provided. In order to properly interpret the data, it is necessary to show the values over time. This information is not provided in Tables 2-5 and 2-6. Standards for these parameters must be provided for reference.	Tables 2-5 and 2-6 have been deleted. A discussion of the existing Surface Water Sampling Program has been added to Section 2.4.4 and analytical results from many of the surface water sampling locations along Woman Creek and the SID are presented in Appendix E. These results were used in the development of the Field and Sampling Plan. All surface water results will be provided in the RFI/RI Report as needed.

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E-35	It is necessary to indicate if the metal values are for total metals or total recoverable metals. It is recommended that under Anions and Cations the term bicarbonate be used in place of carbonate, hydrogen. The elevated metal values for SW-36 in Table 2-6 are somewhat high which need to be explained.	Table 2-6 has been deleted. (See response to Comment E-16)
E-36	The tritium value for SW39 is six times greater than that for SW32. An explanation is required. The gross alpha value for filtered samples is greater than that for unfiltered. This indicates problems with sampling and/or analytical techniques which must be corrected prior to field investigation. The MDA must be shown for all the radionuclides. The sample results indicate that some radionuclides were not detected yet it is more likely that they are present but are below the detection limit. Basically, further evaluation of all the data is needed. The text needs to be clarified in terms of the values for the radionuclide concentrations as being an average or maximum.	Table 2-6 has been deleted. (See response to Comment E-16)
E-37	The section needs to present and evaluate data from all the monitoring wells, sediment stations, and surface water stations shown on figures 2-7 and 7-2. A complete evaluation of all the data in the drainage is a necessary part of the RFI/RI process.	As part of the final work plan a more complete review of the data has been included. DOE agrees that further evaluation of the data may be needed depending on the results of the field investigation with any subsequent evaluation included as part of the RFI/RI report.
E-38	Elevated concentrations of radionuclides found in surface water station SW-36 indicates possible release from the landfill. This must be mentioned in Section 2.2.4.	It is premature to assume that elevated concentrations are the result of the landfill. The purpose of Section 2.0 of the Work Plan is not to speculate on the meaning of the existing data,

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		but rather to present it and use it in the development of a field sampling plan.
E.39	Basically, further evaluation of all the data is needed.	DOE agrees and intends to evaluate the data as part of the RFI/RI efforts.
Section 2.4.5 Geology and Hydrology		
E-40	Hydrologic testing and geologic characterization of the Arapahoe Formation underlying the ponds is necessary to confirm the currently unsupported statement that clays with little ground water flow underlie the ponds.	DOE agrees. The well installation program described in Section 7.0 includes geologic characterization of the top portion of the bedrock in borings drilled in the OU. Additional wells and borings may be proposed, based on the findings of the Phase I investigation, to further characterize the hydrogeology.
Section 2.5 Surface Disturbance (IHSS 209) and the Surface Disturbances South of The Ash Pit Area		
E-41	An additional area of surface disturbance has been identified from review of the air photos (1955) and was discussed in scoping meetings. This area lies to the west of IHSS 209. Investigation of this area is also required.	Please see the response to specific comment number E-8.

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E-42	The 1978 air photo shows a different configuration of trenches than depicted on figure 2-6. Confirmation of the trench locations is necessary.	Trench locations on Figure 2-6 are based on DOE maps. If needed, the location of the trenches will be scaled off the aerial photos and surveyed on the ground to more accurately define their locations prior to field work.
Section 2.5.2 History		
E-43	It appears, in the 1955 photo, that a pond to the north of IHSS may be present.	A pond-like depression is shown on Figure 2-7 and discussed in the text. It is not clear if the feature is a pond or an area of vegetation.
Section 2.5.3 Surface Drainage		
E-44	The water that flows southward from IHSS 209 and the other area of disturbed ground would flow into Smart Ditch. If contamination is found in these areas, then the southern extent of contamination needs to be investigated.	Smart Ditch is shown on several of the figures and has been added to Figure 2-7. A discussion of the location of the ditch has been added to Section 2.5.4. DOE agrees that if contamination is found in the disturbed areas that additional investigations may be necessary to evaluate the extent of the contamination.
Section 2.5.4 Geology and Hydrology		
E-45	The text needs to state the possibility that sandstone units within the Arapahoe Formation are present in the area of disturbed ground.	The characteristics of the geology and hydrogeology at these IHSSs are not known, as stated in the text. Geologic conditions are addressed in Section 1.3 of the Work Plan.

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Section 2.6.1 Conceptual Model for the Original Landfill		
E-46	It is premature to assume that the only receptors from the air pathway are plant workers and animals. Air data and pathway analyses were not provided in the workplan for review. Until such analyses are performed adequately and it is determined that the public is not susceptible to exposure from the old landfill, the public must also be considered receptors.	All of the conceptual models have been modified to present a generic conceptual model showing all pathways of exposures for all of the IHSSs.
E-47	The soil cover on the old landfill is eroded away in areas. Therefore, it is not correct to state that surface water will not come into contact with wastes at the landfill.	See response to the previous comment.
E-48	It is possible that sandstone units within the Arapahoe Formation are present under the landfill are hydraulically interconnected with the surficial units. This must be stated in the text.	See response to the previous comment.
E-49	Seeps must be located and sampled if appropriate.	If additional seeps are identified in the area of the Original Landfill, they will be sampled as part of the site-wide surface water monitoring program.

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Section 2.6.2 Ash Pits, Incinerator and Concrete Wash Pad		
E-50	Ash was disposed of in the ash pits, concrete wash pad and Woman Creek. Ash in the later two disposal sites are susceptible to movement through surface water runoff. In the case of the landfill, it is not stated that standard procedures were to dump a cement mix onto the ash. Ash may have been dumped over concrete. Therefore, the surface water pathway must be considered. Until sample information is gained to determine otherwise, the air pathway must also be considered.	The conceptual model has been modified to present a generic model showing all pathways of exposures.
Section 2.6.3 Ponds C-1 and C-2		
E-51	The air pathway is to be considered during times of low water line in the ponds and during remediation efforts. Discharge and diversion of pond water causes a decrease in volume exposing sediment which allows access of potential contaminants to the air pathway. Until data prove otherwise, the air pathway must be considered.	See response to the previous comment.
E-52	The section on surface water must be updated. The water does not continuously undergo treatment. Discharges are also monitored for compliance with the Agreement in Principal between DOE and the State of Colorado.	A discussion of the current and proposed water discharge system is included in Section 2.1.

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Sections 2.6.4 and 2.6.5 Surface Disturbances		
E-53	Surface water running off of the disturbed areas identified in the workplan has a potential of running into Smart Ditch as well as Woman Creek. Thus, this must also be considered as a potential surface water pathway.	Please see the response to comment E-50.
E-54	Humans offsite are also potential receptors for the air pathway.	Please see the response to comment E-50.
Section 3.2 The ARAR Process		
E-55	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:	The Work Plan has been rewritten to accommodate this process.
	-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.	-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 OU-5.
	-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 FS.	-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

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	The remediation goals are based on risk assessment, proposed ARARs and the NCP. -Action specific ARARs are finalized during the draft and final FS. The workplan must be written to accommodate this process. Failure to do so will result in an inadequate RI report.	scoping of the FS as discussed in the preamble to the NCP, 55 FR 8712, third column. -DOE concurs.
E-56	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 4mrem/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.	SDWA values for strontium 90 and Tritium - There are not 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, than 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. Data on maximum values for contaminants present in OU-5 are presented in Section 7.0 of the Work Plan.

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E-57	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 parameter is also considered an ARAR and not TBC until an ACL is established for that parameter.	The newly promulgated MCL and MCLG values are in the table as TBCs until the date they become effective. Background levels have not yet been established at Rocky Flats for these parameters.
E-58	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.	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., USEPA Contract Laboratory Program Statement of Work for Organic Analysis, Multi-Media, Multi Concentration) 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: • 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.

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		• 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). 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 ARAR's. 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-62). A similar situation could occur with ARAR's 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 ARAR's. 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.

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Section 3.2.3 ARAR Categories		
E-59	The state construction standard for plutonium in soil must be considered as a chemical-specific ARAR.	The state construction standard for plutonium in soil is an action-specific ARAR and has been added to the text.
E-60	Potential ARAR values for radionuclides need to be revised in Table 3-1 to reflect the state temporary standards for ground water which are the same for the Woman Creek surface water segments. RCRA Appendix 9 constituents need to be listed as potential ARARS.	Table 3-1 has been revised to include state temporary standards for groundwater. Only those Appendix 9 constituents which are included in the OU5 Field Sampling Program (see Table 7-5) are included on these ARARs tables.
E-61	Units within Tables 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).	Units in these tables have been converted to ug/l for comparability. Unlike the OU1 Work Plan, which is Phase III, OU5 is a Phase I Work Plan and maximum concentrations for all parameters are not yet available.
Section 3.2.5 Remediation Goals		
E-62	The third bullet listed under development criteria for remediation goals 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	The reader is referred to the response to Comment E-58 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^{-4} aggregate (i.e., cumulative) lifetime added cancer risk is not required at this phase of the investigation nor technically feasible in many cases.

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	sampling and analysis protocols that will be sufficient to evaluate the 10^{-6} point of departure.	For example consider a hypothetical assessment involving carbon tetrachloride: Estimated Detection Limits for Carbon Tetrachloride In Water Based on 1×10^{-4} Case — Target Detection Limit (ug/l) 1 Compound, 1 Pathway — 0.6 5 Compounds, 1 Pathway — 0.1 5 Compounds, 3 Pathway — 0.04 For this assessment, it is clear that practicable technical limitations exist that limit analytical evaluation of 1×10^{-4} 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 5 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

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		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 X 10^{-6} lifetime added cancer risk. This lifetime added cancer risk is clearly within the range of 1 X 10^{-1} to 1 X 10^{-6} which the NCP requires EPA to evaluate in terms of acceptable risk. The National Contingency Plan (NCP) 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). In light of this consideration, and the previous response to Citation E-58, 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.

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		In the event that a second phase of study is required, DQO's that address the concerns of cumulative risk and analytical sensitivities can be specified, as necessary, on a site and media-specific basis.
Section 4.1.2 Evaluate Available Data		
E-63	The possibility for volatile and semi-volatile organic contamination is possible in the landfill due to chemicals disposed of in the landfill and ponds which catch surface runoff and runoff from the south interceptor ditch.	Contamination due to organics is possible but not known at this time. The fourth bullet addresses other contamination.
E-64	The section must address what previous data sources are and how they will be used for evaluation. Problems with data validation are still apparent. The reason for the problems must be identified and corrected prior to field work start up.	As stated in the first sentence of the section, the conditions of the Site were described in Section 2.0. The purpose of Section 4.1.2 is to summarize the data presented in Section 2.0, as described in the second sentence of the section.
Section 4.1.3 Develop Conceptual Models		
E-65	The conceptual models specific to each IHSSs in OU 5 need to be developed. Contaminant particle size must be considered in designing the sampling and analyses plans and evaluating exposure pathways.	The conceptual models were developed in Section 2.6. Particle size analysis is included in the field sampling plan in Section 7.0 of the Work Plan.

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Section 4.1.4 Specify Phase I RFI/RI Objectives and Data Needs		
E-66	Multiple phases of investigation requiring submittal of revised workplans are not encouraged. It is more cost and time effective to prepare a complete field sampling plan and to thoroughly analyze the existing data prior to beginning field work. Data analyses of field samples and activities must be evaluated concurrently with ongoing field work. In this way, changes to the field sampling plan can be made as needed. Section VI. B. of the Statement of Work in the IAG states that technical memoranda to EPA and the State documenting the need for additional data are to be submitted in the event that the workplan needs modification. The modification then becomes an amendment to the workplan. Additional phases are not scheduled for OU5 in the IAG and in the IAG planning documents. If additional work is necessary based on results of preliminary work, the additional work must be completed in a manner as to meet the IAG schedules. EPA will not approve a schedule extension based on an inadequate field investigation for a RFI/RI report.	See response to general comment number E-1.9.
Table 4-1: E-67	(A) Plumes and hot spots must be characterized at the old landfill (see Nature and Extent of Contamination).	A. Plumes and elevated radionuclide concentrations will be located through the soil gas and radiological surveys. As

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	(B) The geology and hydrology of the operable unit and IHSSs need to be characterized. (C) Geophysical methods should be added to the sample and analysis methods for characterization of the landfill and the surface disturbed areas. (D) Level IV (Level of Analysis) must be applied to the investigation for the first three bulleted items.	stated in Section 7.2.1, plumes identified through the soil gas will be characterized using borings. B. The geology and hydrology of the IHSS will be characterized through the use of borings and wells and analytical sampling. C. Please see the response to general comment E-1.4. D. The first three bulleted items do not include chemical analyses. They are field activities, which as defined by EPA Guidance are Level I and II activities.
Section 4.2.2 Identify Data Types		
E-68	A determination of whether additional air monitoring is necessary for adequate completion of the risk analysis is necessary. The air pathway must be investigated for exposure from the potential release of radionuclides at the old landfill as discussed in scoping meetings and update meetings regarding the old landfill.	See response to Comment E-1.3.
E-69	In regard to the Phase I program reference, see comments under 4.1.4.	See response to general comment number E-1.9.
Section 4.2.4 Identify Data Quantity Needs		
E-70	The data quantity needs should be known before field work begins by thoroughly evaluating the existing data. The workplan	See response to general comment number E-1.1 and E-1.9.

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	can be amended as field work is in progress upon receipt and evaluation of data collected during the field investigation. See comments under section 4.1.4 regarding subsequent phases.	
Section 4.3 Stage 3 - Design Data Collection Program		
E-71	The discussions of the scoping meetings also are to be considered in designing the data collection program. This workplan was not modified in the three month period from the time of the scoping meetings to the delivery date.	DOE made the changes appropriate to the Work Plan based on the scoping meetings, including reference to the air monitoring program and several changes to the analytical program.
Table 4-2:		
E-72	Geophysical test methods need to be added to level I tasks.	Geophysical test methods are not included in the Phase I field sampling plan and are therefore not included in Table 4-2.
Section 5.1 - Task 1 - Project Planning		
E-73	The review from which Section 2 was based, is inadequate in that not all available surface water, ground water, soil and sediment data were reviewed, no air data were reviewed within the operable unit and within overlapping operable units.	See response to general comment number E-1.1.

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E-74	Additionally, the data needed to be evaluated in terms of tables and trend analyses (were possible).	See response to general comment number E-1.1.
E-75	In preparing the workplan, it should have already been determined if the available data will meet the DQOs so that data gaps can be filled in.	The discussion of the DQOs was presented in Section 4.0. The review of the data in this section is to determine if the sampling locations described in Section 7.0 of the Work Plan, as required by EPA, overlap with or are duplicative of sampling locations for other OUs or ongoing investigations. This item does not deal with the identification of data gaps completed in the previous section.
Section 5.3 Task 3 - Field Investigation		
E-76	The task must also characterize the geohydrology of the operable unit and IHSS's. Screening activities will need to include geophysical methods in order to assist collection geohydrologic information. Field activities need to be based on the IAG and scoping meetings.	Please see the response to general comment E-1.4. Characterization of the geohydrology of the IHSSs at a Phase I level will be undertaken using borings and wells as described in the field sampling plan. Depending on the result of the Phase 1 program, additional characterization may be needed in later phases.
Section 5.3.1 Old Landfill		
E-77	The evaluation of the radiological survey should have been completed prior to submittal of the workplan. The revised workplan will need to include a complete evaluation of the survey.	The results of the radiologic survey are discussed in Section 2.2.4 of the Work Plan. The Survey is included as Appendix B of the Work Plan.

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E-78	Geophysical methods will greatly assist in the initial field investigation of the Old Landfill to determine depth of fill and possibly the underlying stratigraphy.	Please see the response to general comment E-1.4.
E-79	The extent of the old landfill must be verified.	Nature and extent of contamination are discussed in Section 5.5.3 of this Section.
Section 5.3.2 Ash Pits		
E-80	The location of the ash pits needs to be verified by review of air photos and field surveys.	The reevaluation of the aerial photographs has been added to the outline of the work activities. Prior to field work, the ash pits will be scaled off from the aerial photographs and surveyed in on the ground to properly locate these IHSSs in the field.
Section 5.3.3 Detention Ponds		
E-81	The south interceptor ditch water must also be sampled.	SID water and sediment sampling is part of the ongoing Plant-wide surface water and sediment sampling program. Surface water and sediment samples will also be collected during this investigation. DOE will further analyze the results of the ongoing program as part of the RFI/RI investigation and include the sample results in the RFI/RI Report.
E-82	Any seeps within the OU must be identified and sampled.	If any new seeps are identified in OU-5, they will be sampled as part of the site-wide surface water monitoring program.

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Section 5.3.4 Surface Disturbance Areas		
E-83	Magnetometer surveys will need to be conducted over the three areas of disturbed ground as discussed in the scoping meetings with the regulatory agencies. The third area of disturbed surface area must be added to this section.	Please see the response to comment numbers E-1.4 and E-8.
Section 5.5.1 Site Characterization		
E-84	The hydrostatic characterization of the underlying units of the operable unit must include the hydraulically connected bedrock units.	Bedrock units directly connected to the alluvial deposits will be evaluated during the drilling of borings and wells. Wells will be drilled six feet into the bedrock and completed in the bedrock if the first unit in the bedrock is sandstone.
E-85	As discussed in the scoping meetings, geophysical investigative techniques will greatly assist site characterization. Consideration of these techniques should be addressed as initial steps in the RFI/RI process.	Please see the response to general comment number E-1.4.
E-86	Data quality objectives for ground water modeling need to be determined now in order to collect the necessary data during the field season.	The DQOs described in Section 4.0 address the types and quantities of data to be collected for Phase I ground water modeling. The field sampling plan will collect the necessary data.

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Section 5.7 Task 7 - Development and Screening of Remedial Alternatives		
E-87	See comments under section 4.1.4 regarding multiple phases of investigation.	See response to general comment number E-1.9.
E-88	Table 5-1: The general response actions must consider RCRA and Colorado Hazardous Waste Act requirements when necessary.	Comment noted.
E-89	Detailed Analysis of Remedial Alternatives: See comment under section 4.1.4 regarding multiple phases of investigation.	See response to general comment number E-1.9.
Section 5.8 Treatability Studies		
E-90	The sitewide treatability studies report must be referenced as part of the scope of this workplan.	A reference to the site-wide treatability studies report has been added.
Section 5.9 Task 9 - Remedial Investigation Report		
E-91	The RFI/RI workplan is to be designed to write a complete RFI/RI report. The RFI/RI report is not to be used to identify data gaps. An incomplete RFI/RI report will not be approved	See response to general comment number E-1.9.

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	thus jeopardizing schedules which are enforceable under the IAG.	
Section 7.1.3 Modifications to the IAG Plan		
E-92	The areas of surface disturbance need to undergo a magnetometer survey or other geophysical test method to determine the presence or absence of buried wastes in the area. This was discussed in the scoping meeting.	Please see the response to general comment number E-1.4.
E-93	The results of the rad survey were required to be presented in the workplan to determine the adequacy of the survey. The last oral summary received by EPA on the survey was not conclusive as to the effectiveness of the survey and need for additional investigation. The In-Situ Survey of U.S.DOE's Rocky Flats Plant was submitted under separate cover in June, 1991, two months after the RFI/RI workplan submittal.	Please see the response to general comment number E-18. DOE feels the results were conclusive and intends to substitute the germanium survey for the FIDLER Survey in the Ash Pit Area.
E-94	Collection of borehole samples from the old landfill for volatile and semivolatile organics needs to be based on specific criteria such as indication from field screening equipment or stained area. This needs to be detailed in the SOPA if it differs from the sitewide SOPS.	The items described in Section 7.1.3 of the Work Plan are specific items that differ from the IAG Scope of Work. The changes do not differ from the SOPs, but rather make the work more consistent with the SOPs.

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E-95	While the area to the east of the old landfill needs to be investigated through borehole drilling and sampling, borings and samples must also be taken hydrologically downgradient of the old landfill. Specifically, boreholes are needed where stated in the IAG and near the south east corner of landfill and immediately south of the interceptor ditch.	The field sampling plan (Section 7.0) describes all of the field activities for each IHSS including the items in the IAG. For the full description of sampling activities at the Original Landfill, please refer to Section 7.2.1.
E-96	The samples collected from the ash pits must also be sampled for the isotopes of uranium.	DOE will analyze the Ash Pit samples for the analytes specified in the IAG and those thought to be present at each IHSS. Total uranium, gross alpha and gross beta are the analyses specified since they are able to detect the uranium, the only radionuclide reported to have been disposed at these IHSS.
E-97	The text must indicate that the samples collected from the ponds are cored samples.	The samples will be taken according to the SOPs as described in the text. Please see p. 7-18.
E-98	The surface water and sediment samples collected as background samples along Woman Creek are considered additional to those stated in the IAG. The background samples should be included in the background geochemical characterization report as well.	As stated in number 7) of Section 7.1.3 the background samples are additions to the IAG. These background samples will not be collected as part of the OU5 investigation but in the background characterization program. Thus, the reference to this background sampling has been removed from Chapter 7.0.
E-99	The samples which are to be analyzed for pesticides and PCBs along Woman Creek need to be specified. If it is determined that these parameters are present, additional sampling may be required.	The surface water samples analyzed for pesticides/PCBs will be a random one-half of the samples, as stated in the text. The specific sediment that will be analyzed for pesticides is based on the union of the existing data and is specified in the

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		text. DOE agrees that additional sampling may be required depending on the results of the initial sampling.
Section 7.2 Phase I Investigation		
E-100	See comments under section 4.1.4 regarding phased approached (this applies to the entire section).	See response to general comment number E-1.9.
E-101	The area of surface disturbance which is west of IHSS 209 must also be investigated.	See response to specific comment number E-8.
E-102	Table 7.3 will need to be modified according to the comments below.	Table 7-3 will be modified as appropriate to the comment responses.
Section 7.2.1 Old Landfill		
E-103	As discussed during the scoping meetings, it is more beneficial to conduct a geophysical survey of the landfill prior to soil gas sampling in order to determine locations and grid spacing for subsequent soil gas sampling. HydroPunch sampling could be quite effective for initial ground water screening within the landfill. HydroPunch sampling locations can be determined based on the analyses of soil gas, rad and geophysical surveys. Real-time water and soil data from the HydroPunch samples can be obtained by using onsite gas chromatography in conjunction with soil gas analyses. Application of fluorometric laboratory procedures with hydropunch sampling would enable identification	Please see the response to general comment number E-1.4. HYDROPUNCH is an effective tool in areas where the materials consist of soil with few obstructions. The landfill may have many obstructions. The rockiness of the colluvium/alluvium may hamper the ability to reach an aquifer within or underlying the landfill. In addition, it will be very difficult to position a rig on the steep slope to push the HYDROPUNCH tool. The IAG scope of work for the Phase I investigation focuses on non-intrusive methods that will provide information concerning contamination at the landfill with minimum disturbance to the cover and the

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	of uranium contamination and migration from sources within the landfill. These sampling and analyses techniques can be applied to the other IHSSs in the operable unit.	wastes. The suggestions provided in the comment are not appropriate for the Phase I investigation but will be considered in later phases.
E-104	(A) The locations of the soil gas sampling stations must be shown on a map of the old landfill. (B) The depth of the soil gas probes should be modified from two feet to five to 10 feet, depending on the depth to ground water, due to the cover that was placed on the landfill. (C) Vinyl chloride and 1,2 dichloroethane, degradation products of TCE, should also be analyzed as part of the soil gas testing. (D) The area of disturbed ground east of the landfill and the area south (downgradient) of the landfill should also undergo soil gas sampling. (E) HydroPunch sampling would be appropriate for these areas as an initial screening of contamination.	A. Proposed soil gas locations have been added to the map. Additional locations may be added, based on the results of additional aerial photograph and data review. B. Comment E-47 states that the cover is thin or absent in some areas, and the previous data suggests that groundwater may be less than 10 feet below the ground surface. The depth of two feet has been selected to get below the cover and above the groundwater table. No change will be made. C. The text in Step 2 (page 7-10) 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 evaluated. D. The text already states that the area east of the landfill will be included in the soil gas survey. E. See the discussion above concerning the use of the HYDROPUNCH.
E-105	Soil cores will need to be collected wherever soil gas analyses indicate potential contamination. Two cores are not adequate for characterization of the entire site; a tighter grid is necessary for soil core sampling. The extended boundaries (see comments 2.2) of the landfill must be considered in redesigning the sampling plan. A explanation between soil cores and borings is necessary. The basis on which the decision will be made	The purpose of the soil cores, as stated in the text, is to verify the results of the soil gas survey, not for the purpose of characterization. The soil borings will be used to characterize the disturbed area east of the landfill, the former pond areas, and plumes identified during the soil gas survey. The decisions regarding the locations of the soil borings are based on the IAG and the scoping meeting.

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	regarding placement of soil borings must be provided in greater detail.	
E-106	A monitoring well must be added between the southeast corner of the landfill and the interceptor ditch (see figure 7-1). Additionally, bedrock monitoring wells must be completed downgradient of the landfill in order to characterize the geohydrology of the area. Monitoring wells will need to be sampled quarterly as long as the information is needed in the remedial process.	The well location in the comment is assumed to be the location specified by EPA during the site visit. That location is already shown on Figure 7-1. The wells will be completed in bedrock if sand units are found to be in contact with the alluvium. Additional wells in the bedrock will be proposed later if warranted. DOE will sample the wells quarterly for four quarters at a minimum. 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.
E-107	During site visits by the regulatory agencies, it was determined by the regulatory agencies that a need for soil stabilization of the landfill, air monitoring and additional surface water monitoring may be necessary for protection of human health and the environment and for proper completion of a baseline risk assessment. In a follow up scoping meeting (2/91), DOE and EG&G personnel discussed what might be the best locations for two additional air monitors near the old landfill. There is no mention of the air monitoring effort in the workplan nor are the additional surface water stations identified and the means of soil stabilization addressed. These issues must be addressed prior to workplan approval.	Stabilization of the soils over the original landfill is not planned during the Phase I program for OU-5. Stabilization may hamper the data collection effort during the field program (by reworking and possibly covering of the landfill's surface). The field investigation activities may also cause deterioration of any new surface installed. See response to general comment E-1.3. The additional surface water monitoring station was added, which is what led to EPA's comment E-114.

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CITATION	COMMENT	DISPOSITION
Section 7.2.2 Ash Pits		
E-108	Possible waste disposal areas may exist around the old incinerator as well which will require investigation. The 1955 air photo must also be reviewed.	The incinerator is IHSS 133.5 and is included in the program described in Section 7.2.2. The 1955 photo has already been evaluated during preparation of this work plan and will be reevaluated, if needed, prior to field work.
E-109	Figure 7-2 shows proposed locations of sediment samples only. Surface water sample locations are shown on figure 7-1.	Proposed surface water locations have been added to Figure 7-2.
E-110	The third paragraph on page 7-12 appears to be out of place.	The paragraph has been corrected to make reference to the landfill.
E-111	The text states that the monitoring well locations for the ash pits will be determined following a review of the geologic characteristics of the site. The means and timing of reviewing the geologic characteristics must be explained and the review must be completed in a timely fashion so as to complete installation of monitoring wells on schedule. The monitoring wells will need to be sampled quarterly as long as the information is needed in the remedial process.	The text follows the IAG which stated that locations will be specified after the review of the geologic characteristics of the site. Upon completion of the surface and subsurface sampling, the geologic data will be reviewed and the well locations proposed to EPA and CDH in a Technical Memorandum (see the IAG, Section VI.B). Preliminary locations are shown on Figure 7-3, which EPA and CDH may approve if they wish. DOE will sample the wells quarterly for four quarters at a minimum. 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.

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CITATION	COMMENT	DISPOSITION
E-112	The area of the rad survey must be shown.	The figure has been modified to show the approximate area of the radiological survey. The area of the radiation survey will include the areas identified as part of the IHSS and any other areas identified during the Step 1 reevaluation of the aerial photographs.
Section 7.2.3 C-Series Detention Ponds		
E-113	Two of the sediment samples need to be taken at the deepest parts of the pond, one sample needs to be taken at the bank of each pond above water line and one sample taken below water line, the fifth sample must be taken within the five feet of the inlet.	The locations and rationale of the sediment samples were specifically discussed as modification number 5) to the IAG scope in Section 7.1.3.
E-114	The table on page 7-20 indicating the number of sediment samples taken between 113.6 and Pond C-1 needs to be changed to 11 to match figure 7-20. Sampling of existing surface water stations must continue and results reported and evaluated in the RFI/RI workplan. Information from the OU1 investigation which overlaps OU5 must be incorporated in the OU5 RFI/RI process (this includes several monitoring wells, surface water stations, sediment sampling stations and boreholes).	The Table has been modified. DOE agrees that results of ongoing investigations will be reported and evaluated in the RFI/RI Report. The overlaps of the operable units and ongoing sampling programs are discussed in Sections 7.1 and 7.2.
E-115	Locations of the upgradient sediment and surface water samples must be illustrated.	This background sampling has been removed from Chapter 7.0 since it will not be conducted in the OU5 investigation but in the background characterization study.

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CITATION	COMMENT	DISPOSITION
E-116	The sediment samples which will undergo analyses for pesticides and PCBs must be identified. Special attention must be given to the possibility that pesticides were disposed of in the old landfill.	See response to specific comment number E-99. The sediment samples downgradient of the landfill are to be analyzed for pesticides/PCB.
E-117	Figure 7-4 does not represent all the locations of sediment samples to be taken in the ponds and must.	The locations of the sediment samples were specifically discussed as modification number 6) to the IAG scope in Section 7.1.3. The other locations are discussed in the first (**) note of the explanation to Figure 7-4.
E-118	The location of the original stream channel must be illustrated on a map which also shows the location of the monitoring wells. Monitoring wells will need to be sampled quarterly as long as the information is needed in the remedial process.	The original stream channel location has been added to Figure 7-4. DOE will sample the wells quarterly for four quarters at a minimum. 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.
E-119	In order to adequately characterize the geohydrology underlying the operable unit and specifically downgradient from the ponds, it is necessary to drill bedrock boreholes and complete as monitoring wells as necessary.	Bedrock will be characterized at a Phase I level through the use of the borings and wells described in this field sampling plan. Please see the response to comment E-40.
E-120	Indiana St. needs to be identified on figure 7-2.	Indiana Street is now identified on Figure 7-2.

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CITATION	COMMENT	DISPOSITION
Section 7.2.4 Surface Disturbance Areas		
E-121	The investigation would benefit greatly by a completing a magnetometer survey in the areas prior to sampling. This builds in a safety factor as well as assisting in locating the most appropriate sampling locations. EPA recommended this in the scoping meetings.	Please see response to general comment number E-1.4.
E-122	Descriptions of how grab soil sample locations will be selected must be presented. It may be appropriate to collect grab samples on a random grid within the trenched area.	The text has been modified to state that the grab sample will be collected from the center of the excavations.
E-123	Sample locations and survey grids must be identified on figure 7-4.	The radiation survey will be conducted randomly over the disturbed areas. The sample locations have been added to Figure 7-4.
Table 7-5 Parameters and Detection Limits		
E-124	The units for tritium in soil/sediment should be pci/l and not pci/ml.	The units are correct according to the GRRASP.
Table 7-6 Phase I Analytical Program		
E-125	Clarification between the two pages of the table and between the table and the text is necessary.	This part of the work plan has been modified.

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CITATION	COMMENT	DISPOSITION
E-126	For the old landfill, all samples (all media) need to be sampled for TAL metals (including beryllium), TCL volatiles semivolatiles and pesticides/PCBs and radionuclides (including the isotopes of uranium, tritium and radium). For radionuclide sampling, no more than a 2 ft. interval is allowable for a composite sample.	All samples except for the conformational soil borings for the soil gas survey are to be analyzed for TAL metals (including beryllium), TCL volatiles and semivolatiles. The principal pathways from this IHSS, sediment, groundwater and ½ of the surface water samples, will be analyzed for pesticides/PCB. The radionuclide analytical program is as specified in the IAG. Americium, plutonium, and total uranium (which will detect the presence of the other isotopes of uranium) will be analyzed. This analytical program should detect the radionuclides that are believed to be present at this IHSS. The confirmation soil cores for the soil gas survey will be analyzed for only TCL volatiles because their purpose is to verify the results of that survey.
E-127	For the ash pits, samples (all media) must be analyzed for TAL metals, pesticides/PCBs, all the radionuclides listed in the headings including all isotopes of uranium, tritium and radium. Dioxin and semi-volatile organic analyses must also be run on the ash pit soil samples.	The analytical program for the ash pits is as specified in the IAG. Pesticides/PCB analyses are not needed for these IHSSs since these compounds were not reported to be present in the ash pits. TCL semi-volatile analyses are not specified for these samples (except for the groundwater) since these compounds are not thought to be present in these units, and if they were present, the incineration should have oxidized these compounds. Total uranium, gross alpha and gross beta are the only radionuclides in the analytical program since spent uranium is the only radioactive material reported to have been disposed of at the ash pits. The total uranium analyses will be able to determine if any of the uranium isotopes are present.

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CITATION	COMMENT	DISPOSITION
E-128	For the ponds, all samples (all media) must be analyzed for TCL volatiles and semivolatiles, TAL metals, pesticides/PCBs and all the radionuclides listed in the headings including all isotopes of uranium, tritium and radium. Nitrates must also be analyzed for surface water and ground-water samples.	The pond samples (all media) will be analyzed for all these analytes except that the sediments only will be analyzed for TCL pesticides/PCB. This is because the sediment is the medium that will accumulate these compounds if they were present. Thus the sediment will be used as an indicator for the presences of these compounds in the Detention Ponds.
E-129	For the disturbed areas, soil and boring samples must be analyzed for TAL metals, all the isotopes of uranium, plutonium and americium. Field screening for volatile organics must be used during collection of soil and boring samples. If an indication organic contamination is present (either through the equipment or soil staining) then samples must also be collected for TCL volatiles and semivolatiles.	All samples will be analyzed for TAL metals and TCL volatiles and semivolatiles. No radioactive compounds have been reported to have been disposed of at these IHSS. However, if the presence of these analytes should be detected by the gross alpha, gross beta and total uranium analyses specified.

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CITATION	COMMENT	DISPOSITION
Section 8.1 Overview-Baseline Risk Assessment		
E-130	For a more complete list of publications to use when performing the health risk assessment refer to the Final Phase III Revised Workplan for OU1, p. 8-1.	Informational comment acknowledged, no response required.
E-131	The workplan must specify how the risk assessment process will be carried out for OU5.	The workplan specifies that the BRA will be performed in general within the EPA Risk Assessment for Superfund (RAGS) guidance. One point not discussed in the 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. EPA and CDH review and approval of this series of technical memoranda will ensure the agencies participation in the risk assessment process.
E-132	In the second bulleted item, the term exposure pathway needs to be replaced with media.	The text has been modified accordingly.

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Section 8.2 Identification of Chemicals of Concern		
E-133	The procedures for this section must be consistent with those outlined by the Technical Risk Assessment Working Group in which EPA and CDH are members.	DOE anticipates that all relevant facets of the risk assessment will be discussed in the Technical Risk Assessment Working group. Important OU-5 specific facets will likely be addressed in the Technical Memoranda discussed in citation E-131.
E-134	Data taken from other sources and used in the risk assessment must meet the acceptance criteria under the QA/QC protocols established in this program.	DOE is unaware of formal acceptance criteria that are directly relevant to the risk assessment process. The numerous data quality requirements embodied in the QAPjP will be applied as required. DOE will ensure that all data utilized in the risk assessment are suitable for its intended application. Guidance for evaluating data usability will include EPA's Guidance for Data Useability in Risk Assessment, as appropriate.
E-135	EPA has requested that a TIC evaluation procedure be incorporated in the SOPs and QAPJP. This workplan will need to be revised to be consistent with those procedures.	DOE is unaware of a SOP for evaluating TICs in the analytical data. TICs will be considered according to standard practice in Superfund as identified in RAGS.
E-136	The criterion of frequency of detection for selecting a list of contaminants of concern must be evaluated carefully. For ground water, the frequency may be dependent on the amount of ground water flow (seasonality) at the time of sampling or the frequency of sampling.	Informational comment acknowledged. DOE is aware of EPA's point regarding this comment. Data handling will be discussed in an upcoming Technical Risk Assessment Working Group meeting.

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E-137	The lack of an ARAR for an chemical is not a sufficient reason for removing the chemical from consideration in the risk assessment.	Informational comment acknowledged. Identifying a chemical as having an ARAR is intended to signify its consideration in the risk assessment rather than exclusion owing to the absence of and ARAR. Potential indicator chemicals will be evaluated against all considerations in an iterative manner. Thus, while a chemical may be eliminated on one criterion, it may subsequently be identified as an indicator based on another criterion.
Section 8.3.1 Potential Receptors		
E-138	The baseline risk assessment must include exposure of current and future receptor to contaminated media.	Informational comment acknowledged. The BRA will comply with the National Contingency Plan including the requirement to consider potential risks to human health.
Section 8.3.2 Exposure Pathways		
E-139	The text states, "Sources of chemical release will be sites within OU5 that contain chemicals of concern significantly above background levels. One of the criteria on which the list of chemicals of concern are developed is the concentration relative to background. Therefore, the referred to statement should be changed to, "Sources of chemical release will be sites within OU5 that contain chemicals of concern."	The text has been modified accordingly.

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Section 8.4 Toxicity Assessment		
E-140	The discussion of uncertainties should be included in the section on uncertainty analysis.	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.
Section 8.5 Qualitative and Quantitative Analysis		
E-141	The uncertainty analysis should follow the risk characterization section. The risk characterization may also have uncertainties built in to it.	Information comment acknowledged. DOE feels that uncertainties associated with each component of the risk assessment are an integral component of the risk characterization and communication process. The uncertainty analysis will be presented in a stand-alone segment of the report.
Section 8.6 Risk Characterization		
E-142	The summed exposure of contaminants must also be addressed. Clarification of the terminology, "reasonable minimum exposure conditions", is necessary.	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.

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		RME is the approximate upper 95th percentile estimate. RMinE is the approximate lower 5th percentile estimate.
Section 9 Environmental Evaluation **General Comments**		
E-143	The workplan states that the EE for OU5 will be integrated with EEs for OUs 1 and 2. However, there is not an explanation of the methods to be used in integrating the data resulting from the studies. The overlap between the operable units must be identified. Sampling of vegetative communities for vegetative analysis provides an example. The required sample numbers is determined by statistical evaluation of sample adequacy. Because the workplan does not specify a required sample number, the assumption must be made that the samples will be taken until adequacy is met. Difficulties may arise due to high variability in vegetative types. The workplan does not specify if adequacy will be based on only OU5 samples or all OU samples. The correlations between the studies and basis of adequacy must be addressed.	Sampling efforts for OUs 1, 2 and 5 will be integrated to the extent possible. Although sampling locations are duplicated in the different work plans, such locations will only be sampled once and the data will be used in each work plan. The text has been modified to clarify this point. In the case of vegetative sampling, sample adequacy will be obtained for each vegetation/habitat type within the OU. Where operable units overlap, habitats within the overlap area would only be sampled once and data would be applied to both OUs. The level of accuracy desired determines the amount of sampling that should be conducted. For most habitats, an 80% level of accuracy is considered standard and sufficient to achieve adequacy for characterizing the vegetation community without excessive, unnecessary sampling. For more disturbed areas with high variability in vegetative types, it was decided, based on preliminary sampling efforts, that 60% was an acceptable level of accuracy for obtaining an adequate amount of data for characterizing the vegetation community. A statement has

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		been added to the text stating that an 80% level of accuracy will be used, unless, as determined through preliminary field sampling, a lower level of accuracy is necessary due to high variability or heterogeneity in the habitat.
E-144	The workplan states that air monitoring will be conducted as part of OU 5 activities. However, as commented on above, the workplan is lacking inclusion of an air monitoring program specific to OU5. Air monitoring can be a necessary part of the EE and must be addressed.	Air quality modeling is currently being conducted on a site-wide basis as part of a separate program format OU5 RFI/RI effort. Air quality modeling data specific to OU 5 will be obtainable from this program and will be incorporated into the risk assessment as appropriate.
Section 9.1.1 Approach, Task 8		
E-145	Here and in other parts of the text, the Natural Resource Damage Assessment Rule is referenced as 40 CFR Subtitle A Section 11.62. The correct reference is 43 CFR Subtitle A Section 11.62(f).	The reference citation has been corrected in the text.
Table 9-2		
E-146	Include an additional footnote to the table to indicate that the July 1, 1991 Federal Register contains a notice of the final rule establishing 2 mg/L as the MCL for barium. The effective date for this MCL is January 1, 1993. Also, the MCL for selenium of 50 ug/L is effective July 30, 1992. Add a footnote indicating this.	These footnotes have been added.

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E-147	The workplan must identify state water quality standards (Executive Order 12088 requires compliance with state water quality standards). Standards set for the Rocky Flats stream reaches will become effective (1993) prior to remediation of OU5 and therefore must be evaluated.	A table comparing maximum OU5 surface water values to state and federal surface water quality standards has been added. The purpose of this table is to provide a preliminary examination of which metals are likely to be contaminants of concern. Selection criteria for contaminants of concern are presently being determined by the Risk Assessment Technical Working Group. The selection criteria will include consideration of state-wide, basin-wide, and stream segment standards for Rocky Flats.
Section 9.1.1 Metals		
E-148	Please include the references for the toxicity values indicated for metals in this portion of the workplan (page 9-11).	The toxicity profiles include in this portion of the document were referenced in the paragraph proceeding the profiles. These profiles were largely summarized from EPA's Quality Criteria for Water (1986). Additional references are included where cited.
Section 9.2.1.1 Selection Criteria for Contaminants of Concern		
E-149	The text indicates in this section that the process for selecting contaminants of concern is being developed as a Standard Operation Procedure. EPA believes this is inappropriate. Section IV in the Statement of Work of the Interagency Agreement specifies that the Standard Operating Procedures	This statement was incorrect and has been changed to state that the selection criteria and the contaminants of concern are being developed in discussions and working sessions of the Risk Assessment Technical Working Group.

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	shall detail field techniques to be used during investigation of the site. EPA does not consider the application of this criteria for the selection of contaminants of concern to be a field activity. Many of the factors which will be considered during the selection process are dependent on interpretation of available data and information in the scientific literature. EPA believes that selection criteria are appropriately developed in discussions and working sessions of the Risk Assessment Technical Working Group and appropriately documented in meeting minutes or summaries. The application of the criteria is an evaluation activity not a field activity and should be documented in the RFI/RI report.	
Section 9.2.1.2 Identification of Key Receptors - Table 9-5		
E-150	Selection criteria for key receptors is based on several criteria of which four are identified. Based on these criteria, it is not clear why cheatgrass and bindweed are included on the table. Only three grasses and two upland forbs are identified in the workplan. Additionally, the selection of only two species that are associated with damaged ecosystems appears to bias the study to a finding of no impact. Selection criteria must be evaluated against the preliminary list prior to identifying the key receptors for the study.	The cited table is only an example of potential key biological receptors. Cheatgrass and bindweed were included on the list because they are dominant species in disturbed areas. They may or may not be appropriate key receptors depending on exposure pathways and the selected measurement endpoints. A more extensive list of candidate species and selection criteria for key receptors is currently being developed by the Risk Assessment Technical Working Group.

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Section 9.2.1.3 Reference Areas		
E-151	EPA agrees that reference areas should be selected based on measurement endpoints and that more than one reference area may be used depending on the effects to be studied. EPA suggests that the RFI/RI report contain a matrix of candidate reference areas and selection criteria to lend support to decisions on which areas are chosen for various comparisons.	Selection criteria as well as the mode (e.g., matrix) of presenting and documenting the selection of reference areas are being developed in discussions and working sessions of the Risk Assessment Technical Working Group. Once the criteria are selected, candidate areas can be determined.
Section 9.2.2 Task 2: Data Collection/ Evaluation and Conceptual Model Development		
E-152	Please elaborate on what other DOE facilities will be sued (sic) in the development of a preliminary list of contaminants of concern and how information from other facilities will be considered.	DOE facilities such as Oak Ridge, Savannah River, Los Alamos, and Fernald will be contacted regarding any ecological risk assessment or related studies that have been conducted at those facilities. Available information from these facilities, including databases on chemical concentration in environmental media and reports on radionuclide uptake and effects, will be reviewed regarding contaminant effects, particularly radionuclides, on biota.

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Section 9.2.5 Task 4: Toxicity Assessment		
E-153	The last sentence in this section indicates that the adequacy of the existing toxicological database will be evaluated. EPA and CDH need to be closely involved in such an evaluation.	As part of the Risk Assessment Technical Working Group, EPA and CDH will be involved in such an evaluation.
Figure 9-4, Decision Process on Use of Reference Areas for Contaminants in Tissues:		
E-153	The footnote on this figure indicates that ARARs are not applicable if they are below background. This is incorrect. Background is a consideration in the development of remediation goals, as are ARARS. However, the consideration of background is irrelevant when determining whether or not criteria should be considered as an ARAR. Delete this portion of the footnote.	This portion of the footnote has been deleted.
Table 9-6, Proposed EE Report Outline for Woman Creek Drainage		
E-154	Include sections on sediment and air in section 6.2, Exposure Point Identification.	Sediment and air have been added to Section 6.2.

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Section 9.2.11 Task 10: Environmental Evaluation Report		
E-155	The text states that biomagnification of contaminant residues will be traced from organisms at the top of the food chain back through intermediate trophic levels to the abiotic environment. This implies that the model to determine no effects criteria will be validated using site-specific data. Clarification is necessary as to how biomagnification by organisms at the top of the food chain will be calibrated or validated without collection and chemical analysis of terrestrial animals.	It is stated in Section 9.2.10 that "to the extent possible, tissue samples will be collected simultaneously with environmental media samples. This will allow for a determination of site-specific BCFs. These BCFs will be incorporated into the final exposure assessment and will be used to calibrate/validate the pathways model." Explanation and discussion of calibration-validation will accompany model presentation at the appropriate stage in the overall process.
Section 9.3.2 Sample Location and Frequency		
E-156	It is not clear if a transect is considered a sample point or if each sample location along the transect will be a sample point. For a stratified random approach, the data from the entire transect must be considered as one data point because it is the location of the random transect.	The text has been corrected to state that the entire transect will be considered as a sample point.

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QAA Comments		
Section 3.1.1 Objectives		
E-157	The DQOs for environmental evaluations must be added.	Section 3.1.6, DQOs for Environmental Investigations has been added.
Section 3.1.3 Completeness		
E-158	The target for completeness is 100% and the minimum acceptable is 90%.	Agree. The text has been clarified as such.
Sections 3.1.4 Comparability		
E-159	SOPs 5.11, 5.12 and 5.13 are also applicable. A reassessment of which SOPs are appropriate for this workplan must be completed as the SOPs are undergoing changes and approval.	SOPs 5.11, 5.12, and 5.13 have been added to Table 1. A reassessment of applicable SOPs are done each time a QAA or Work Plan is revised.
Sections 3.2.1, 3.2.3 and 3.2.6		
E-160	These sections will need modification based on comments in section 7 of the workplan. Specification of a soil core sample frequency is not a random sample.	These sections will be revised based on modifications made to the Work Plan concerning soil gas, radiation, and air

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CITATION	COMMENT	DISPOSITION
		quality sampling. The reference to the soil core sample being a random sample has been deleted.
Section 3.2.6 Groundwater Samples		
E-161	The text references SOP 2.2 as that for well installation, rather than for well development. The text needs modification to show that SOP 2.2 is for well development and SOP 3.6 is for well installation.	The text has been modified to clarify that well installation will be done according to SOP 3.6 and will be developed according to SOP 2.2.
Section 3.4 Environmental Evaluation		
E-162	Sops 5.11, 5.12 and 5.13 are also applicable to the EE.	SOPs 5.11, 5.12, and 5.13 have been added to Table 1 as applicable SOPs.
E-163	The reference to OU1 should be changed to OU5.	OU-1 has been changed to OU-5.
Section 3.7 Quality Control Samples		
E-164	Equipment rinsate blanks are required at the rate of 1 per 20 samples or 1 per day, whichever is greater.	This specification - 1 per 20, or 1 per day - has been added to Table 2.

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Section 3.7.2 Laboratory QC		
E-165	The section is missing a listing of the actual operating conditions in effect during analysis (see OU6 QAA).	Laboratory SOPs that must be developed by each laboratory to control actual operating conditions has been added.
E-166	See OU6 QAA (section 3.8) for insertion Quality Assurance Monitoring requirements.	A discussion on QA monitoring actions has been added as Section 3.8.
Section 3.8.2 Data Validation		
E-167	The section should reference section 3.7.1 in the QAPJP and the field sample DQOs identified in Appendix A.	Reference to Subsection 3.7 of Section 3.0 of the QAPjP and Appendix A has been added.
Section 3.8.3 Data Reduction		
E-168	The reference for the specified procedures needs to be added.	Subsection 3.4.1 of Section 3.0 of the QAPjP is now referenced for data reduction functions, as well as the specifications in the GRRASP for laboratory data and SOP 1.14 for field data.
E-169	The subsection on data reporting is needed.	Subsection 3.9.4, "Data Reporting," has been added.

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CITATION	COMMENT	DISPOSITION
Section 4.0 Instructions, Procedures and Drawings		
E-170	References to the site-wide QAPJP should include specific section numbers.	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.
Table 3		
E-171	The symbol Pq is not understood.	"Pg" is changed to "Pb".
Section 12.0 Control of Measuring and Test Equipment		
E-172	The specific model numbers of equipment need to be provided on the list of field water monitoring equipment. The list of equipment is not consistent with that listed in SOP 4.2. Consistency is necessary.	Model numbers have been added as well as additional equipment to be consistent with the requirements of SOP 4.2.

DOCUMENT REVIEWED: OU5 - Phase I RFI/RI Work Plan

DOCUMENT REVIEWER: Environmental Protection Agency Region VIII **Date:** August 30, 1991

CITATION	COMMENT	DISPOSITION
Appendix A		
E-173	Please check units and chemical names, several of them are incorrect. For example, the units for the detection limit of percent solids in soil and sediment samples should be mg/kg not mg. The 16th compound on page 32 should be trans-1,3-dichloropropene and the second compound on page 33 should be n-nitroso-di-n-propylamine.	Appendix A has been rechecked, and the corrections noted have been made.

DOCUMENT REVIEWED: OU5 - Phase I RFI/RI Work Plan

DOCUMENT REVIEWER: COLORADO DEPARTMENT OF HEALTH **Date:** August 30, 1991

CITATION	COMMENT	DISPOSITION
General Comments:		
C-1.1	1) The Division is concerned that Table 5 within the Statement of Work (SOW) portion of the IAG is perceived by DOE as satisfying the sampling requirements necessary to define the nature and extent of contamination at the various IHSS's in OU 5. Quoting from the SOW, page 25, Section VI.B, the text reads "The FSP shall incorporate the sampling objectives of Table 5, and shall anticipate investigations beyond the work specified in the Attachment." The Division feels, therefore, that Table 5 provides initial guidance but leaves the meat of the FSP to be flexibly tailored to incorporate the latest data and characterization needs of each IHSS. Many of the following comments, particularly to Section 7, have been conveyed because the Division feels the proposed FSP cannot define the nature and extent of contamination, let alone its fate and transport.	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 accepts that the FSP may not provide for complete characterization of the nature and extent of contamination, nor its fate and transport, if unexpected conditions are encountered. The purpose of a Phase I investigation is to initially assess if contaminants are present to the extent that they represent a significant risk especially for sites that have limited existing data available. Its purpose is not to investigate all possible scenarios that may be encountered at a site. Please see the response to the next comment.
C-1.2	2) At several points in this document, the text refers to the possibility that additional phases of investigation may be necessary to completely characterize some of the IHSS's in this OU. This may be true, but <u>only if</u>, during the implementation of this workplan, a complex situation or development is discovered that goes beyond the original workplan scope. However, it is the responsibility of DOE to ensure that this workplan characterizes, <u>to the greatest extent possible</u>, each and every IHSS within this OU (see previous comment) . Currently, not only is no additional phase of RFI/RI work scheduled in the IAG, but the Final ROD for OU 5 is to be submitted on March 8, 1996. Failure to meet	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-5 has been added to Section 1.0 of the Work Plan for clarification. The Final IAG does not specify a schedule for OU-5 beyond the submission of the Phase I RFI/RI Report. DOE understands that the March 8, 1996 date referred to by the comment was in the older version of the IAG but is not referenced in the Final IAG.

DOCUMENT REVIEWED: OU5 - Phase I RFI/RI Work Plan

DOCUMENT REVIEWER: COLORADO DEPARTMENT OF HEALTH **Date:** August 30, 1991

CITATION	COMMENT	DISPOSITION
	this deadline for reasons other than stated above will be the liability of DOE alone.	
C-1.3	3) The logistics and advantages of a "phased" approach could still be incorporated into this workplan by formulating a plan that would be implemented in stages (similar to what has been proposed in the Phase II RFI/RI Workplan for the bedrock in OU 2). However, in order for the regulatory agencies to approve a staged plan, all stages of the investigation, and alternatives, must be outlined in the workplan.	The steps of the Phase I investigatory program are outlined in this Work Plan. Later phases of the OU-5 effort are not outlined as they will be determined by the regulatory agencies, as outlined in Section I.B.9 of the IAG.
Specific Comments:		
Executive Summary		
C-2	The first paragraph of this section states that the FSP presents the planned investigation that will evaluate the presence or absence of contamination at the IHSSs. The IHSSs have semi-arbitrary boundaries based upon sometimes incomplete or inaccurate historical data. Please revise the text to clarify that the RFI/RI investigation will not be confined to predetermined and possibly incorrect IHSS boundaries.	DOE agrees that sometimes the IHSSs have semi-arbitrary boundaries (mostly due to the lack of information for an IHSS). The RFI/RI investigation will focus on the IHSSs, including a first step of further evaluating the extent of the IHSSs. The FSP text in Section 7.0 regularly refers to re-evaluating the boundaries as the investigation proceeds. The clarification is not necessary in the Executive Summary.
C-3	The fourth paragraph on page ES-2 describes the requirements of the FSP. Characterization of the IHSS's will not be complete nor adequate if the vadose zone is ignored. The importance of the vadose zone is discussed on page 2-8 of "Volume I, Interim Final RCRA Facility Investigation Guidance, Development of an	Vadose zone sampling is provided for in the FSP through the soil sampling of borings and wells, during the Phase I investigations. More complete monitoring of the vadose zone would be proposed as Phase II work if appropriate for an IHSS.

DOCUMENT REVIEWED: OU5 - Phase I RFI/RI Work Plan

DOCUMENT REVIEWER: COLORADO DEPARTMENT OF HEALTH **Date:** August 30, 1991

CITATION	COMMENT	DISPOSITION
	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.	
Section 1.0		
C-4	The second paragraph of this section mentions that this investigation is part of a comprehensive, phased program of site characterization. Please clarify the term "phased" in light of the previous general comment on additional phases of RFI/RI work in OU 5.	Please see the response to general comment number C-1.2 regarding the phased approach. Additional text has been added to Section 1.0.
Figure 1-4		
C-5	This figure needs to be corrected to show the lenticularity of the Arapahoe Formation sands 1, 2, 3, 4, and 5.	The figure has been revised to show the lenticularity of the Arapahoe Formation. The figure was acquired from the OU-2 Report.
Section 1.3.6.2		
C-6	This section describes the Verdos, Slocum, and Louviers alluvial deposits as "terrace" alluvium. However, Figure 1-6 has labelled the Louviers, but not the Slocum or Verdos, as a terrace deposit. Please correct either the text or the figure.	The figure has been corrected.

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DOCUMENT REVIEWER: COLORADO DEPARTMENT OF HEALTH **Date:** August 30, 1991

CITATION	COMMENT	DISPOSITION
Figure 1-5		
C-7	The legend for this map includes a "Terrace Alluvium." Please make this consistent with the text and define which terrace it actually is.	The figure has been corrected.
Section 1.3.6.3		
C-8	Please clarify the term "stream channel-shaped structures" that appears in the first paragraph of this section. The first paragraph also says that the upper Arapahoe Formation was deposited by a complex system of meandering streams. It is the Division's understanding that the upper portions of the Arapahoe Formation are not present at RFP having been eroded away prior to the deposition of the Rocky Flats Alluvium. In fact, the Division is still under the impression that it is a distinct possibility that all of the Arapahoe Formation was removed by erosion underneath RFP. Please clarify these apparent contradictions.	The text has been modified to match the geologic discussion in the OU-2 Work Plan.
C-9	Also in the first paragraph, the text states that the lower Arapahoe sandstones were deposited by braided stream systems. This represents a significant departure from geologic discussions presented by DOE in previous documents. The Division concludes that the geologic conceptual model that was presented in the Phase II RFI/RI Workplan (Bedrock) for OU 2 has been changed. The text and model presented in the above referenced document clearly stated that the Arapahoe Formation	The text has been modified to match the geologic discussion in the OU-2 Work Plan.

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DOCUMENT REVIEWER: COLORADO DEPARTMENT OF HEALTH **Date:** August 30, 1991

CITATION	COMMENT	DISPOSITION
	(undifferentiated) was deposited in a meandering stream environment. Please clarify which model is now the currently accepted version and where this has been documented. If you cite EG&G 1990b (which is cited at this point in the Walnut Creek Ph I Workplan) , the Division will want to see this report and will withhold approval of this plan until we have had a chance to review the site-wide geologic characterization.	
Table 2-1		
C-10	Please rename the last column of this table "Screened Interval" or an equivalent thereof.	The last column has been renamed as recommended.
C-11	Please plot the wells listed on this table on Figure 2-1.	The wells have been added to Figure 2-1.
C-12	Please generate a "Bedrock Surface Structure Map" for inclusion in this section of the document that uses the data presented on this table as well as any other pertinent well information from adjacent OUs.	As discussed in later comments, very little data exists in OU-5 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 OU5 will be included in the RFI/RI Report.
Section 2.1		
C-13	Please add text to this section that explains some of the construction details of the South Interceptor Ditch (SID). Please include the SID's depth, depth to bedrock under the SID, and whether or not the SID is lined in some fashion.	Records have not been identified that provide information on the construction of the SID. Text has been added to describe the physical characteristics of the SID.

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CITATION	COMMENT	DISPOSITION
Figure 2-1		
C-14	Please clarify which RAAMP stations are existing and which ones are planned as part of this RFI/RI.	The location of the existing and proposed air monitoring stations have been clarified and are contained on Figure 7-2.
Section 2.2.2		
C-15	The last paragraph of this section has several items that need clarification. First, please clarify how it is known that the surface outfall pipe is not connected to a drainage pipe, as is stated in the fifth sentence of the paragraph. Second, please show exactly where the seepage emerged from the surface of the original Landfill on a map. Next, please add text explaining where the SID was enlarged, how much it was enlarged, and why it was enlarged. In addition, please explain how water could be heard flowing within the eastern pipe but no outfall was observed emanating from the pipe. Additional explanation is also needed for an understanding of the "berm structure" that was added to the SID and the "containment embankment" that was constructed near the eastern-most outfall pipe. Where were these items constructed and are they still in place?	Section 2.2 of the Work Plan is a review of available data. The sources of the information are referenced in the text. This is all the information available at this time. It is not possible to answer the questions raised in the comment based on the available data. DOE will continue to evaluate data regarding the history of the IHSS and include the data collected in the RFI/RI Report.

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DOCUMENT REVIEWER: COLORADO DEPARTMENT OF HEALTH **Date:** August 30, 1991

CITATION	COMMENT	DISPOSITION
Section 2.2.4		
C-16	The State and EPA have repeatedly been assured that a report on the results of the germanium gamma survey would be made available to us and incorporated into this RFI/RI Workplan. The Division finally received the report on June 17, 1991; only two weeks before comments on this workplan were due and after most of the review had been completed. No effort was made to incorporate anything about the survey into this workplan. Please place in this section of the text a discussion and summary of the results from the germanium survey and add maps showing the survey grid locations and relative radioactivity picked up at each grid point in the Old Landfill. Please be sure that the areas and levels of contamination are clearly delineated. If data from the report is presented, clearly explain what the data means and which radionuclides show background and which show contamination.	The results of the germanium survey have been added to the Work Plan now that they are available. A discussion of the survey is included in Section 2.2.4 and the results are included as Appendix B.
Table 2-2		
C-17	In light of previous text that states that disposal of multiple solvents occurred in the Old Landfill, please add the maximum concentrations of other suspected contaminants that may be present in the Old Landfill to this table, particularly the organic contaminants.	Table 2-2 has been deleted and replaced with two new tables (Tables 2-2 and 2-3) that more completely present the existing data. These tables list the maximum hits for analytes detected above the CRQLs in groundwater samples collected from monitoring wells 7086 and 5786. A more comprehensive summation of the analytes detected and analyzed in these wells is contained in Appendix C.

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CITATION	COMMENT	DISPOSITION
Section 2.3.1		
C-18	Please add text to the second paragraph explaining possible reasons for the irregular hummocky surface at the Concrete Wash Pad.	The purpose of this section is to describe the existing site description, not to speculate on the reasons for the current conditions.
Figure 2-5		
C-19	Please make an effort to match the groundwater sampling points with the well bores on this figure. Also, along the southern border of the figure, there are several locations where the potentiometric contour lines of a particular elevation cross over the equal topographic elevation contour lines implying that the potentiometric surface is above the topographic surface. Please correct this problem on the figure.	The figure has been corrected.
Figure 2-6		
C-20	After a review of several historical air photos, the Division is concerned that the ash pit IHSS's have been spotted incorrectly on this figure. For example, on Figure 2-6, IHSS 133.3 is spotted straddling and slightly to the north of a small east-west dirt road. According to the air photos, this pit was well to the south of the road and appears to be actually two trenches side by side. Also, there appears to be two older trenches located about mid-way between IHSS's 133.3 and 133.4. Several other areas show up on the photos as being disturbed and possibly containing ash.	As stated in comment C-2 the locations of some of these IHSSs have semi-arbitrary boundaries. Section 7.2.2 describes the planned activities at the ash pits which include Step 1, a further review of aerial photographs as needed. Prior to the field work the ash pit locations will be scaled off the aerial photographs and surveyed on the ground so that they can be properly located for the sampling program.

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CITATION	COMMENT	DISPOSITION
	Please review the locations of the ash pit IHSS's as well as their extent so that the efforts of this workplan will not be expended in the wrong places.	
Table 2-3		
C-21	Please clarify whether the chemicals listed on this table are the only ones for which water from well 5686 is tested or if these represent only the elevated values.	Table 2-3 has been deleted. In its place Table 2-4 has been added to this section. This table lists the maximum hits for analytes above the CRQLs in groundwater samples collected from monitoring well 5686. A more comprehensive summation of the analytes detected and analyzed for in this well is contained in Appendix C.
Section 2.6		
C-22	A discussion of conceptual models must include a description of the sources, release mechanisms, transport mechanisms, and affected populations. In addition, these discussions must include all known and anticipated pathways and describe both current and future use scenarios. The pathways should summarize what is known about rates of migration and the receptor analysis should include types, sensitivities, time of exposure, concentrations, and numbers for the receptor populations. The descriptions of the conceptual models in the text do not present any of these completely. Please revise the conceptual models presented in this section so that they completely address these items.	All of the conceptual models have been modified to present a generic conceptual model showing all pathways of exposure for all of the IHSSs. This is a Phase I Work Plan therefore specific data regarding the IHSSs are not available at this time.

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CITATION	COMMENT	DISPOSITION
Section 2.6.1		
C-23	The air pathway must include off-site receptors as part of the exposed populations. Also, the first sentence of the surface water pathway needs clarification in light of the radioactive contamination that has already been found on the surface of the Old Landfill.	All of the conceptual models have been modified to present a generic conceptual model showing all pathways of exposure for all of the IHSSs.
Sections 2.6.1, 2.6.2, 2.6.4, and 2.6.5		
C-24	Please add a soil pathway to each of these sections under the future use scenario.	See response to the previous comment.
Section 3.0 - General Comment		
C-25	The Division would like to suggest that Tables 3-1, 3-2, and 3-3 be made into a comprehensive site-wide list of potential chemical specific ARARs. From such a list, the Division could ascertain the thought process that DOE and EG&G are using to screen the various standards and chemicals. We could also have a consistent list against which to compare future analytical suites and future sites.	While this is not a site-wide list, it is comprehensive and can be used largely as the basis for a site-wide list.

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CITATION	COMMENT	DISPOSITION
Section 3.1		
C-26	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.
Section 3.2		
C-27	This section, page 3-2, indicates that ARARs will be derived from federal and state regulations including "Colorado Department of Health (CDH) surface water 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 of the Basic Standards 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.	Domestic water supply standards are now included in Table 3-3.

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CITATION	COMMENT	DISPOSITION
C-28	The last paragraph of Section 3.8.29 states that "For the organic pollutants contained in Tables A and B, the practical quantitation limits (PQL's) listed as "detection levels" are to be used as the "compliance thresholds." Therefore, even though the detection limits are more stringent than the standards, the detection limits are 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 appropriately affected constituents on Tables A and B.	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.
C-29	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.	The applicable PQLs and methods, as determined by Rocky Flats, have been added to the Tables.
C-30	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 (PQLs) 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 Table 3-1 (Groundwater Quality Standards) of the text that currently have the standard, instead of the less stringent	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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CITATION	COMMENT	DISPOSITION
	detection limit, listed as the potential ARAR. This can be changed in the ARAR tables.	
Table 3-1:		
C-31	The section of the CCR that became effective April 30, 1991 (Section 3.12.0; 5 CCR 1002-8) includes a "Table 611 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: 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.
C-32	Please add the following standards that are missing from the "Tables A and B - Statewide" column: 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	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.

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CITATION	COMMENT	DISPOSITION
C-33	Please replace the following standards with the detection limits in the "Tables A and B - Statewide" column: bis (2-Chloroethyl) ether 10 ug/l Chlordane 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 PCBs 500 ng/l	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.
C-34	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.	These values (typos) have been removed.
C-35	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. Standards have been added for Lindane, 2,4-D, and 2,4,5-TP Silvex.

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CITATION	COMMENT	DISPOSITION
C-36	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-37	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-38	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-39	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.
<u>Table 3-3</u>		
C-40	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. If these were intentionally omitted, please provide the rationale. if	The following chemicals and their standards have been added to the Tables: Aldicarb Carbofuran

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CITATION	COMMENT	DISPOSITION
	inadvertently omitted, please include these chemicals and their regulatory standards in Table 3-3. TABLE A: 1,2 Diphenylhydrazine TABLE B: Aldicarb Carbofuran Dichlorophenoxyacetic Acid (2,4-D) Pentachlorobenzene Tetrachlorobenzene 1,2,4,5 Trichlorophenoxypropionic Acid (2,4,5-TP) TABLE C: Benzene BHC Hexachlorocyclohexane Chloro-4 Methyl-3 Phenol Chlorophenol 2 Chlorpyrifos Demeton Dichloropropene Dimethylphenol 2,4 Dinitrotoluene Diphenylhydrazine 1,2 Guthion Malathion Mirex Parathion Phenol	2,4-D Pentachlorobenzene 1,2,4,5 - Tetrachlorobenzene 2,4,5-TP 1,2-Diphenylhydrazine Chloropyrifos Demeton Guthion Malathion Mirex Parathion The following chemicals and their standards were already listed on the Tables: Benzene Phenol Dichloropropene Dinitrotoluene 2-Chlorophenol BHC Hexachlorocyclohexane 4-Chloro 3-methyl phenol 2,4-Dimethylphenol

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CITATION	COMMENT	DISPOSITION
C-41	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.)	Please see response to the following comments.
C-42	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 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.	Please see response to the following comments.
C-43	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-44	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.

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CITATION	COMMENT	DISPOSITION
C-45	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-46	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-47	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-48	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-49	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.
C-50	The standard for Hexachloroethane, column 2, page 3-25 should be 980 ug/l (or .98 mg/1) not 0.98 ug/l.	The standard for hexachloroethane (0.98 mg/l) has been corrected.
C-51	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-52	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 IHSS's." The Division feels it is important for DOE to recognize that further phases are not	Please see the response to general comment number C-1.2.

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	scheduled in the IAG, but a submittal date of March 8, 1996 is scheduled for the Final ROD for OU 5. Failure to meet this delivery date will likely result in stipulated penalties being assessed against DOE.	
Figure 4-1		
C-53	This figure would be more effective and strategic if placed in Section 2.6.1.	The figure has been deleted. A generic conceptual model is presented in Section 2.6.
Table 4-1		
C-54	The only point at which pond water and sediment sampling appears on this table is the second bullet. Within this bullet, only analytical levels I and II are going to be used. The Division does not feel this is adequate and that analytical level IV should be used.	The ponds have been added to the fourth bullet of page 2 of the table. This was implied but has now been clarified.
C-55	In addition, in light of preceding comments on conceptual models, the first bullet (Identify plumes, if present, at the Landfill) under "Characterize and Delineate Contaminant Sources" should be clarified. Contaminant plumes do not constitute a "source" in this context. The source is the improperly disposed solvent somewhere in the landfill that has created (sourced) the plume. While the Division recognizes the difficulty, unless and until the point sources within the landfill are found and removed, remediation is all but impossible.	The identification of plumes is hoped to lead to the identification of the sources of those plumes, if the sources still exist. Without removing the entire landfill at this time, the identification of plumes is one of the best methods of characterizing the potential sources. The text has been clarified on this point.

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C-56	Regarding the third bullet on the second page of the table, it is hard to picture how surface radiological surveys will characterize the horizontal and vertical extent of radionuclide contamination. Please explain how this will be accomplished. Also, unless the types of radiological surveys are listed, the nature of the radionuclides cannot be addressed. This is particularly true when only analytical levels I and II are proposed. Please add text to explain how this will be resolved.	The text has been clarified regarding the characterization of the surface extent of the radionuclides. As with the previous comment, it is hoped that the identification of subsurface contamination through the use of soil borings will lead to the identification of sources.
Section 4.2.4		
C-57	Please remove this entire section as it is incorrect. Please see general comment 1 regarding the IAG and Table 5, and general comment 2 regarding the need for additional phases of investigation in OU 5.	This section specifically addresses the requirements of the fifth paragraph of the IAG statement of work (page 7) which states "The draft Phase I RFI/RI Reports for OUs 3 - 16 shall also recommend work to be performed for each Phase II investigation."
Section 5.3		
C-58	Regarding the last sentence of the first paragraph of this section, please see previous comments regarding additional phases of investigation at IHSSs in this OU.	Please see the response to general comment number C-1.2.

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Section 5.5.1		
C-59	The first paragraph of this section says that geologic data will be used to detail the stratigraphy of the alluvium and colluvium at each site. The Division thinks that this is an admirable goal, but we are unclear about how this can be done at sites like the C-series ponds where only two wells are being drilled and no other subsurface work is planned. Even at the Old Landfill, the amount of drilling for soil borings and well installation cannot support a stratigraphic characterization that can detail the heterogeneities of the fill materials.	DOE agrees that a detailed stratigraphic interpretation will not be complete based on the Phase I drilling program if significant heterogeneities are present. However, the field program will provide information for a Phase I level of site characterization. The word "detail" has been replaced with "evaluate."
Section 5.7		
C-60	With regard to the subsection entitled "Detailed Analysis of Remedial Alternatives," please see previous comments regarding additional phases of investigation.	Please see the response to general comment number C-1.2.
Section 7 - General Comments		
C-61.1	1) At the scoping meeting for OU 5 held on January 10, 1991 at RFP, the Division was under the impression that some sort of a hand-held radiation survey would be done at the old landfill. It was mentioned that perhaps a FIDLER survey would not be the best choice, but that something should be used to more intimately measure radioactivity on the surface of the landfill.	The germanium survey, which has been provided to the agencies, will serve as the radiation survey for the Old Landfill. The germanium survey is considered superior to the FIDLER survey, since it provides better coverage, has a broader energy range, and can identify and quantify all gamma ray emitting radionuclides.

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	Please explain to the Division why this has been dropped from the plan and what, if anything, will take its place.	
C-61.2	2) There are several obvious applications for non-intrusive geophysical techniques both in the Old Landfill and the Ash Pits. These techniques were also discussed at the scoping meetings. However, they have not been included in the workplan. Please explain to the Division why these technically effective and cost effective techniques have not been considered for the characterization of the OU 5 IHSSs.	Geophysical investigations are not planned during Phase I for OU-5 because of 1) their limited success at other areas of the site, 2) their application to the ash pits may be limited since these IHSSs may not be dissimilar enough to the adjacent hillside where numerous slides occurred, and 3) there is usually too much clay present in the adjacent alluvium which limits the effectiveness of ground penetrating radar to identify subsurface features. Surface geophysical techniques may be tried after the initial investigation when additional data is available on each area.
Section 7.1.3		
C-62	Item 4 listed under the "Phase I Sampling Program Modifications" does not agree with the Division's latest understanding of the relevant Standard Operation Procedure (SOP). Please revise this bullet to be consistent with the SOP.	The bullet has been revised to be consistent with the SOP except for modifications described in this Work Plan in Section 11.0. (This bullet is now Item 5).
Table 7-1:		
C-63	Please explain how the plume verification soil borings will be placed. Explain the placement of the transect (i.e. does "downslope" mean down the hillside or down gradient?) and how far apart the soil borings will be placed. Is the strategy to place	The text has been expanded to clarify the placement of the borings in the plume areas. Downslope means down the hillside, as we assume that is also downgradient. Since we do not know the extent of the plumes, the actual placement of

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	the third and last soil boring far enough from the second to get non-detect results?	the borings will depend on the result of the soil gas survey. The last soil boring will be placed to get low-detection results.
C-64	It is mentioned that wells will be installed in soil borings where the highest concentrations of plume contaminants are found as well as at three locations down gradient from the landfill all to be completed in the alluvium. Please explain why no bedrock monitoring wells or even bedrock soil borings are being contemplated.	Borings will be drilled into bedrock as specified in the IAG. As specified in the SOPs, the wells will be drilled 6 feet into bedrock and completed in bedrock if warranted by the bedrock lithology. These borings will provide Phase I data regarding the potential for contamination of the bedrock. Additional characterization of the bedrock may be proposed for Phase II if the Phase I results indicate that further bedrock characterization is needed.
Table 7-2:		
C-65	The second item on this table is a radiation survey that is planned for the "entire site." Please define "entire." During the OU 5 walk-through, it was mentioned that this rad survey would link up with the rad survey from the Old Landfill. Please verify that this is, in fact, the plan and add text clarifying this issue. It would also be helpful to identify the type of radiation survey that is planned for the ash pits.	The text has been revised to indicate that the radiation survey will include the areas between the ash pits and the landfill. The Work Plan currently specifies that a Germanium radiation survey will be conducted over this area (see comment C-61.1).

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Section 7.2.1 - General Comment:		
C-66	This is, perhaps, the weakest section of this workplan. An over-dependence on Table 5 from the IAG has crippled complete three-dimensional characterization of the old Landfill. The Division provides the following discussion as a summary of our concerns:	Our current understanding of the landfill is that it is a potentially very complex IHSS with it being premature to develop a detailed program for this IHSS without additional data. Potentially, the Phase I program may not provide a complete three-dimensional characterization of this IHSS if significant complexities are encountered. The purpose of this initial investigation is to provide data for the baseline risk assessment and to guide the agencies' decisions regarding the need for further investigations. See response to general comment C-1.2.
C-67	Soil gas surveys are best used as screening tools. Because of the number of complicating factors at most sites (soil heterogeneities, complex stratigraphy, fluctuating water table, etc.), the results of a soil gas survey are used in a very qualitative manner. The reason this is the case, and the reason for the main concern at the Old Landfill, is that a negative result cannot be interpreted as definitively "clean." However, the Division is concerned because this workplan indicates that if no plumes are found with the soil gas at the Old Landfill, then no plumes are present and the site has been completely characterized. The Division will never agree with that.	DOE understands the nature of the soil gas survey, which is why it is considered a Level II activity. The completeness of characterization of the landfill necessary to satisfy the agencies will need to be evaluated at the time when the Phase I RFI/RI Report is evaluated by the agencies.

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C-68	A further weakness in the proposed soil gas survey is the 100 foot grid spacing. Using the data provided in Section 2.2 and the conceptual cross-section 4-1, the average thickness of fill in the Old Landfill is slightly less than 8.5 feet. Considering the suspected nature of the mobile contaminants at the landfill (solvents, paint, paint thinners, pesticides, and cleaners), and the fact that these were probably disposed of in containers that are now point sources, there is a very high probability that a 100 foot soil gas grid spacing would miss the volatilizing contaminants from a source only 8.5 feet below the ground. An exception to this would occur if enough contamination was present to reach and spread on or in the ground water (a situation DOE must consider unlikely given the repeated phrase "if plumes are present").	The spacing of the soil gas grid specified in the work plan (100 foot centers) is thought to be adequate for the identification if any significant volatile plumes exist. Volatile organics are mobile compounds and thus should be detected at some distance from a spill location. In addition to the soil gas, the groundwater monitoring wells should be able to detect if volatile organics have migrated downgradient of the landfill in the groundwater. Reduced soil gas sample spacing may be specified in the future during later work to fill in where additional data is needed.
C-69	The soil gas survey is supposed to guide the drilling of three soil borings for each "plume" identified by soil gas. Three points of data cannot possibly define the extent of a three-dimensional plume. The sources for these plumes are almost certainly located in the unsaturated (vadose) zone. Therefore, the plume may consist of residual free product zones, aqueous phase contamination in residual water, adsorbed contamination onto soil particles, and soil gas, all in the unsaturated zone. Or the plume could be aqueous phase (dissolved) contamination, DNAPL or LNAPL free product, or adsorbed contamination, all at or below the ground water level. Each of these possibilities has different remedial design contingencies and three borings	It is not likely that characterization of the landfill will be complete if plumes are identified. The data will be used to guide further investigations which may include vadose zone monitoring and three-dimensional characterization of the landfill.

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	(and one well) will not give enough data to characterize the plume, let alone aid future remediation decisions.	
C-70	So far, all discussions in these comments and in the text have addressed mobile sources of contamination. A more important issue from the public's perspective is the immobile contamination, the most important constituent of which is radionuclide contamination. Other than the rads detectable on the surface, this workplan makes no effort to characterize and does not even mention radionuclide contamination in the subsurface. This must be addressed.	The approach taken at the old landfill consists of monitoring the principal migration pathway from the old landfill (groundwater) and using surveying techniques (soil gas, radiological, and magnetometer surveys) to guide soil sampling since this approach should be the most efficient to investigating this IHSS (because of the heterogeneity of this unit). These techniques should identify if there have been any major releases from the old landfill. Depending on the results of this initial work, additional work (such as soil borings) may focus on the identification of more limited contaminated areas that may have immobile contaminants at this IHSS. This approach should increase the efficiency of the investigation at the old landfill.
<u>Section 7.2.1 - Specific Comments</u>:		
C-71	Please provide a map of the soil gas survey locations.	The approximate locations of the soil gas survey have been added to Figure 7-1. The area of the survey may be modified based on further evaluation of the aerial photograph review.

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C-72	One verification soil core collected for every 50 soil gas samples is inadequate for proper confirmation. In a "landfilled" substrate with extensive heterogeneities, soil gas can have a very confusing and ambiguous surface signature. This can lead to a long, expensive subsurface chase of the actual contamination unless the soil gas is more accurately confirmed. In addition, as the program is designed, only 2 confirmation soil cores will be collected. The Division does not consider this to be a very representative "random" sample. Therefore, the Division proposes that one random verification soil boring be collected for every 15 soil gas samples. This will allow 4 or 5 soil cores to be collected which will give a more representative cross-section of the soil gas variability.	DOE agrees and will collect one random verification soil core for every 15 to 20 soil gas samples. This will result in the collection of a total of approximately 4 soil cores.
C-73	Please verify that the new surface water collection point agreed upon during the OU 5 walk-through in the SID below the old Landfill has been added to this workplan.	This surface water collection point has been added to the Work Plan.
C-74	The Division feels that the addition of at least one monitoring well is necessary for this workplan. The Division suggests that this additional well be located midway between wells 5786 and 7086 but north of the SID and still down gradient from the landfill.	DOE agrees and has added the monitoring well as suggested.
C-75	The last paragraph of this section says that the three monitoring wells downgradient of the Landfill will be sampled quarterly for one year. It is the Division's opinion that these wells should be sampled quarterly until further notice. If no plumes are	DOE will sample the wells quarterly for four quarters at a minimum. 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

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	delineated by the soil gas survey and the soil borings, that does not mean that 1) there are definitely no plumes present or 2) that plumes may not originate in the future and begin to leave the site.	further sampling, analytical parameters and frequency, if warranted by the data.
C-76	At several of the scoping meetings held for OU 5, the regulatory agencies repeatedly asked DOE to take some short term action to stabilize the soils in and around the areas delineated by the gamma radiation survey as having some amount of surface contamination. Not only has nothing been done to date on this matter, but nothing is proposed in this workplan. Please remedy this situation. This is an issue that must be addressed before approval will be granted to this workplan.	Stabilization of the soils over the original landfill is not planned during the Phase I program for OU-5. Stabilization may hamper the data collection effort during the field program (by reworking and possibly covering of the landfill's surface). Also, the field investigation activities may cause deterioration of any new surface installed.
Figure 7-1:		
C-77	At the scoping meeting held on February 28, 1991, all parties agreed to install two new RAAMP stations (A and B) in the Woman Creek Drainage. Station A was to be located near the west access road in a background area. Station B was to be installed slightly southeast of the Old Landfill. These stations need to be included in the text and on the map. Please include appropriate text explaining the RAAMP stations and locate them on all appropriate figures including this figure, Figure 7-1.	The location of the air monitoring stations and a description of the air monitoring program have been added to Chapter 7 (see Section 7.2.5 and Figure 7-2).

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Figure 7-2, parts 1 & 2:		
C-78	Please revise the title of this figure to include surface water sampling. Also, the map key needs to be revised in a similar manner.	The title has been revised as has the explanation.
C-79	On the second half of this figure (part 2), there is an error on the map scale. The description says 1" = 600' but the one inch bar scale only goes to 300'.	The error has been corrected.
Section 7.2.2:		
C-80	As mentioned in a previous comment, the Division is concerned that the extent of ash burial is not well understood at this point. Therefore, we would like to emphasize the importance of the aerial photo review.	DOE agrees. See response to comment C-20.
C-81	The radiation survey for the ash pits should tie all of the pits together on a 50' grid spacing and tie to the landfill rad survey on 100' grid spacing. Please provide a map of the planned sample grid. Also, describe the type of radiation survey that will be used.	Please see the response to specific comment number C-65. DOE intends to use a germanium detector survey instead of the FIDLER survey (See comment C61.1.). The approximate area of the radiological survey has been added to Figure 7-3. A germanium survey will now be performed at the Ash Pits that should result in almost 100 percent coverage being obtained.

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C-82	There appears to be a contradiction in the second paragraph under Step 3. Figure 7-3 shows soil boring transects crossing both the long and short axes of each ash pit. However, the text does not mention the short axis transects. Please clarify if these short transects are still being planned, if they are going to be located at the mid-point of the trench, and how additional borings around hot-spots will be handled.	The short axis locations are still planned to evaluate the extent of the trenches. The text has been modified to clarify the short axis borings and borings at locations with elevated concentrations of radionuclides.
C-83	Please explain why no other types of geophysical surveys are being contemplated for the ash pits. Since the exact location and number of pits is still in question, why not run an areal ground penetrating radar or other survey that would show the location and extent of all ground disturbances in the area.	Please see the response to comment C-61.2. A ground penetrating radar geophysical survey has been performed at several other areas on site and has not been very successful in identifying subsurface features. It is thus not proposed for the ash pits.
C-84	The Division feels that the ground water monitoring wells installed down gradient from the ash pits should be sampled quarterly for at least two years. This will give the wells a longer stabilization period as well as allow for a more statistically significant sample set to be collected.	DOE will sample the wells quarterly for four quarters at a minimum. 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.
C-85	In the last paragraph of this section, please add the ground water analyte list that is delineated in Table 5 of the IAG.	The analytical program outlined in Table 5 of the IAG is the analytical program described in Section 7.3 of the work plan and referenced in the last paragraph of the section.

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Figure 7-3:		
C-86	The Division suggests moving the easternmost monitoring well for the ash pits to a location on the 6020' elevation contour line immediately to the south of the "S" in the words "South Interceptor Ditch."	The final locations of the wells at the ash pits will depend on the geologic characteristics of the site and approval of the agencies, as explained in the text.
Section 7.3.2:		
C-87	As commented on previously, the Division believes that reference to Phase I implies that a Phase II investigation will follow. This is not currently the case.	Please see the response to general comment number C-1.2.
Table 7-5:		
C-88	The title of this table should not include "Phase I" for the same reason stated above.	Please see the response to general comment number C-1.2.
C-89	This table needs to be consistent with the ARAR tables of Section 3. Therefore, if DOE is proposing ARAR's for certain chemicals, those chemicals obviously need to be on the analyte list. This means that Table 7-5 needs to include the following: Cesium 134, Cesium 137, Titanium, Tungsten, Radium 226, Radium 228, Fluoride, Nitrate + Nitrite as N, and Nitrite as N. Also, if chemicals show up on the analyte list, they should be there for a purpose and therefore need an ARAR analysis. Please add the following to the ARAR tables of Section 3: Lithium, 2,6-Dinitrotoluene, Benzo(a)anthracene, Chrysene,	The ARAR tables in Section 3.0 (Tables 3-1, 3-2, and 3-3) are comprehensive lists of potential chemical specific ARARs, not all of which may be applicable to OU5. Subsequently, Table 7-5 does not match the ARARs tables, but is based on the analytical program specified in the IAG with additional analyses added as needed to characterize each IHSS. The proposed analytical program for OU5 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 basis for

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	Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenz(a,h)anthracene, Benzo(g,h,i)perylene, and the entire pesticide/PCB's target compound list.	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 assurance/quality control procedures that are widely accepted by both federal and state agencies; 3) 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); and 4) They are the standard analytical program that is used for other operable units at Rocky Flats to detect the contaminants which may be present. Because of these above reasons the comprehensive TCL and TAL analytical programs are being used to characterize OU5 during the Phase I investigation. Additional analytes may be added in later phases as needed.
Table 7-6: C-90	Please see the attached photo copies of this table for the Division's suggested additions.	The analytical program in the Work Plan is based on that specified in the IAG with the additions discussed in Section 7.1.3. The addition of gross alpha and gross beta is not planned for the landfill samples because the total Uranium and the specific isotopes analyses currently proposed should identify the contaminants present. For samples with total uranium analysis specified it should indicate if any of the isotopes of uranium are present. No additional analyses are

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		proposed for the confirmation soil cores for the soil gas survey at the Old Landfill since the purpose of these cores is to evaluate the performance of the soil gas investigation. Finally, several other radioactive isotopes were suggested for analysis by the state in its revised Table 7-5, however the analytical program originally proposed in Table 7-5 in the final draft work plan are the principal radionuclides that are anticipated at each IHSS. Thus the original proposed analytical program is believed to be appropriate for this investigation since it should evaluate if the principal radioactive contaminants are present.
Section 8.0: C-91	Additional risk assessment comments from Ms. Normie Morin, PhD, of the Rocky Flats Program Unit that are applicable to this workplan will be included in the comments to the RFI/RI Workplan for OU 6 (Walnut Creek). Please review these comments and incorporate them into both the revised version of this Workplan for OU 5 and the revised workplan for OU 6.	The comments made to the OU5 risk assessment have been reviewed and incorporated if appropriate.
Section 8.0: C-92	For consistency and clarity, the Division suggests that the tasks of the Baseline Health Risk Assessment be identified numerically, similar to section 9.0.	The five main steps for the Baseline Health Risk Assessment have been divided into tasks as suggested.

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Section 8.1:		
C-93	In the first sentence of the second paragraph of this section, please remove the phrase ". . confirm the presence or absence of contamination at OU 5 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.
Section 8.2:		
C-94	On page 8-3, an additional bullet needs to be added to the list already presented that incorporates the following concept: The IAG, in Section VII.D.l.a states that when selecting indicator chemicals, "DOE shall also consider the additive or synergistic effect of risks, to the extent possible."	This addition has been incorporated into Section 8.0.
Section 8.3:		
C-95	Several items need to be added to either Section 8.3.1 or Section 8.3.2 based on Section VII.D.l.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.

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Section 8.3.2:		
C-96	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 significantly above background levels will be considered sources of chemical release. Please clarify this apparent contradiction.	Text has been modified as suggested.
Section 9.0: General Comments to the Revised EE (June, 1991):		
C-97.1	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.	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 ecological field 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 Task 9 ecotoxicological field sampling locations may be modified with respect to physical, chemical, and biological data needs.

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C-97.2	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.	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.
C-97.3	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.	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.

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CITATION	COMMENT	DISPOSITION
C-97.4	4. An Approach for Selecting and Using Indicator Species to Monitor Ecological Effects Resulting From Chemical Changes in Soil and Water, 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-97.5	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 will be collected as part of the ecological field survey.
C-97.6	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.

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		Biosurveys, biomonitoring, and toxicity testing are each proposed in this 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.
C-97.7	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.	Flow measurements are being collected along Walnut Creek at select sampling locations.
Section 9.1.2.1:		
C-98	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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Section 9.1.2.2:		
C-99	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. Plutonium and Americium have such a significance to this site, obtaining body burden data in selected organisms is paramount.	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 depend on the selection process for contaminants of concern, key receptor species, and assessment and measurement endpoints.
Figure 9-6:		
C-100	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	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.

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CITATION	COMMENT	DISPOSITION
	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.	
QAA COMMENTS		
C-101	Please remove any and all references to additional phases of RFI/RI characterization from this QA Addendum. In addition, please remove "Phase I" from the title of this addendum and anywhere else it has been included.	"Phase I" has been removed from the QAA.
C-102	The Division believes that the groundwater monitoring wells should be sampled for longer than one year.	The monitoring intervals and frequencies are established in the Work Plan. If these are revised in the Work Plan, the QA will be modified for consistency.
C-103	Please change this section to more closely parallel the equivalent section in the QAA for OU-6.	This section of the QAA has been revised as requested.
C-104	Please include as Section 3.8 "Quality Assurance Monitoring" as included in the QAA for OU-6.	A "Quality Assurance Monitoring" section has been added as Section 3.8.
C-105	Also include a section entitled "Data Reporting".	"Data Reporting" has been added as Section 3.9.4.
C-106	Please clarify that the specific analytical protocols referred to in this section are spelled out in the GRRASP.	Clarification requested has been added. The protocols specified in the GRRASP are now referenced.

DOCUMENT REVIEW COMMENT RECORD

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CITATION	COMMENT	DISPOSITION
Comment 1	The overall strategy and content of the environmental evaluations (EEs) is similar for each of the operational units (OUs 1,2, and 5) and the comments listed below apply to all three.	
	Under Task 8: Planning. In each of the EEs it is stated that "Field sampling will only be performed where acceptance criteria for demonstrating injury to a biological resource will be satisfied in accordance with regulations under the Natural Resource Damage Assessment Rule and the accompanying Type B Technical Information Document." This section of the Natural Resource Damage Assessment Rule does not discuss whether or not field work should be pursued to demonstrate injury but rather which type of biological response should be measured. It is the biological response under consideration that must satisfy the acceptance criteria (Natural Resource Damage Assessment Rule, 43 CFR Part 11, Subpart E, section 11.62, (f). This may be the intent of the statement in the EE but it is not clear.	Field sampling will be conducted, as appropriate, to determine and quantify exposure pathways and adverse effects resulting from contamination. The statement in the text has been changed to indicate that" field sampling <u>for assessment of injury</u> will only be performed where acceptance criteria..."
Comment 2	In the discussion of OU contamination, under the metals section, it is stated that there is no aquatic life criteria for aluminum, however, there is an EPA Criteria Document for Aluminum: Ambient Water Quality Criteria for Aluminum -1988 EPA 440 15-86-008 August 1988. This document specifies aquatic life criteria which should be used.	The AWQC for aluminum have been added to Table 9-2 and also to the ARAR Table 3-2.

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CITATION	COMMENT	DISPOSITION
Comment 3	In the discussion of wetlands under the section: Protected Wildlife, Vegetation, and Habitats, it is stated that wetlands at the Rocky Flats Plant fall under the jurisdiction of the U.S. Army Corps of Engineers (COE). The COE only has jurisdiction over the filling of wetlands. The Service encourages the U.S. Department of Energy (DOE) to consult with the Service on any type of wetland disturbance including filling or draining.	We agree. The statement in the text has been modified to incorporate this idea.
Comment 4	Under Task 5: Exposure Assessment and pathways Model, the validity of any model (s) used will depend upon well documented field validation. Proper field validation is dependant upon the use of "real" data producing results similar to those predicted by the model (S). All models should have documented field calibration and validation.	Agreed. Use of the pathways model, if appropriate, will involve both calibration and validation. The approach for doing this will be presented in detail as part of the Work Plan revisions that address toxicity and exposure assessment methodology.
Comment 5	Under Task 3: Ecological Field Investigation, for the same reasons that aquatic toxicity tests will be done ("to aid in the determination of the nature and extent of contamination, particularly since there is the potential for exposure to mixtures of contaminants") sediment and soil toxicity tests should also be done. These tests would provide a biological measure of toxic effects.	These tests are not ruled out, but it would first be necessary to establish a rationale for performing these tests (e.g., do these tests meet the criteria of acceptance under NRDA). If it cannot be shown that such tests would demonstrate injury (adverse effects to the environment) it may not be appropriate to use them.
Comment 6	The following comments apply to the Field Sampling Plans (FSPs) portion of the EEs:	

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CITATION	COMMENT	DISPOSITION
	The FSPs, as written, for each of the operational units violate SOP #13: Field Sampling Plans (Standard Operating Procedures, Ecology 5.0, EG&G Rocky Flats, May 1991). None of the FSPs have a predetermined sample size, nor a description of the statistical treatment to be used. This information should accompany all FSPs.	The Field Sampling Plan (FSP) (Section 9.3) presents neither a detailed methodology with predetermined sample sizes nor a description of the statistical treatments to be used because the need for such methodologies has not yet been established. The FSP presents a comprehensive and phased approach to developing and implementing such methodologies, based on the results of initial investigations. In order to accomplish this in a logical and well documented manner, it is first necessary to identify contaminants of concern, characterize the study area(s), obtain and evaluate information on the likelihood and nature of potential toxic effects, and then prepare appropriate approaches to investigate the exposure pathways and potential effects. The phased approach presented provides for the incorporation of the detailed methodology in the revised plan (Tasks 2 and 8 - see Figure 9-1).
Comment 7	The FSPs do not mention any bird inventories or sampling (or is this covered under terrestrial wildlife ?). Birds could be an important link in the food chain at Rocky Flats and should be inventoried and sampled for residue analysis.	As stated in Section 9.3.4.2, "Field data will be recorded on the standardized qualitative survey/relative abundance data form 5.0C for large mammals, small mammals, birds, reptiles,..." Observations of bird and raptor nests will be recorded; vocalization surveys for birds will also be conducted (see SOP 5.7, Sampling of Birds in Volume V, Ecology SOPs). More specific bird sampling studies (e.g., tissue analyses) may be conducted, depending on exposure pathways and the selected measurement endpoints.

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CITATION	COMMENT	DISPOSITION
Comment 8	For any fish or wildlife species sampled, the incidence of tumors, lesions, or other external deformities should be documented. These are potential biological responses which may be caused by the types of contaminants present at the Rocky Flats Plant which can be used for the determination of injury or no injury to natural resources (Natural Damage Assessment Rule, 43 CFR Part 11, Subpart E, Section 11.62 (f) (iv) & (vi)).	One of the principle objectives under Task 3 (see Section 9.3.1, Sampling Objectives) is to "Observe the site for obvious signs or zones of contamination or injury to biota and their habitats". Incidental information such as tumors, lesions, or other external deformities are considered obvious signs of contamination or injury and would be recorded and collected, where possible, as a matter of proper documentation.
Comment 9	The FSPs state that very few samples, if any, would be analyzed for radionuclides. The Service believes that it is important for some environmental samples to be analyzed for radionclides so that a determination of injury or no injury to natural resources resulting from radionuclides can be made. Tissue concentrations of radionuclides are needed to estimate the radiation-absorbed dose rate which is in turn needed to estimate the potential for population level responses.	While it is agreed that radionuclides such as americium and plutonium are of concern, sampling of such in biota will depend on the likelihood of determining potential adverse effects based on exposure to contamination and distinguishing such adverse effects at the population level from background "noise". It is anticipated that such distinctions will be difficult to make and thus few samples are likely to be collected. The Field Sampling Plan does not rule out the possibility of collecting samples for radionuclide analysis. The numbers of samples, organisms, and tissues to be sampled will be determined in revisions to the Work Plan for the Ecotoxicological Field Investigation (Tasks 8 and 9).
Comment 10	It has come to the attention of the Service that Dr. Ward Whicker (Radiation Ecologist, Department of Radiation Biology, Colorado State University, Fort Collins, CO) is currently under contract to EG&G to conduct a small mammal analysis of radionuclides. The Service encourages DOE to utilize this data or collect similar data for use in the EEs. Also, through conversation with Dr. Whicker, we were informed that Dr. Bill	DOE plans to use all available relevant data in conducting the Ecological Evaluation studies in conformance with NRDA rules and regulations. Dr. Whicker's studies would be particularly pertinent and will be used together with any and all other sources of applicable relevant and appropriate information relating to contamination distribution and effects.

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CITATION	COMMENT	DISPOSITION
	Alldredge (Ecologist, Department of Fishery and Wildlife Biology, Colorado State University, Fort Collins, CO) is conducting a mule deer study at the Rocky Flats Plant under contract to EG&G. While the emphasis of the study is not tissue analysis, Dr. Alldredge is collecting tissues from incidental mortalities and preserving them for Dr. Whicker who is saving these tissues for later analysis of radionuclides if and when funding becomes available. Because data from a previous study documenting concentrations of radionuclides in mule deer tissues at the Rocky Flats Plant is available, the Service encourages DOE to either have these recently collected tissues analyzed or collect additional tissues for analysis. This data would provide a temporal comparison for radionuclides in an important component of the food chain.	
Comment 11	Organic chemicals occur at each of the Operational Units yet there is no indication that environmental samples will be analyzed for organic compounds. Many of these compounds are lipid soluble and tend to bioaccumulate. Environmental samples should be collected and analyzed for the organic compounds present. Concentrations of these compounds are needed for the same reasons that trace element and radionuclide tissue concentrations are needed.	Criteria for selecting contaminants of concern to biota and for selecting taxa for nondestructive and destructive sampling (e.g., chemical analysis of tissues) are currently being developed. Once these chemicals and potentially exposed taxa have been identified, it will be possible to develop sampling plans to address exposure pathways and possible or likely effects of organic contaminants on biota. Appropriate samples will then be chosen and analyzed.

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CITATION	COMMENT	DISPOSITION
Comment 12	The following comments are specific to a particular Operational Unit:	
	Woman Creek Priority Drainage (OU No. 5). Biota sampling in Woman Creek, where it enters and exits the Rocky Flats Plant property, should be collected. This data would be useful for spatial comparisons of biota in relation to the OU.	The suggested sampling locations have been added to the Work Plan. The sampling locations as shown in the Work Plan were selected to provide a preliminary characterization of stream biota upstream and downstream of OU5 IHSSs and to determine whether enough sample material is present should tissue analyses or other ecotoxicological tests on stream taxa be requested. The initial toxicity tests will also provide a screen of potentially toxic stream conditions and assist in determining the need for additional sampling locations.
Comment 13	903 Pad, Mound, and east Trenches Areas (OU No. 2). Aquatic biota sampling sites should be established and biota collected in South Walnut Creek since it is a main drainage in OU No. 2.	Aquatic and biota sampling sites are established and biota will be collected in South Walnut Creek as part of the OU2 and OU6 Work Plans.
Comment 14	The following comments apply to the Standard Operating Procedures (SOPs), Ecology 5.0, May 1991. These sampling techniques and procedures are commonly used and are well documented in the scientific literature. Besides the issues discussed in the comments listed below, the SOPs should be adequate to collect the proposed data assuming that sample sizes, sample locations, and statistical approach will be documented in the field sampling plans.	

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CITATION	COMMENT	DISPOSITION
	SOP #6, Birds - This SOP should include information detailing the collection of bird tissues including eggs and nestlings should they be needed. With respect to Section 6.1, small mammals alone will not provide an adequate representation of site contamination with respect to Rocky Flats avifauna.	We agree that organisms other than small mammals may need to be collected. The determination of which organisms and tissues will be selected for analysis will be made once the Contaminants of Concern are selected and the likely exposure pathways and potential effects are characterized.
Comment 15	SOP #13, Field Sampling Plans	
	Section 6.1.5 Reference Areas - The Service recommends the use of an off-site along with the on-site reference area if a suitable site can be found. Possible areas include Boulder and Jefferson Counties Open Space areas.	Criteria for the selection of reference areas are currently under development. Depending on the endpoint selected, off-site along with on-site reference areas may be selected. Use of the Boulder and Jefferson County Open Space Areas will be considered.
Comment 16	Section 6.2 Sampling methods and Intensity, pg. 18 - There are incomplete sentences in the last paragraph which discusses composite samples. With respect to this section, when samples are composited, the composite becomes only one sample because the variance of the individuals is unknown.	The paragraph has been revised in the more recent version of the SOPs.
Comment 17	Section 6.4 Quality Assurance/Quality Control - Spiked samples should be included to check the quality and precision of laboratory analyses.	Spike samples will be used where appropriate for the media and chemicals to be sampled.

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DOCUMENT REVIEWER: Colorado Division of Wildlife **Date:** August 30, 1991

CITATION	COMMENT	DISPOSITION
Comment 1	Standard Operating Procedures (Ecology) - These data collection procedures seem to be reasonable and pretty much the "industry standard" to accomplish the tasks proposed. We have no problem with their implementation.	Comment noted.
Comment 2	Environmental Evaluation Work Plans - These three plans are quite similar in content and scope, so we feel comfortable addressing all three together here. In general, much of the plans deal with quite technical aspects of sampling for various potential pollutants. Neither Tom nor myself are knowledgeable in these areas and we are thus not able to comment on the parts of the plans relating to these subjects. It might be possible to find someone in the Division of Wildlife with more knowledge in these areas and have them review the documents, but I suspect that the comments of the Colorado Department of Health staff may adequately cover these subjects.	Comment noted.
Comment 3	With regard to the actual wildlife portion of the plans, we generally think that these are reasonable plans which should result in the gathering of much useful data. We have a few minor comments/corrections:	
	In the discussion of black-footed ferrets under the Terrestrial Ecosystems section, we suggest changing the statement "black-footed ferrets are not extinct in the wild" to "black-footed ferrets are thought by many to be extinct in the wild".	The suggested change has been made.

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DOCUMENT REVIEWER: Colorado Division of Wildlife **Date:** August 30, 1991

CITATION	COMMENT	DISPOSITION
Comment 4	In the Wetlands discussion under the Terrestrial Ecosystems section, the statement is made that "these wetlands currently fall under the jurisdiction of the U.S. Army Corps of Engineers". It is our understanding that the COE only has jurisdiction over filling of wetland areas, not for any other aspect of wetlands.	The suggested change has been made. The text now states "Should filling of wetlands occur, the U.S. Army Corps of Engineers would have jurisdiction."
Comment 5	In both the Terrestrial Ecosystems section and again in the Environmental Evaluation Tasks section, reference is made to "Protected Wildlife". It is not clear what this term means. Protected from what? By whom? What is really being referred to here?	"Protected Wildlife" refers to wildlife with federal or state legal "protected" status; i.e., threatened and endangered species.