
HAZWRAP

HAZARDOUS WASTE REMEDIAL ACTIONS PROGRAM

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Remarks:

OU 9 EE comments

REVIEW COMMENT SET: DRAFT FINAL PHASE I
ENVIRONMENTAL EVALUATION WORK PLAN
ROCKY FLATS PLANT ORIGINAL PROCESS WASTE LINES
OPERABLE UNIT NO. 9
ROCKY FLATS PLANT, GOLDEN, COLORADO
NOVEMBER, 1991

[PRELIMINARY NOTE 1: All numbering of paragraphs in this review considers the first full paragraph on each page as "paragraph 1." Section headings have no bearing on paragraph numbering]

CRITICAL COMMENTS

1. Data quality objectives (DQOs) have not been met and need to be given serious consideration in this work plan.

GENERAL COMMENTS

1. The Environmental Evaluation (EE) Work Plan (WP) does not completely fulfill the recommended Environmental Protection Agency (EPA) guidance for preparation of an RI/FS Work Plan and a Field Sampling Plan (FSP). The most significant shortcomings in the EEWP as compared to the EPA guidance are deficiencies in: (1) project scoping, which should include the initial evaluation of existing data and information in the context of conceptual model development; and (2) the work plan rationale, which should include the definition of the environmental risk assessment methodology and associated data needs.
2. The most obvious deficiency in the work plan, and one that plagues every Department of Energy (DOE) Operable Unit (OU) EE, is inadequate project scoping. Tasks 1 and 2 essentially comprise project scoping, as defined in EPA guidance. This scoping is supposed to culminate in development of a sound work plan and RFI/RI effort. It is supposed to be completed as part of work plan development. Since project scoping has not been adequate, work plan development cannot be adequate. The work plan that should be reviewed by the regulators is one produced at the end of Tasks 1 & 2, with the addition of a reconnaissance/pilot study as part of Task 2.
3. The EEWP lacks an adequate discussion of the impact and risk assessment methodologies. In general, DOE has failed to demonstrate how risks and impacts will be assessed (based mainly on tissue burdens), and how exposure to suites of contaminants will be addressed. The methodology used to define remediation criteria in the pathways analyses should be explained in detail. The general nature of the discussion precludes an adequate evaluation of the criteria development methodology, the uncertainties associated with the methodology, and how these criteria can be used in impact assessment.

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4. In general, the EEWP is not clear regarding the qualitative/quantitative aspects of the effort. Environmental risk and impacts define one of two threshold criteria for evaluating remedial alternatives under the National Contingency Plan (NCP). The EE must provide the information for a meaningful evaluation, and the study should be as quantitative as is reasonable. The level of quantification should be clearly defined and supported in the EE. Those aspects of the EE that will be addressed qualitatively should be defined, and the limitations of a qualitative assessment discussed.
5. The DQO process should be discussed in detail. The work plan should provide a solid generic methodologies for DQO development. We suggest the DQO process be revisited, and a firm generic methodology be developed along the lines of Neptune et al. at EPA Quality Assurance Management Staff. DOE needs to provide a framework wherein DQOs can be reviewed and approved by regulators.
6. The EE correctly recognizes the limitations of using biological parameters in impact assessment in disturbed habitats (due to their high variability). We suggest that use of any of the standard impact assessment methodologies using such parameters be de-emphasized, and the implementation of any of these methodologies be quantitatively based. Data for making such determinations could be generated during a Task II reconnaissance/pilot study.
7. In a similar context, we are concerned that the precise use to which reference areas will be put has not been fully defined (i.e., in a quantitative context). Reference area comparisons will be very difficult in the disturbed habitats of OU9. The EEWP should describe in detail the approach to impact or risk assessment to be employed using these reference areas. Even more important, DOE should justify on quantitative grounds, the feasibility of using this approach by acquiring key quantitative data during a reconnaissance/pilot study.
8. The EEWP indicates that the ecological inventory stations will be located at, or in the immediate vicinity of, stations at which abiotic media will be characterized for contaminant burdens. We are concerned that sufficient data on the nature and extent of contamination will not be available to aid in the selection of the final locations for the ecological inventory sampling, assuming such sampling is necessary. The EEWP indicates that development of criteria for selection of contaminants of concern will occur during Task 1. However, it is not clear that these criteria will influence the selection of contaminants for Phase I sampling of abiotic media.
9. According to the Interagency Agreement (IAG), biota sampling is not required until Phase II RFI/RI. As such, there is justification for delaying Task 3 field efforts until Phase I abiotic data are available for planning. These abiotic data are critical to designing the sampling program.
10. The IAG calls for a baseline risk assessment at the end of Phase I. Since only soils media are extensively characterized during Phase I, complete risk assessments are not possible at the end of Phase I. Only those exposure pathways associated with soils contamination can be covered in the risk assessment. It is a partial risk assessment. On this basis, the absence of

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an EE from the Phase I risk assessment is acceptable, if not expected (given that biota are to be studied in Phase II).

11. The overall and generic DOE Rocky Flats Plant (RFP) (ten task) framework for the EE appears sound, but the inclusion of all ten tasks seems very much like overkill for this particular OU. There is a need for decision points to determine if further activities are really needed. This can be provided by the screening level (preliminary) risk assessment model. A decision point for proceeding with the Environmental Evaluation (EE) at OU9 should be defined no later than the completion of Task 2 activities. The EE process is not meant to be applied to industrial or urban environments that harbor little or no natural habitat and associated wildlife. The U.S. Environmental Protection Agency (EPA) states in the *Risk Assessment Guidance for Superfund*, Volume II, Environmental Evaluation Manual (Chapter 1) that "...Environmental evaluation at Superfund sites should provide decision-makers with information on threats to the natural environment associated with contaminants or with actions designed to remediate the site..." This guidance manual goes on to say "...Not all sites will require environmental evaluations. Indeed, many are in industrial areas with little or no wildlife..."

Task 1 and 2 activities should include screening-level assessments of the potential for significant impacts and risks to key receptors from exposure to surface and near-surface soil contamination. Tasks 1 and 2 should include the following activities, which are developed in the context of the conceptual model and on the basis of existing data and data derived from a reconnaissance/pilot study:

- a. Estimates of the aerial extent of natural habitat and the population levels of key receptors that the natural habitat could support (carrying capacity);
- b. Estimates of the aerial extent of surface and near-surface soil contamination in natural habitats;
- c. Estimates of the variability of key biotic parameters to assess the feasibility of these parameters for quantitative impact assessment and hypothesis testing.
- d. Assessment of the potential for populations of key receptors to be adversely affected from exposure to surface and near-surface soil contamination in the context of the expected narrow, linear pattern of contamination (limited bands of contamination along pipeline trenches) and the size of the ranges and activity patterns of populations of key receptors;
- e. Assessment of the ability to link contaminant tissue burdens with the sources addressed in OU9; and
- f. Assessment of the potential for transport of contaminants from OU9 to natural areas in other OUs where key receptors could be significantly exposed.

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- g. The ecological assessment endpoints and measurement endpoints should be clearly defined on the basis of PARCC parameters. The endpoints should include the level of reduction in key receptor populations that is judged to represent a significant effect.
12. The EEWP identifies the need for coordination and integration of data collection activities with the EEWPs being conducted for OUs 1, 4, 5, and 6. However, the management plan and protocols for realizing this coordination are not discussed. The integration and coordination of the data collection activities (and subsequent interpretations of impacts and risks to receptors) among OUs assumes a similar technical approach in each OU. The reviewers recommend that DOE (1) define how the integration and coordination among OUs will be achieved, and (2) ensure consistency in technical approach in all of the EEs at RFP.

SPECIFIC COMMENTS

1. Section 9.1, p. 9-1, para. 1: The objectives of the baseline EE should include the evaluation of potential ecological effects under future conditions.
- We suggest changing the "ecosystem level of biological organization" to "community level of biological organization." A trophic-based model is very much community-based. At least include a concise description of the "ecosystem approach to ecological risk assessment."
- In the context of OU9, assessment of "populations, structure, productivity, or diversity" is probably not feasible because the site is disturbed and the acreage is small.
- In the last sentence, delete "individual levels" of biological organization and replace "ecosystem" with "community."
2. Section 9.1, pg. 9-1, para. 3: With regard to the last sentence, we suggest being more specific on the information "from the EEs" that will assist in determining the type, . . . " and include a summary explanation of how this will be accomplished.
- We suggest that DOE include a summary of NCP requirements for ecological evaluation (i.e., its importance as one of two threshold criteria).
3. Section 9.1, pg. 9-1, para. 4: The OU associated with the "previous draft Phase I RFI/RI Work Plan" should be identified.
4. Section 9.1, pg. 9-2, para. 1: The role of future use scenarios in these EE assessment activities should be described.

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5. Section 9.1, p. 9-2, para. 2: The EE objectives should be reviewed and revised. Phrases such as "biological and ecological characteristics" and "biological sensitive environment" need to be clarified
6. Section 9.1.1, p. 9-2, para. 3: Please describe in detail the "weighted best evidence" approach, and how this approach compares to existing approaches commonly used in ecological impact and risk assessments.

The statement regarding uncertainties needs to be supported. A methodology does not appear to have yet been devised.

7. Section 9.1.1, pg. 9-3, para. 1: Discuss the role of the Phase I abiotic sampling in meeting these data needs.
8. Section 9.1.1, p. 9-3, para. 3: The management plan and protocols for achieving the integration and coordination of the OU 9 EE with the RFI/RI activities at OUs 1, 4, 5, and 6 should be discussed.

The third sentence beginning with "Contamination that occurs . . ." should be reworded.

The role of the conceptual model as the framework for the intra- and inter-OU integration activities mentioned herein should be discussed. The discussion of "Migration of contaminated surface or ground waters . . ." should be expanded and should be model-based.

9. Section 9.1.1, pg. 9-3, para. 4: This information on inter-OU dynamics as pathways in the conceptual risk model should be discussed.
10. Section 9.1.1, p. 9-4, para. 2: The Task 1 efforts should have already been accomplished as part of the RI scoping.

Task 1 includes initiation of the DQO development process, but does not mention the preliminary identification of data needs. The preliminary identification of data needs should precede the development of DQOs.

The reference to conceptual models in the last sentence is confusing. The purpose and content of each conceptual model to be developed should be discussed.

11. Section 9.1.1, p. 9-4, paras. 2 and 3: A decision point for proceeding with the Environmental Evaluation (EE) at OU 9 should be defined no later than the completion of Task 2 activities.
12. Section 9.1.1, pg. 9-4, paras. 3 & 4 (Tasks 1 & 2): The Task 1 and 2 activities discussed in these paragraphs should be combined under a single task.

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Stress the importance of the conceptual model as a framework for Task 2 activities (i.e., the organization of the information collection and synthesis activities, and the identification of key data gaps needed for quantitative impact assessment.

The inclusion of a Preliminary Risk Assessment in these scoping activities is to be applauded. However, we feel the scope and objectives of this assessment do not meet program needs (as discussed in the general comments above).

"Completing and verifying the list of contaminants of concern (COCs) . . ." cannot be accomplished until after the Phase I abiotic sampling results are available. The scheduling implications should be discussed.

A decision point needs to be added to the end of Task 2 that will essentially determine if the assessment of terrestrial ecosystems needs to continue. This decision will be based on the results of the preliminary (screening-level) risk assessment.

13. Section 9.1.1, pp. 9-4 & 9-5, para. 5 (Task 3): Move the preliminary field survey (i.e., reconnaissance survey) to the Task 2 scoping activities, and consider expanding, as needed, to address the needs of a screening level risk assessment for the terrestrial ecosystem.

Describe the uses of the quantitative data on community composition collected in the field inventories.

Indicate that these data will be used to refine the conceptual model.

14. Section 9.1.1, p. 9-5, para. 1: The heading identifying Tasks 4-7 as "Contamination Impact Assessment" is confusing. Do the authors mean "Environmental or Ecological Impact Assessment?" These tasks constitute part of a risk assessment approach. Do the authors view risk assessment and impact assessment as the same process?

The discussion of Task 4 is confusing. The second and third sentences are unclear.

Task 4 assumes that the COCs have been determined, and this, in turn, is dependent on the scheduling of Phase I abiotic sampling. This sequencing does not appear to be feasible.

The reference to "compared to exposures relative to RfDs" is not clear. It sounds like the quotient method.

We suggest deleting the statement that "biomarkers or ecosystem disfunctions will be determined."

15. Section 9.1.1, p. 9-5, para. 2: The pathways model approach and the verification methodology should be described in detail

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How "exposure and level of dose" can be determined through literature values should be discussed.

16. Section 9.1.1, p. 9-6, para. 1: Task 6 should be entitled "Preliminary Environmental (or Ecological) Risk Characterization."

We suggest deleting the second sentence, which commits DOE to address the "actual or potential effects of contamination on ecological endpoints." This is probably not feasible, and should be so caveated.

Those aspects of the EE that will be addressed qualitatively should be defined, and the limitations of a qualitative assessment discussed.

Please define the "weighted best evidence" approach.

Define "remediation criteria." The discussion of the derivation of remediation criteria is confusing. Please discuss the role of the pathways model in deriving remediation criteria. Please define the "RCRA risk-based criteria."

The circumstances that Task 6 "may" include preliminary derivation of remediation criteria should be described.

17. Section 9.1.1, p. 9-6, para. 2: Please discuss the methodology for the calibration and validation of the pathways models, and compare these activities to the model verification discussed under Task 5.

18. Section 9.1.1, pg. 9-6, para. 3: We suggest modifying the second sentence dealing with "additional population endpoints" to include evaluation of the feasibility of this approach.

Please explain the reference to the NRDA process in the last sentence.

19. Section 9.1.1, p. 9-7, para. 1: Please define the "complete data validation" mentioned in the last sentence.

20. Section 9.1.2, pg. 9-7, para. 4: The RFI/RI Phase I scope indicated in this paragraph exceeds that defined in the IAG.

Discuss in detail coordination of the EE with the Phase I abiotic sampling program.

Explain how the "Additional soil sampling locations and procedures" will be accomplished. This sampling does not appear to be part of Task 9.

21. Section 9.1.2, pp. 9-7 & 9-8, para. 5: The statement to the effect that "present information is not verified" and its relationship to the incomplete nature of the summary tables is not clear. The next sentence beginning with "In these tables" needs editing.

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22. Section 9.1.2, pg. 9-8, para. 1: Explain what "incompatibility of process wastes with the pipe and tank materials" is and how this led to releases to the environment.

Provide support to the strength of the information leading to the position that volatile and other organics groundwater contamination "have not been related to the OPWL releases."

Statements to the effect that lateral and vertical extent of the contaminant release "... is expected to be confined to the trenches and adjacent fill materials and soil" and that the FSP for site characterization in Section 7.0 "... is expected to be sufficient for the EE purposes" have not been adequately supported, and should be removed in they cannot be supported.

23. Section 9.1.2, pg. 9-8, para. 3: This information needs to be discussed in the context of a conceptual site model.
24. Section 9.1.2.1, p. 9-8, entire section: This discussion of COCs should be integrated with the discussion of COCs in section 9.2.1.4.
25. Section 9.1.3.1, pg. 9-10, entire section: This material should be presented in the framework of a conceptual model, and should include a map(s) of OU9 characteristics.
26. Section 9.1.3.1, pg. 9-10, para. 1: Whether the weed control measures introduced herbicides into the soils at OU9 and whether these contaminants are candidates for COC status should be stated.

Deer mice and house mice are two-word common names.

Use of abbreviated common names such as "cottontails" should be avoided.

27. Section 9.1.3.1, pg. 9-10, para. 3: The basis that a determination of whether or not contamination "is expected" will be made should be explained.

Discuss the total extent of existing natural habitat in terms of surface area, the portion of the existing natural habitat that may be contaminated due to OU 9 sources, and whether or not the potentially contaminated natural habitat is extensive enough to cause significant adverse effects in populations of key receptors.

The statement beginning with "Due to the nature . . ." is not clear.

28. Section 9.1.3.1, pg. 9-11, para. 1: Indicate that the "thorough and systematic survey" may be conducted, if needed.
29. Section 9.1.3.2, p. 9-11, para. 2: Please name some of these taxa or cite a table that includes them.

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30. Section 9.1.3.3, pg. 9-11, para. 4: Preble's meadow jumping mouse may have recently been found along Woman Creek. Please update this information.

31. Section 9.1.3.3, pg. 9-12, para. 1: The forktip three-awn has been collected recently just south of the railroad tracks near the west gate.

Provide some discussion of the adequacy of the "recent survey" that supports the absence of these species of special concern at RFP.

32. Section 9.1.3.3, pg. 9-12, para. 2: The relationship of these wetlands to OU9 should be described. Are they along potential exposure pathways?

33. Section 9.2, pg. 9-12, para. 3: Explain how the "procedures are intended to reduce the uncertainty . . ."

34. Section 9.2.1, pg. 9-12 & 9-13, para. 5: All of these activities should have been conducted as part of the work plan development.

Emphasize how the coordination of the EE with other studies should be based on a detailed conceptual model for OU9.

These "decision points" should be described in some detail. They can be very valuable in limiting the scope of the overall EE effort.

35. Section 9.2.1.1, pg. 9-13, para. 1: This section identifies the need for coordination and integration of data collection activities with the other RFI/RI work and other OUs. However, the management plan and protocols for realizing this coordination and integration are not discussed. The reviewers recommend that DOE (1) define how the integration and coordination within and among OUs will be achieved, and (2) ensure consistency in technical approach in all of the EEs at RFP.

The statement that "The COCs for the OU9 EE will be used to suggest surveys, . . ." needs to be stated more clearly.

The discussion of "Environmental pathways for fate and transport of contaminants . . ." should be framed within the conceptual model for OU9.

36. Section 9.2.1.2, pg. 9-13, para. 2: The "time frame and boundaries of the study area" are not clearly stated, particularly their relationship to "seasonal biological sampling." Please clarify.

37. Section 9.2.1.3, pg. 9-13, para. 3: Data quality objectives cannot be developed until data gaps are identified, preferably in the context of the conceptual model.

Change "primary objective" to "ultimate objective"

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We suggest deleting the reference to "preliminary DQOs."

38. Section 9.2.1.3, pg. 9-14, para. 1: The identification of data gaps should be added to this paragraph.

The last sentence in this paragraph should be clarified.

40. Section 9.2.1.4, pp. 9-14 & 9-15, para. 2: Move the fourth sentence beginning with "The list identified . . ." before the second sentence beginning with "A complete list . . ."

If the initial list of COCs is to be developed herein, as indicated under "Occurrence," then the Phase I abiotic data must be available. Please discuss this sharing of data.

The first and third bullet items under "2. Ecotoxicity" are related and somewhat redundant. Please make sure they are distinct to merit separate bullets.

Under "3. Extent of Contamination" the indication is that this will be based on the historical data, and not the Phase I abiotic sampling data. If this is true, COCs cannot be identified.

The reference to the "Annual Background Geochemical Characterization Report" for RFP is not exactly correct, and the information included therein may not meet work plan needs.

Define how "present above" is defined, quantitatively.

Explain how the criterion for "reported in greater than five percent of the samples" is applicable to naturally occurring contaminants, which will be reported for virtually every sample.

Discuss the Phase I soil sampling work that is being conducted at OU9 to identify "hot spots."

41. Section 9.2.1.4, pg. 9-16, para. 1: The statement regarding biotic populations that "can be measured by contaminant concentrations" is not clear.

The statement that these ecosystems show "the absence of species in higher trophic levels" is not clear. Certainly there are herbivores there. If no carnivores is implied, please make explicit.

42. Section 9.2.1.4, pg. 9-16, para. 2: Describe the potential uses of the reference area, in quantitative terms.

The basis for a decision on whether or not a reference area for OU9 will be required should be included.

The implication is that at most, only one reference area will be identified. A single reference area will not be very useful.

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43. Section 9.2.1.5, pg. 9-16, para. 3: The bullet items do not include all the components of the conceptual model. Based on this model, inter-OU dynamics would not be considered, since they represent inputs-output relationships of OU9.

The last bullet item should be deleted. It is not part of the conceptual model.

44. Section 9.2.1.5, pg. 9-16, para. 4: The reference to "Other models" that may be used to compare values of contaminant target analytes measured in environmental media to concentrations in biological tissue" is not clear. This should be part of the overall conceptual model. Plants are media for herbivores, and herbivores are media for carnivores, etc. All these interactions are properly part of the site conceptual risk model. DOE is erring in segregating the food web model from the overall site model.

45. Section 9.2.2, pg. 9-16 to 9-21, entire section: Stress the importance of the developing conceptual model as the framework for Task 2 activities, and the interaction of the two tasks (as shown in Figure 9-1).

Add a reconnaissance survey (including a limited pilot study) to collect the data needed to complete the preliminary (screening-level) risk assessment.

Whether the necessary information is going to be available to select the COCs according to criteria should be stated.

We suggest changing the focus of the preliminary risk assessment to one of a screening-level assessment used to eliminate soil related exposure pathways from further consideration.

The use of "functional groups" is good, and represents a more realistic approach to trophic based studies.

A decision point for proceeding with the (EE) at OU 9 should be defined no later than the completion of Task 2 activities.

46. Section 9.2.2, p. 9-16, para. 5: Item 2 indicates that data on the nature and extent of contamination will be available for Task 2 activities. Please describe the relationships between Task 2 and past or ongoing RI activities related to abiotic sampling, and the relationship between Task 2 and Task 3 sampling activities. Also, describe how the data on the nature and extent of contamination will be used to design the Task 3 activities.

47. Section 9.2.2, p. 9-17, para. 1: Discuss where the final selection of contaminants of concern and target biota taxa will be conducted, and cite the specific task and work plan section.

In general, discuss the central importance of the availability of information on the nature and extent of contamination in conducting these integrated Task 2 & 3 activities.

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With reference to the third bullet, discuss the attributes of these plant and animal species that will be characterized.

"Information" is too nebulous, be specific about what population characteristics will be studied.

48. Section 9.2.2.1, pp. 9-17 & 9-18, para. 2: The bullet item for "Phase I data base" is not clear. Does this include the results of Phase I soil sampling? This is an important point. Please be specific.
49. Section 9.2.2.2, pg. 9-18, entire section: Please define the relationship of these activities with Phase I abiotic sampling, including the availability of Phase I soil data. Present these relationships in the context of the developing conceptual ecosystem model.

Explain how the Task 3 information "... will be used in the pathway analysis and exposure assessment portion of the ecological risk assessment."

Add "Aquatic Ecosystems" as a bullet item. Thus far, sufficient information has not been presented to exclude it from consideration.

50. Section 9.2.2.2, pp. 9-18 & 9-19, para. 3: We suggest focussing this discussion in terms of acquiring data for the screening level risk assessment.
51. Section 9.2.2.2, pg. 9-19, para. 1: Discuss the scheduling of the EEs at other OUs (i.e., OUs 1, 2, and 5) in greater detail, including the availability of the data for OU9 Task 2 activities.
52. Section 9.2.2.2, pg. 9-19, para. 2: The reference to "... an on a general trophic-level model" is not clear.

The last sentence in this paragraph (beginning with "Based on the model ..." is confusing and should be clarified.

53. Section 9.2.2.3, pp. 9-19 & 9-20, para. 4: We suggest focussing this discussion in terms of conducting a screening level risk assessment, the results of which can be used to determine the need for Task 3 activities.

The sentence stating that "Preliminary assumptions will be formed and the conceptual pathway will be used an tested." is confusing and should be clarified.

54. Section 9.2.2.4, pg. 9-20, para. 1: The potential contaminants discussed in the first sentence must be developed with due consideration of the results of the Phase I soil sampling. In this light, it is difficult to see the value in developing this preliminary list of COCs. This work should not be undertaken until the Phase I data are available.

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55. Section 9.2.2.4, pg. 9-20, para. 2: Describe the approval process for the EG&G criteria for target biota.

The phrase "economically important in other ecosystems" should be explained.

56. Section 9.2.2.4, pg. 9-20, para. 3: The use of reference areas is probably not feasible, given the disturbed nature of the OU9 habitat.

The statement in the first sentence about available information being "insufficient to do so" needs clarification.

57. Section 9.2.2.5, Figure 9-3: Establishing a decision process is a good one, but it is based solely on feasibility. It should reflect the results of the screening level risk assessment.

With regard to feasibility, DOE should define the criteria upon which decisions will be made regarding "no acceptable method to study effect exists" and "no measurable effect expected at ecosystem level."

58. Section 9.2.2.5, pp. 9-21, entire section: Describe how the DQOs to which the FSP will be consistent were developed. This process has not been described in enough detail. Section 9.2.1.3 introduced DQOs, but the process needs to be laid out in detail.

Explain how the "... overall sample design will be consistent among tasks."

59. Section 9.2.3, pg. 9-21, entire section: The specific objectives of the Task 3 field investigations should be provided.

The fact that the air program is site-wide and not OU9-specific needs to be made clear.

If the Phase I RFI/RI activities for abiotic media will cover surface water and ground water, this is beyond the scope laid out in the IAG.

60. Section 9.2.3.1, pg. 9-21, para. 5: We suggest restating the purpose of the site characterization program to better reflect quantitative risk assessment. "Validating conceptual models" is a somewhat strange way of stating this purpose.

61. Section 9.2.3.1, pg. 9-22, para. 1: Data from the site-wide air quality monitoring program should be used during Task 2 to conduct screening level risk assessment. These data exist as historical data, and are fair game for Task 2 activities.

62. Section 9.2.3.1, pg. 9-22, para. 3: Justify that the Phase I soil sampling program is adequate for ecological characterization.

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63. Section 9.2.3.1, pg. 9-23, para. 1: The first sentence indicating that the Phase I RFI/RI field investigations will be reviewed and modified as necessary" is not clear. Please elaborate on this important issue.
64. Section 9.2.3.1, pg. 9-23, para. 2: The last sentence indicating that "Sediments in OU9 are not extensive and are not of concern for the biota" needs to be adequately supported and justified.
65. Section 9.2.3.1, pg. 9-23, para. 3: This "Ground Water" discussion is incomplete. The data mentioned herein should be synthesized in Task 2 in the context of the developing conceptual model.
66. Section 9.2.3.2, p. 9-24, entire section: For each subsection, discuss what will be done with the data, why will each data type be collected, and how these data will be used in impact or risk assessment.
67. Section 9.2.3.2, pg. 9-24, para. 2: We suggest moving the initial qualitative survey (i.e., reconnaissance survey) to Task 2 (which together with Task 1 define scoping activities), and possibly increasing the scope of the survey to one of a pilot study.
- The statement regarding "Detailed and quantitative field investigations, if needed, are planned . . ." should be expanded.
- Where the "additional abiotic sampling" whose needs arise from the Task 3 efforts will be conducted should be explained.
68. Section 9.2.3.2, pg. 9-24, para. 3: These objectives should apply to terrestrial vegetation and wetlands vegetation.
- A subsection should be inserted following this paragraph addressing the methods for Terrestrial Vegetation.
69. Section 9.2.3.2, pg. 9-24, para. 4. The relationship of these wetlands to OU9 is not clear. Present this information in a figure based on a conceptual model.
70. Section 9.2.3.2, pp. 9-24 & 9-25, para. 5: The objectives given for Terrestrial Wildlife sampling should have been largely accomplished during Task 2. We see nothing described herein or in the following paragraph that could not be accomplished in Task 2.
71. Section 9.2.4, p. 9-25, entire section: Start this discussion with a summary of the information that is available at the initiation of Tasks 4-7. The relationship of Tasks 4-7 to the data/information collection activities should be clarified.
72. Section 9.2.4, pg. 9-25, para. 4. Much of what is described herein should be accomplished during Task 2.

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The adequacy of "existing environmental criteria" for this assessment should be discussed.

Indicate that the preliminary (screening level) assessment in Task 2 will also determine the need for Task 9 ecotoxicological field investigations.

73. Section 9.2.4.1, pg. 9-26, para. 1: This sounds like the quotient method of ecological risk assessment. If this is true, please state as such clearly.

The difference in RfDs and EPA critical toxicity values need to be clarified.

74. Section 9.2.4.1, pg. 9-26, para. 2: The feasibility of using "ecological endpoints" or "biomarkers" is questionable. DOE should consider incorporating in Task 2 a pilot study to gain the information needed to assess the feasibility of this approach. Are these studies to be part of Task 4, or are they to be conducted later (e.g., under Task 9)?

Explain how DQOs will be developed for these data collection activities.

75. Section 9.2.4.2, pp 9-26 & 9-27, para. 3: All three subtasks defined herein for Task 5 could be conducted to some degree in Task 2, especially if data from Phase I abiotic sampling is available. This is particularly true of the identification of exposure routes and pathways, which should have been developed as part of the OU9 conceptual model.

76. Section 9.2.4.2, pg. 9-27, para. 1: The qualitative evaluation of actual or potential pathways is a Task 2 activity.

77. Section 9.2.4.2, pg. 9-27, para. 2: This paragraph should be clarified with reference to modeling of exposure pathways. Explain this procedure in greater detail since it is so important to the EE.

78. Section 9.2.4.2, pg. 9-27, para. 3: Much of this work should be accomplished in Tasks 1 and 2.

Explain the use of fate and transport modeling to this assessment. Modeling is not needed for current conditions.

The indication is that Phase I abiotic data may or may not be available. This is not acceptable. This EE should not progress beyond Task 2 without Phase I abiotic data for soils.

79. Section 9.2.4.2, pg. 9-28, para. 2: The first sentence is incomplete.

Clarify these direct and indirect routes. Why is foliar deposition an indirect route for the plant receiving it? For a predator, a prey is a biological medium and the consumption of the prey is direct. Please clarify this.

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Clarify the meaning of the sentence beginning with "Exposures will be evaluated according . . ."

Explain the meaning of the last sentence (beginning with "A pathways model . . .") and how this will be accomplished

80. Section 9.2.4.2, pg 9-28, para 4: The adverse biological effects mentioned herein (e.g., death, diminished reproductive success, reduced population levels) are very likely not useful at OU9 because of the small size and disturbed nature of the habitat.

81. Section 9.2.4.3, p. 9-28, entire section: This approach represents a major departure from the standard "quotient method" of ecological risk assessment, and the methodologies should be presented in detail, including assessment endpoints, measurement endpoints, hypotheses to be tested, and how will these data will be provided.

Discuss the implications of the qualitative nature of this characterization of adverse effects, including what can and cannot be done.

82. Section 9.2.4.3, pg. 9-29, para. 2: There is question whether or not this approach is feasible at OU9. We suggest that DOE collect the data needed to judge this feasibility issue in a pilot study under Task 2.

83. Section 9.2.4.3, pg. 9-29, para. 3: This entire paragraph is weak and needs reworking.

84. Section 9.2.4.4, pp. 9-29 & 9-30, para. 4: Relate this uncertainty analysis to the DQO process, particularly regarding the "level of confidence by quantifying the results of the assessment."

The first and third bullets are virtually the same.

85. Section 9.2.4.4, pg. 9-30, para. 1: Explain how the "validation and calibration of the pathways model" will be used to control uncertainty.

86. Section 9.2.5, pg. 9-30, para. 3: Does an SOP exist for soil microbial function?

87. Section 9.2.5, pg. 9-31, para. 1: The reference to "program DQOs" is not correct. DQOs are specific to specific data needs.

Bullets 2 and 4 should be defined in terms of PARCC parameters. These two bullets should be addressed in a Task 2 pilot study.

88. Section 9.2.5, pg. 9-31, para 3: Incorporate a discussion of the use of clear statements of hypotheses to be tested in defining these data needs.

Type I and II errors in the last bullet item should be explicitly defined.

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89. Section 9.2.5, pg. 9-32, para. 1: It is not clear how Task 9 activities (planned in Task 8) can be conducted simultaneously with Phase I RFI/RI abiotic sampling activities. The EE should never proceed to this stage without the benefit of the Phase I RFI/RI abiotic sampling activities.

Explain how published, predicted, or investigation derived BCFs will be used in the pathways model to assess potential impacts.

90. Section 9.2.6, pg. 9-32, para. 5: Add "and appropriate" to the end of the second sentence (beginning with "Reference areas will be sampled . . .").

91. Section 9.2.7.1, pg. 9-33, para. 2: We suggest moving this paragraph (i.e., everything down to the start of Section 9.2.7.2) after Section 9.2.7.2, and call it Section 9.2.7.3, *Content of the Initial Draft Report*.

92. Section 9.2.7.2, p 9-33, entire section: This discussion of remediation criteria, and the use of the pathway trophic model for establishing remediation criteria has not been properly introduced. Discuss the validation methodology and how this model will be used to assess impacts.

The methodology for establishing ecological effects criteria should be discussed in greater detail. Also, how the methodology takes into account exposure to multiple contaminants should be discussed.

Discuss the feasibility of this methodology in light of the existing toxicological data base and the prospects for collecting tissues in quantities sufficient for chemical analyses.

Discuss how determination of these criteria for OU 9 will be coordinated with other RFI/RI studies and EEs, and how the acceptable criteria will be used in conjunction with Applicable or Relevant and Appropriate Requirements (ARARs) to evaluate potential adverse effects.

93. Section 9.2.7.2, pp. 9-33 & 9-34, para. 3: Task 10 is too late to be developing remediation criteria. At the very least, they should be developed in Task 9.

The development of remediation criteria should utilize data from all OUs, as available. This discussion should reflect this need for sharing of information.

The "acceptable environmental concentrations" need to be clarified.

94. Section 9.3, pp. 9-34 to 9-42, entire section: Include consideration of Task 2 reconnaissance and pilot studies to acquire the information needed for screening level risk assessment and the design of Task 3 and 9 sampling efforts, as required.

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Discuss the role of information on the nature and extent of contamination (and particularly the results of the Phase I sampling of abiotic media contamination) in the design of the field sampling plan. Provide the general rationale underlying the selection of sampling stations.

Describe the types of quantitative data to be collected during this sampling effort.

DOE should also stress the use of these quantitative data to establish samples sizes for acceptable levels of uncertainty.

Define the criteria for determining an adequate number of transects and how this will be implemented in the field. Discuss whether or not adequacy based on a species-area type relationship, or an acceptable level of variability for a population parameter (e.g., density) or community measure (species diversity).

- 95. Section 9.3, pg. 9-34, para. 2: Change "Tasks 8 and 9" to "Tasks 3 and 9."
- 96. Section 9.3, pg. 9-34, para. 3: Discuss the use of Phase I data for abiotic media in designing this FSP.
- 97. Section 9.3.1, pg. 9-35, para. 1: This information is quite repetitive of earlier sections.
- 98. Section 9.3.1.1, pg. 9-35, para. 3: This information is quite repetitive of earlier sections.
- 99. Section 9.3.1 1, pg. 9-35, para. 4: This information should be shown via a conceptual model and maps.

Define the basis of determining the "OU9 study area boundaries." Is this based on some "zone of influence" reflected in the nature and extent of contamination?

Consider using another term than "vagrant" to describe biotic users of OU9.

- 100. Section 9.3.1.2, pg. 9-36, para. 1: How will decisions be rendered regarding whether or not specific sites within the study area are "determined to be of concern?"

With regard to the second bullet, how will "the exact extent of the area of concern" be determined?

The last statement, beginning with "Notable differences . . ." is weak. It should include something of consequence.

- 101. Section 9.3.2, pg. 9-36, para. 3: The second objective is not entirely consistent with the other three (apples and oranges), and we suggest deleting it.
- 102. Section 9.3 2, pg. 9-36, para. 4: We suggest not using the term "preliminary list of COCs." It is misleading. Until Phase I abiotic data are evaluated, any listing of COCs is pointless.

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103. Section 9.3.2, pg. 9-37, para. 1: Indicate the possibility that aquatic habitats and taxa may be important.

Target taxa could be identified on the basis of Task 2 activities.

104. Section 9.3.3, pg. 9-37, para. 4: The sentence beginning with "Aquatic habitats not represented . . ." is not correct and should be clarified.

105. Section 9.3.3.1, pp. 9-37 & 9-38, para. 5: Explain how "the study are will be finalized."

106. Section 9.3.3.1, pg. 9-38, para. 1: Explain how the bullet items are to be used to meet the objective of constructing an OU9 food web and exposure pathways models. Explain what use these data are if they are not quantitative (see comment 108 below).

107. Section 9.3.3.1, pg. 9-38, para. 2: Sample locations should be based on the nature and extent of soil contamination, particularly if food web methods are to be employed. These locations should not be identified "during the initiation of this study." The necessary information base is not available at this time

108. Section 9.3.3.1, pg. 9-38, para. 3 (Collection Methods): This paragraph indicates that the collection methods for vegetation will be nonquantitative. The use these data are to impact or risk assessment should be explained.

109. Section 9.3.3.1, pg. 9-39, para. 1: This discussion is too diffuse. It should be much more focussed and directed at filling key data gaps. Use of 0.5 m² plots appears to be quantitative. This appears to be inconsistent with earlier statements.

110. Section 9.3.3.1, pg. 9-39, para. 2: The use of species area curves to assure adequate sampling effort for vegetation taxonomy is applauded.

Change "climate" to "weather."

The statement that Task 9 sampling occurring " . . . immediately after Task 3 sample results are analyzed for completeness for modeling" is inconsistent with the conduct of Tasks 4-8 prior to Task 9. This apparent contradiction should be resolved.

111. Section 9.3.3.1, pg. 9-39, para. 3: It is our understanding that the Quality Assurance Project Plan (QAPP) does not define duplicate samples as "collocated" samples, but as splits of field samples. Please clarify.

112. Section 9.3.3.1, pp. 9-39 & 9-40, para. 5: The three bullet items are not feasible endpoints for impact assessment. Please reconsider their use.

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113. Section 9.3.3.1, pg. 9-40, para. 3: This methodology for locating vegetation transects in areas of known contamination assumes these areas of known contamination are known. This requires the Phase I abiotic data. It is our understanding these data may not be available to serve this function in a timely manner.

The circumstances under which composite samples would be required should be described. Why six samples were specified for the composite samples needs adequate justification.

The statement that tissue sampling will occur after the conclusion of the live-trapping program is confusing. Do the tissue samples not derive from the live-trapping?

114. Section 9.3.3.1, pg. 9-41, para. 3: The bullet items will be of no value to impact or risk assessment.
115. Section 9.3.3 1, pg. 9-41, para. 5: Whether or not enough insect biomass can be obtained should be determined during a Task 2 pilot study.
116. Section 9.4, pg 9-43, para. 1: With regard to "decision points for the necessity for a task" which have not yet been determined should be. We have made suggestions regarding these decision points (i.e., the end of Task 2, after a screening level risk assessment).

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