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July 8, 1992

Nancy Uziemblo
Washington State Department of Ecology
7601 W. Clearwater, Suite 102
Kennewick, Washington 99336

Subject: PUREX Source AAMS Report: Technical Review Comments From EPA

Dear Ms. Uziemblo:

The U.S. Environmental Protection Agency (EPA) and our contractors have reviewed the PUREX Source AAMS Report DOE/RL-92-04. Attached are our comments in both hardcopy form and diskette in Wordperfect 5.1 format.

Please contact me at (509) 376-9884 if you have any questions.

Sincerely,

Laurence E Gadbois

Laurence E. Gadbois
Unit Manager

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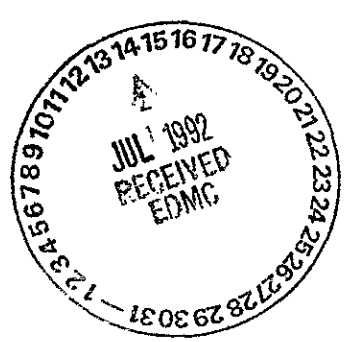
Enclosure: (1) Hardcopy of comments
(2) Diskette with comments

Copy w/ enclosure (1):

David Jansen, Ecology
Darci Teel, Ecology
Audree DeAngeles, PRC
Ward Staubitz, USGS
~~Tim Veneziano,~~ WHC (Admin Record, PUREX)



Enclosure (1)

PUREX SOURCE AAMS REPORT, DRAFT A. EPA COMMENTS

GENERAL COMMENTS

In general, the report thoroughly addresses the scope of the Purex Source Aggregate Area Management Study (AAMS). However, deficiencies exist that need to be addressed. Since this report is a guide for preparing a work plan for the Purex source, it should contain as much information as possible from available reference sources instead of merely citing statements from the sources. The type of wastes received by each waste management units (WMU) is stated, but the origin of the waste generated and the suspected or known constituents in each waste type are not clearly discussed. One example is laboratory cell drainage from the 202-A building and the 291-A-1 stack drainage; the nature and composition of these wastes are not described.

Although facility, process, and operational history descriptions are thoroughly presented, some information is missing for certain facilities addressed in the specific comments sections. When discussing the known and suspected extent of contamination, the contaminants of concern at each WMU should be provided. Dry well logs and monitoring data for radiation monitoring wells for each WMU should also be included in an Appendix. Lists of chemicals discharged to each WMU should be tabulated and referenced in the text.

There is no indication of a scheduled time-frame to submit the report on the limited amount of field characterization work that is performed in parallel with preparation of the AAMS report (Section 1.4) to meet the objective to "conduct limited new site characterization work if data or interpretation uncertainty could be reduced by the work (Section 1.3, page 1-9). For example, some of the unplanned releases and WMUs (Table 5-1) are evaluated as low priority sites on the basis of hazard ranking system (HRS) scores and radiation monitoring data. Limited field characterization data gathered from samples collected at these unplanned releases and WMUs may indicate current risk to human health and environment and may support decisions for expedited, interim, limited, or no action. Although some of the WMUs (examples: 216-A-37-2 crib, 207-A retention basins, and 216-A-42 Retention Basin) are potential sources for contaminant migration to groundwater and environmental threats, these WMUs are dispositioned for investigation to an unknown later date. An expedited response action (ERA) is warranted if further degradation of the medium occurs.

The discussion on preliminary development of alternatives is too general. EPA (1988) recommends that once the existing site information has been analyzed and a conceptual understanding of the site is obtained, a preliminary range of remedial action alternatives and associated technologies should be clearly

potential technologies at this stage will help ensure that data needed to evaluate them (e.g., solvent selection for chemical extraction, particle size classification for physical separation, selection of reagent mixtures for fixation/solidification/stabilization, literature data on existing and innovative technologies, performance and cost information for commercial technologies from vendors and landfill capacities) can be collected as early as possible. In addition, the early identification of technologies will allow earlier determinations as to the need for treatability studies. To the extent practicable, a preliminary list of broadly defined alternatives should be developed in the work plan that reflects the goal of presenting a range of distinct, viable options to the decisions maker. In this way, the preliminary identification of remedial actions will allow an initial identification of ARARs and will help focus subsequent data gathering effects.

Although the various criteria are used to evaluate the sites for an expedited response actions (ERA), the sites are selected finally on the basis of surface contamination using the 1990 radiological survey data for an ERA. This approach may be inappropriate due to the following reasons:

- The base line values used to determine the sits having surface contamination that exceeded the baseline values for an ERA on the basis of measured surface radiation levels in units of counts/minute, disintegration/minute and mrem/hour are not provided.

- A rationale for only using the 1990 data for surface contamination is not provided. Some of the WMUs are eliminated from consideration for an ERA because the 1990 radiological survey did not identify any area of contamination. This assumption is not correct. For example, the 1988 survey did not identify any surface contamination at 216-A-28 French Drain (Section 4.1.2.3.37). But even after the center of the unit was excavated and backfilled to grade in 1981, during the 1990 radiological survey direct readings of 10,000 dis/min (beta-gamma) and 2,300 dis/min (alpha) were identified.

The logic used to select representative WMWs for limited field investigations (LFI) is not clearly justified.

The rationale provided for investigation of groundwater as a single 200 East Area wide groundwater operable unit (GOU), rather than in individual source operable units is not adequate. Unless otherwise data gathering events for groundwater investigations for the single 200 East Area wide GOU are planned efficiently for representative data, delays in obtaining data for risk characterization and remedial actions is anticipated. This may not serve the purpose of implementing the three paths (ERA, IRM,

and LFI) for decision making (Section 1.1.2). Groundwater investigations in individual source operable units may be more appropriate for interim decision making if any threat is identified to human health and the environment.

The PUREX Plant Aggregate Area Management Study (AAMS) adequately discusses human health and ecological risk assessments, and appropriately references the Hanford Site Baseline Risk Assessment Methodology (DOE 1991).

SPECIFIC COMMENTS

1. **Table of Contents**
   The executive summary is not listed in the table of contents, but should be. The titles for Appendices A and D are not consistent with the appendices title pages. These discrepancies should be resolved.

2. **Executive Summary, page ES-5, lines 17 through 25**
   The text states that health and environmental concerns are presented in Section 5.0. The text continues with a discussion of potential human health concerns, but does not include a discussion of ecological concerns. The text should include a discussion of potential ecological concerns.

3. **Section 1.5, page 1-12, lines 17 and 27**
   The titles of Appendices A and D are inconsistent with the appendices title pages. These discrepancies should be resolved.

4. **Section 2.3.1.1, page 2-11, lines 8 through 10**
   The text states, "When the PUREX Plant resumed operations in 1983, another facility (the PUREX plant) was added that produced plutonium oxide from the plutonium nitrate." This sentence is confusing. The text should be clarified.

5. **Section 2.3.2.1, page 2-15, line 24**
   The text states that "All of the tanks are currently inactive and each has undergone initial stabilization and has a status of either partial interim isolation or interim isolation." The text should describe the procedures taken for initial stabilization, partial interim or interim isolation.

6. **Section 2.3.3, page 2-45, lines 5, 28, and 30**
   The correct figure number 2-8 should be used for the figure showing the location of cribs and drains. Lines 28 and 30 refer to figures 2-7 and 2-8 for the figures indicating a typical crib and french drain, respectively. The correct figure numbers 2-9 and 2-10 should be used.

7. Section 2.3.5, page 2-63, line 32

The correct figure number 2-11 should be used for the figure indicating the locations of ditches and trenches.

8. **Section 2.3.6, page 2-66, line 34**
The correct figure number 2-12 should be used for the figure indicating the location of septic tanks and drainfields.

9. **Section 2.3.7, page 2-68, line 13**
The correct figure number 2-13 should be used.

10. **Section 2.3.8, page 2-77, line 4**
The correct figure number 2-14 should be used.

11. **Section 2.3.8.2, page 2-77, line 38**
The section describes an unplanned release of beta/gamma contamination associated with the 216-A-42 retention basin. This section should discuss whether any actions taken to determine the extent of this release or any corrective measures taken to remediate the location of the release.

12. **Section 2.3.9, page 2-78, line 4**
The correct figure number 2-15 should be used.

13. **Section 2.3.9, page 2-78, lines 6 and 26**
This section discusses unplanned releases UN-200-E-62 and UPR-200-E-106. Line 6 refers to the UPR-200-E-62 release. The correct release identifier is UN-200-E-62. Line 26 refers to UPR-200-E-100 release. The correct release identifier is UPR-200-E-106. The correct identifiers should be used throughout the text.

14. **Sections 3.3.1, page 3-4, line 12**
It is noted that surface drainage from the Horse Heaven Basin enters the Pasco Basin. As shown in Figure 3-7, the Horse Heaven Basin does not drain into the Pasco Basin.

15. **Sections 3.5.3.1.1, page 3-30, 1st paragraph**
Moisture content is described in terms of volume in the text in Section 3.5.2.1.1 and in Figures 3-33 and 3-34, but as moisture content by weight percent in the text on page 3-30. Units should be consistent in the report for comparison. We suggest converting the moisture contents listed by weight percent on page 3-30 to a volume percent if the data is available to support this conversion.

16. **Sections 3.6.1.1 to 3.6.1.4, pages 3-32 to 3-36**
Several scientific names within the text are misspelled or archaic. The text should be revised to include current scientific names with accurate spelling.

17. **Section 3.6.1.1, page 3-32, first paragraph, line 7**
The text includes the statement, "The vegetation of the 200 Areas Plateau is characterized by native shrub steppe interspersed with large areas of disturbed ground with a

dominant annual grass component." The word steppe should be removed, as it is indicative of a biome not a vegetative type.

18. **Section 3.6.1.2, pages 3-33 and 3-34**
Scientific names of all species should be included in this section.

19. **Figure 3-8, page 3F-8**
The figure does not show the "Structural Provinces of the Columbia Plateau" as the title indicates, but rather shows the "Columbia Plateau and Surrounding Structural Provinces". Consider changing the title.

20. **Figure 3-16, page 3F-16**
"Hun" is identified in this figure but not in the explanation on page 3F-15. Is this a typographical error for "Hug"? Figure 3-14, page 3F-14-I' is identified as the north end here but shown as the south end in figure 3-16. This should be consistent.

21. **Section 4.1.1.1, page 4-4, line 1**
The text should explain why four of the seventeen air sampling stations are removed from service in 1989.

22. **Section 4.1.1.2.2, page 4-6, line 36**
This section discusses soil samples, analytical results, and counting errors associated with the samples. This section should include information on how these counting errors are determined.

23. **Section 4.1.2.1, page 4-9**
The text refers Table 4-7 and states that the external radiation monitoring TLDs averaged 95 and 107 mrem/yr for 1990. Table 4-7 presents minimum, maximum, and total external radiation monitoring TLDs for various sites. The two locations for TLD sampling at the Grout Treatment Facility are not presented in the table. These discrepancies should be clarified.

24. **Section 4.1.2.2.1.5, page 4-13, line 5**
This section refers to Table 4-24 for information on the vertical and lateral distribution of tank leaks. This table does not and should provide the actual measurement of the distribution.

25. **Section 4.1.2.2.2, page 4-13**
This section states that there is no volume, chemical, or radiological data available for vaults. Conversely, the information on waste currently stored in the 244-A Receiving Vault and the radiological contamination from unplanned releases associated with 244-AR vault are presented in Sections 2.3.2.15 and 2.3.2.16. This discrepancy should be clarified.

26. **Section 4.1.2.2.2.1, page 4-13**
The text in this section states that the 241-A-302A catch tank is an active waste management unit (WMU) when it is not (Section 2.3.2.9). This inconsistency should be addressed and the text changed where appropriate.

This comment is applicable to 241-C-301 catch tank.

27. **Section 4.1.2.7, page 4-27**
Only unplanned release at the 241-CR-151 Diversion Box is stated here. Other unplanned releases associated with the Diversion Boxes are not reported. Examples include:

- Several unplanned releases associated with the 241-A-151 Diversion Box (Section 2.3.7.3)
- A release associated with the deactivated 241-C-151 Diversion Box (Section 2.3.7.22). The release, estimated at less than 500 millicuries of ^{90}Sr spread detectable contamination over approximately a 2 mi^2 (square miles) area.
- A release associated with 241-C-152 Diversion Box

This inconsistency should be addressed and the text changed where appropriate.

28. **Section 4.1.2.8.2, page 4-28**
The unplanned release associated with the 216-A-42 retention basin should be discussed here or a reference section (Section 2.3.8.2) should be cited.

29. **Section 4.2.2, page 4-33**
This section discusses transport pathways and lists examples of such pathways. This section should also include ingestion of soil as a transport pathway.

30. **Section 4.2.2.1.4, page 4-36, lines 10 through 12**
A reference is not, but should be given for the information presented on the leaching of americium.

31. **Section 4.2.2.3, page 4-37, lines 29 through 33**
The text states that surface water is only available at the 216-A-29 Ditch and the 207-A Retention Basins. The text discusses the ditch, but not the retention basins. A discussion of the retention basins should be included.

32. **Section 4.2.3, page 4-39, lines 10 and 11**
The text states that only some of the unplanned releases are indicated on Figure 4-3. The rationale for not indicating all unplanned releases on Figure 4-3 is not, but should be provided.

33. **Section 4.2.4, page 4-40, third bullet**

The screening criteria used for selecting contaminants of concern should not be limited to only those contaminants that are known or suspected carcinogens, or that have an EPA noncarcinogenic toxicity factor. Toxic, noncarcinogenic contaminants do exist; an example is lead. The screening criteria should follow EPA Region 10 guidance (EPA 1991).

34. **Section 4.2.4.3, page 4-42, line 32**
The text discusses the mobility of contaminants listed in Table 4-27. However, mobility is a discussion item listed for Table 4-31 (see page 4-41, lines 1 and 2). The text should be changed to reflect Table 4-31.

35. **Section 4.2.4.5.1, page 4-46, lines 1 through 5**
The text states that genetic and teratogenic effects occur at higher exposure levels than those required to cause cancer. A reference is not, but should be provided for this statement.

36. **Section 4.2.4.5.1, page 4-46, line 23**
The reference listed for excess cancer risks is "EPA 1991." This reference is for the 1991 Integrated Risk Information System (see page 10-4, line 43). However, the information provided in this paragraph is found in the 1991 Health Effects Summary Assessment Tables (HEAST). The text should be corrected in both this section and in Section 10.0 References to reflect the appropriate resource.

37. **Section 4.2.4.5.1, page 4-46, lines 25 through 29**
The text discusses the method to use for determining risks for radionuclides that do not have EPA slope factors. However, the 1992 HEAST contains slope factors for all radionuclides. This paragraph should be deleted.

38. **Section 4.2.4.5.2, page 4-47, lines 11 and 12**
The text discusses the carcinogenic and noncarcinogenic health effects associated with chemicals anticipated at the aggregate area. The text should indicate that these health effects, which are presented in Table 4-38, may be associated with either human or animal data.

39. **Figure 4-3, page 4F-3**
The arrow leading from human to biota for ingestion should be reversed because it is generally assumed that humans ingest biota more than biota ingest humans.

40. **Table 4-33, page 4T-33a**
The acronym "MEPAS" should be defined. The Ph should be given in the columns headings for the second and third columns which present soil-water distribution coefficients.

41. **Section 5.0, page 5-1, line 15**

The text indicates that contaminants of potential concern are presented in Table 4-26. However, the information is presented in Table 4-30. The text should be corrected.

42. **Section 5.1, page 5-2, second paragraph**
The text states that the occupational exposure scenario is the most appropriate for identifying health hazards associated with the PUREX Plant Aggregate Area. The text should indicate that the occupational exposure scenarios is the most appropriate for identifying current health hazards.

43. **Section 5.2.2, page 5-5**
This section does not, but should include a discussion on wind erosion as a fugitive dust contributor. Ecological migration of contaminants is not, but should be discussed.

44. **Section 5.3, page 5-6**
The first paragraph in this section states that criteria used for setting priorities for waste management units and unplanned releases include the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Hazard Ranking System (HRS) and the system used by the Westinghouse Hanford Environmental Protection Group. This section discusses the HRS, but does not discuss the Westinghouse system. A discussion of the Westinghouse system should be included.

45. **Section 5.3, page 5-6, line 6**
The text refers to criteria used in the HRS scoring. Certain criteria have changed since the finalization of the HRS on December 14, 1990, and the text should note scoring was done using the old system.

46. **Section 5.3, page 5-6, second paragraph, lines 13 to 17**
The text states the following:

> The HRS ranking system evaluates sites based on their relative risk, taking into account the population at risk, the hazard potential of the substance at the facility, the potential for contamination of the environment, the potential risk of fire and explosion, and the potential for injury associated with humans or animals that come into contact with the waste management unit inventory.

The term "hazard potential" should be more accurately described as "hazardous waste constituent toxicity and quantity." The phrase "potential for injury" should be more accurately stated as "potential for exposure."

47. **Section 5.3, page 5-6, fourth paragraph, lines 27 to 28**
The text states that, "the mHRS takes into account concentration, half-life, and other chemical specific parameters that are not considered by the HRS." The present

HRS does take these factors into account. The text should clarify that the previous HRS did not consider those factors.

48. **Section 7.2, page 7-4, lines 37 and 38**
The preliminary disposal alternatives for the excavated soil and material on a small-or large-scale basis should be clearly identified and described.

49. **Section 7.2, page 7-5, lines 16 through 20**
Waste containment should also include vertical and horizontal barriers technologies in addition to capping technology.

50. **Section 7.3, page 7-7, line 1**
This section refers to biota RAOs. It should be noted that biota contamination is a result of soil contamination and soil remediation will automatically provide biota remediation. Listing the RAO for biota is not necessary and should be deleted.

51. **Section 7.4, page 7-7**
This section discusses remedial alternatives for treatment of hazardous chemicals, radionuclides, and volatile organic compounds. It should be noted that semi-volatile organic compounds are also contaminants of concern for the PUREX Plant Aggregate Area (Table 4-30) and the selected remedial alternatives should be applicable for treatment of this contaminant.

52. **Section 7.4.1, page 7-7 through 7-9**
This section provides a list of remedial action alternatives proposed for the Purex Source Aggregate Area. This section should also consider other remedial action alternatives such as land spread and chemical extractions. Land spreading could be an option for untreated soil with low radioactivity levels. The material could be transported to an appropriately selected and sufficiently large expanse of remote open land and spread to a degree that the soil radioactively level approaches the natural background radiation level of these materials. This technology is simple and relatively inexpensive.

Chemical extraction is another type of remedial alternative. The objective of this technology is to concentrate the radioactive contaminants resulting in smaller volume of soil for disposal. This technology includes the use of salt solutions, mineral acids, and various completing agents to extract the radioactive contaminants from the soil.

53. **Section 7.4.1, page 7-7, lines 35 and 36**
Technologies with process options proven effective at industrial waste sites and also pertinent technologies being developed should be specified.

54. **Section 7.4.1, page 7-8, lines 36 through 38**
A reference for EPA guidance on feasibility studies for uncontrolled waste management units is not listed in Section 10.0 and should be included.

55. **Section 7.4.1, page 7-8, lines 36 through 39**
The remedial action alternatives summarized in this section should list the process options retained from Table 7-3 for development of alternatives under each alternative.

56. **Section 7.4.2, page 7-10, lines 8-20**
Disadvantages of capping vertical barriers alternative should be included. Capping does not eliminate the source of radioactivity, which further limits use of the site. The cap must be maintained as long as contaminants exist at the site without penetration, indefinitely. If barrier walls are not used, horizontal and vertical migration of contaminants could still occur. Another potential disadvantage is the possible deteriorations of the barrier walls resulting from the chemical contained in the waste, particularly organic chemicals.

57. **Section 7.4.3, pages 7-10 and 7-11**
The text in this section states that in-situ grouting or stabilization of soil would reduce the leachability of volatile organic compounds. Section 7.4.1 states that volatile organic compounds are not easily treated by in-situ stabilization. Alternate 2 should also provide a combination of immobilization and containment for organic compounds. The text should be consistent with the capability of in-situ grouting or stabilization of soil in treating the volatile organic compounds.

Semivolatile organic compounds are also potential contaminants of concern at the waste management units. It is not clear from this section whether Alternative 2 would reduce the leachability of semivolatile organic compounds. This discrepancy should be addressed.

58. **Section 7.4.4, page 7-11, line 15 and Table 7-2, page 7T-2a**
The text states that conventional techniques using standard construction equipment will be used for excavation of radioactive and hazardous soil. In section 7.2, macro-engineering, which is based on high volume excavation using conventional surface mining technologies is proposed. The text should clearly explain the type of conventional techniques to be used for excavation and be consistent with other sections of the report.

59. **Section 7.4.6, page 7-12**
Alternative 5, "Excavation, Above-Ground Treatment, and Geologic Disposal of Soil with Transuranic Radionuclides," considers excavating contaminated soils, separating transuranic from nontransuranic soils, backfilling the

excavation with the nontransuranic soils, and treating and disposing transuranic soils. This alternative does not consider treatment of nonradioactive soil. The nonradioactive contaminants can potentially migrate and contaminate the groundwater. These issues should be considered before selection of the final alternative.

60. **Section 7.4.6, page 7-12, line 27**
This section discusses treatment of soils containing TRU at concentrations exceeding 100 nci/g. This section should state procedures taken to process soils at concentrations below 100 nci/g.

61. **Section 7.4.7, page 7-13, line 1**
The rationale for treating the vented vapors by the catalytic incinerator to at least 95 percent destruction should be provided.

62. **Section 7.5, page 7-13, line 38**
The text indicates Alternative 3 (excavation and on-site treatment) may not be applicable to treat volatile organic compounds. However, it is reported in Section 7.4.4 that thermal desorption with off-gas treatment (an on-site treatment option) could be used if organic compounds are present. Many on-site treatment options such as vitrification; thermal desorption; and fixation, solidification, and stabilization retained for development of alternatives (Table 7-3) could be potentially be used to treat both volatile and semivolatile compounds. The text should be changed to include volatile organic compounds in Alternative 3.

63. **Table 7-1, page 7T-1**
Some information is either presented under inappropriate headings or the information is not consistent with the text in Section 7.0. Examples include with recommendations:

- The text in second and third bullets in the second column for soils and sediments should be moved to the third column.
- The general response actions for soils and sediments should be consistent with the text in Section 7.0.
- The text in first and second bullets in the second column for biota should be moved to the third column.
- The general response actions for biota should be the same as for soils and sediments as stated in Section 7.3.
- The text in the second bullet under the human health column for air should be moved to the third column.

The text should explain why treatment is not included in the column for general response actions for biota.

Although, soil remediation will eliminate the air contamination source, some kind of remedial action is necessary for air until the source is remediated. Hence, general response action column should include no action/institutional actions and dust control measures for the environmental media "Air".

64. **Table 7-2, page 7T-2a through 7T-2c**
The text indicates that solvent extraction is applicable only to organics. Solvent extraction is applicable also to metals and radioactive substances. The text in the contaminants treated column should include "M, R" for the solvent extraction process option.

The process option for landfill disposal should include on-site landfill and RCRA landfill in place of landfill disposal.

The process option for geologic repository is specifically proposed for transuranic contaminants. Hence, the text in the last column should be substituted with "T" (I, M, O, nontransuranic radionuclides if mixed with T) in place of "R" (I, M, O if mixed with R) for the process option geologic repository.

Treatment as a general response action, the potentially applicable technology types, process options, and contaminants treated for treatment option should also be included for biota.

A footnote reading "T = Transuranic Contaminants Applicability" should be included at the bottom of the table.

65. **Table 7-3, pages 7T-3a through 7T-3k**
The technology dust and vapor suppression is rejected on the basis of limited duration of integrity and protection. Dust and vapor suppression may be used during remedial activities or before any action being taken place to prevent air pathway. Hence, this technology should be retained for use in conjunction with other process options.

The text "may not be effective for deep contamination" should be included under the column effectiveness for the process option grout curtains.

Off-gas treatment may be required for volatile compounds as well as for gaseous radionuclides (e.g., tritium generated during vitrification). Hence, the text under the column effectiveness should include gaseous radionuclides for off-gas treatment for the process-option vitrification.

For soil washing process option, the following text should be included:

- Effective with sandy soils. The process may work only for low level radiologically contaminated soils, under the column effectiveness.

- The process may not work for humus soil. The recycled water must be treated for radioactive and other contaminants.

The text is not clear under the column description whether contaminated soil or treated soil will be placed in an existing on-site landfill for the landfill disposal process option (page 7T-3f). The text in Section 7.0 indicates that treated soil will be placed in an on-site landfill. This inconsistency should be addressed and the text changed where appropriate. This comment is also applicable for the geologic repository process option in page 7T-3g.

Vapor extraction (page 7T-3h) is also ineffective for semivolatile compounds. Hence, semivolatile compounds should be included before inorganic compounds under the column effectiveness.

For the above-ground vitrification, the text in the conclusions column should include metals and inorganics in addition to radionuclides and organics.

The rationale provided for the rejection of incineration process option is not correct. Technologies with equipment are readily available to control and treat air emissions and wastewater generation. A single technology may not be sufficient to remediable all contamination at a single site or group of sites or operable unit or aggregate areas. For example, incineration to treat organic contaminants for a group of sites or aggregate areas could precede solidification/stabilization for soils contaminated with volatile and semi-volatile compounds and heavy metals. At this stage, incineration should not be rejected but retained for use in conjunction with other process options.

The rationale provided for rejection of solvent extraction process option is not adequate. Physical separation followed by chemical (solvent) extraction is being selected for removal of cesium-137 and cobalt-60 from the excavated soils/sediments (INEL, 1992). Treatability studies are being conducted to identify the preferred chemical option for chemical extraction and to treat the extracted solvent containing the contaminants. Hence a good rationale should be provided to reject solvent extraction technology. The technology should be rejected either on the basis of not fully demonstrated or on the basis of ineffective for the contaminants of concern.

In-situ soil flushing is rejected because of implementation problem. Soil flushing with chemical additives may have implementation problems. But, soil flushing with treated groundwater may be effective and easily implementable for flushing contaminants at low levels from deep soils. Hence, in-situ soil flushing should be retained for use in conjunction with other process options such as shallow excavation, and pump and treatment of groundwater.

A rationale for selecting an off-site landfill for disposal of contaminated biota should be provided. For soils, an existing on site landfill is considered for disposal (Table 7-3, page 7T-3k).

66. **Section 8.1.2, page 8-5, line 34**
The evaluation of existing data appears to begin here rather than on page 8-9. The appropriate text should be moved.

67. **Section 8.1.3, page 8-10, line 25**
This section states that "the best indication of the validity of the data is the reproducibility of the results, and this indicates that validity (completeness) is one of the less significant problems with the data." This discussion of completeness should be clarified. The existing data gathered in the Purex Plant Aggregate Area may be complete based on the intended level of validation. However, it appears that the data is not complete if the intended use of the data is for risk assessment purposes. For data to be considered complete for risk assessment purposes, it must meet contract laboratory program (CLP) validation protocols. Also, the existing data may not be representative of the contaminant release at the Purex Plant Aggregate Area since "The survey or sampling has been done at a location different from the waste management unit or release . . ." (Section 8.1.2, page 8-6, line 8).

68. **Section 8.1.5, page 8-12, second bullet**
The text states that the preliminary site conceptual model is discussed in Section 8.1.3. However, the correct section is 8.1.4. The text should be corrected.

69. **Section 8.2.1, page 8-14**
This section should discuss the data type and data quality level required for each of the categories listed. Table 8-3 provides a definition of the analytical levels but does not refer to the applicability of each level for the intended use of the data.

70. **Section 8.2.1, page 8-14, lines 39 and 40**
The text refers to Volume 1 of the Superfund Risk Assessment Guidance (EPA 1989a) for discussions on risk assessment data uses and needs. The text should also refer to Volume 2 of the Superfund Risk Assessment Guidance (EPA 1989b) because Volume 1 presents only guidance on human risk assessment,

whereas Volume 2 presents guidance on ecological risk assessment.

71. **Section 8.2.2.5, page 8-19**
This section should describe quality assurance and quality control samples (for example, field blanks, field duplicate, matrix spike and matrix spike duplicate, etc.) to be collected to measure precision and accuracy.

72. **Section 8.3.3.6, page 8-27, lines 34 through 38**
This section on ecological investigation does not, but should include a brief statement that data collected through the ecological investigation will be used to conduct the ecological risk assessment.

73. **Table 8-1, page 8T-1a to 8T-1c**
The indication of the (*) in Table 8-1 should be defined in the footnote section.

74. **Table 8-4, pages 8T-4a to 8T-4c**
The unit for the practical quantitation limit (PRQL) for the water matrix is presented as pCi/g. This unit should be corrected to pCi/L. The source and rationale for the stated PRQLs should be stated. The analytical method listed for kerosene is 8015. Modified method 8015 should be used for this analysis.

75. **Section 9.1, page 9-3**
A rationale should be provided for using surface contamination greater than 2 mrem/hr for exposure rate, 100 count/min beta/gamma above background, alpha greater than 20 counts/min, or Environmental Protection Program ranking of greater than 7 to designate a site as an interim remedial measure (IRM) candidate.

76. **Section 9.1.1., page 9-5, lines 28 through 41**
This section states that if a release is greater than 100 times the CERCLA reportable quantity for any constituent, the release remains in consideration for ERA. The rational for selecting the 100 times the CERCLA reportable quantity should be stated. The procedures taken for releases under the 100 times should be stated.

The text addresses the criteria used to determine unacceptable risks on the basis of the quantity and concentration of the release for an expedited response action (ERA). The application of the criteria to each waste management unit (WMU) should be presented quantitatively in a table or in an appendix to determine whether each WMU passed or failed the criteria.

77. **Section 9.1.1, page 9-6, lines 4 through 8**
The text is confusing. The first sentence states that the ERA screening criteria <u>in addition</u> (emphasized) to those

presented in the Hanford site past practice strategy were applied to provide a consistent quantitative basis for making recommendations in the AAMS. Then, in the second sentence, the text states that the decision to implement the recommendations developed in the AAMS will be based only (emphasized) on the criteria established in the Hanford site past practice strategy. The text should explain why the decision to implement the recommendations developed in the AAMS will be based only on the criteria established in the Hanford site past practice strategy when the recommendations are developed on the basis of Hanford site past practice strategy and additional ERA screening criteria prescribed in this section.

78. **Section 9.1.1, page 9-6, lines 10 through 15**
This paragraph addresses the criteria on the availability of technology to control the release for a unit or unplanned release to be considered for an ERA. The example provided in this paragraph is for water. The text should discuss on the availability/non-availability of technologies for soils if a release to soils is unacceptable with respect to health or environmental risk for an ERA.

79. **Section 9.1.1, page 9-6, lines 28 through 30**
The text states that active facilities will not be included in past practice investigations unless operation is discontinued prior to initiation of the investigation. The text should explain whether the above decision is made solely by DOE or among DOE, EPA, and Ecology. It should also explain whether or not the above decision is applicable even after a release from an active facility is unacceptable with respect to health or environmental risk.

80. **Section 9.1.1, page 9-7, lines 1 through 3**
The purpose of AAMS is to assess each WMU and unplanned release to determine the most-expeditious path for remediation by DOE, EPA, and Ecology.

The text should explain why a final decision regarding the conduct of ERAs in the aggregate area will be made based, at least in part, instead of fully (emphasized) on the recommendations provided in this section, and results of the final selection process outlined in WHC (1991b).

Also, the text should explain why the results of the final selection process outlined in WHC (1991b) are not used for making recommendations in this report.

81. **Section 9.2.1, page 9-9**
A rationale for using only surface contamination criteria using 1990 radiation survey data to evaluate the sites along the ERA path should be provided. Each site should be evaluated for all of the criteria presented in Section 9.1.1

for an ERA path and ranked with scores for each criteria before recommending for an ERA.

82. **Section 9.2.1.1, page 9-10**
Surface contamination levels up to 5,000 count/min and 20,000 disintegration/min are reported for the 207-A Retention Basins and the 216-A-42 Retention Basin respectively. The reported values are not discussed anywhere in the report (in Sections 2.3.8 and 4.1.2.8). This discrepancy should be addressed.
The comment is applicable to the following WMUs:
- 216-A-40 Trench
- UN-200-E-88
- UN-200-E-100

Also, a rationale for eliminating many sites that may have surface contamination high enough to be of immediate concern for an ERA is not provided. Many sites indicated high level of alpha and beta activities. Example sites include:
- 216-A-37-2 crib
- 216-A-15 french drain
- 216-A-16 french drain
- 216-A-17 french drain
- 216-A-22 french drain
- 216-A-23A french drain
- 216-A-23B french drain
- Many unplanned releases

83. **Section 9.2.1.2, page 9-11, lines 9 through 11**
The text states that a majority of the unplanned release sites will be addressed by the RARA program. But, only two unplanned release sites are considered for RARA (Section 9.2.1.1). Also, the statement that a majority of the unplanned release sites had insufficient quantity and concentration of contamination to qualify as an ERA is general. The statement should be substantiated with data.

84. **Section 9.2.2, page 9-11**
The total number of WMUs and unplanned releases and the number of WMUs and unplanned releases identified as high priority units reported in this section does not match with the values in Section 5.0 and Table 5-1. The discrepancy should be corrected and the text changed accordingly.

85. **Section 9.2.3.1, page 9-14, lines 1 to 7 and lines 30 to 37**
A more detailed investigation of one or two of the cribs and a french drain based on similarities of units may provide adequate data only if the WMUs have similar characteristics in terms of waste volume received, waste strength, waste composition, operational period, soil conditions, construction details and other unknown factors. For example, the crib 216-A-6 received the steam condensate, the equipment disposal tunnel floor drainage, the water filled door drainage and the slug storage basin overflow waste from

the 202-A Building whereas the 216-A-5 crib received laboratory cell drainage from the 202-A building and the 291-A-1 stack drainage. The operational periods are different for the cribs. The strength and composition of the waste received at these units may be also different. Similarly, the nature of waste received at other cribs are also different. Hence, the data obtained from one or two cribs may fail to provide adequate information on the nature and extent of contamination for other units to determine the health and environmental risks as well as to select the remedial alternatives. Limited field investigation should be conducted at each WMU unless otherwise substantial evidence is provided to support the data collected from one or two of similar WMWs for representativeness.

86. **Section 9.2.3.1, page 9-14, lines 9 through 13**
The WMU designation for possible representative cribs cited in the first sentence does not match with the designation cited in the subsequent discussion. This discrepancy should be corrected and the text changed accordingly.

87. **Section 9.2.3.2, pages 9-15 and 9-16**
The 218-E-12A Burial Ground is selected as a possible representative burial ground for the LFI representing 200-E Burning Pit, 218-E-1 Burial Ground, 218-E-8 Burial Ground, and 218-E-13 Burial Ground. The 200-E burning pit is a burning pit and received construction and office waste, paint waste, and chemical solvents. The representative burial ground received dry waste packaged in card board boxes and plastic bags, and acid-soaked material. The wastes received at 218-E-1 and 218-E-8 burial grounds are mixed fission products and transuranic (TRU) dry waste. The 218-E-13 burial ground contains only fission products. It is not clear how the data obtained from the 218-E-12A burial ground will be representative for other burial sites cited above. This discrepancy should be clarified.

88. **Section 9.2.4.1.1, page 9-17**
The discussion on the selection of possible representative cribs and french drains for remedial investigation is not provided for the group containing nine cribs and nine french drains and should be.

This comment is applicable for sections 9.2.4.1.3 through 9.2.4.1.6.

89. **Section 9.3.2, page 9-20**
A table should be included clearly indicating the assigned waste management units and unplanned releases in the redefined operable units, including which sites deferred to other aggregate areas or programs.

90. **Section 9.3.2, page 9-21 lines 1 through 16**

The UPR-200-E-59 unplanned release is reassigned to 200-PO-3 operable unit. The rationale provided for inclusion of this site to 200-PO-3 is not adequate. This unplanned release is associated with the use of contaminated mud and tumbleweeds from the 216-A-40 trench to build nests at the 244-AR vault by swallows (Table 2-5). The nests were removed from the 244-AR vault. The contaminated mud and tumbleweeds were removed from the trench. The sides of the trench were also washed. The only missing information is whether or not the trench is a potential source for further use of contaminated mud and tumbleweeds by birds. The text in Section 2.3.5.6 states that currently, the ditch is filled with several tumbleweeds, indicating a potential source for contaminant migration to other source areas. Hence, this unplanned release should be retained in the originally included operable unit 200-PO-1.

The rationale provided to reassign the 216-A-16, 216-A-17, 216-A-23A, and 21-A-23B french drains from the 200-PO-5 operable unit (OU) to the 200-PO-3 operable unit is not justifiable. There is no relationship between the 241-A tank farm (200-P0-3 OU) and these french drains (200-PO-5 OU) in terms of any unplanned release, wastes handled and facility operation. Unless otherwise a good rationale is provided, these french drains should be retained in their original operable unit (200-PO5 OU).

91. Section 9.3.3, page 9-21

A new order of prioritization is recommended with the 200-PO-4 Operable Unit being highest priority of investigation based on the largest quantities of contamination received by the cribs and french drains. But, some of the cribs and french drains that received largest quantities of contamination are included in other operable units. Examples include:

- 216-A-2 crib - 200-PO-2 OU
- 216-A-5 crib - 200-PO-7 OU
- 216-A-7 crib - 200-PO-5 OU
- 216-A-8 crib - 200-PO-5 OU
- 216-A-9 crib - 200-PO-1 OU
- 216-A-10 crib - 200-PO-2 OU
- All french drains - 200-PO-1, 200-PO-2, 200-PO-3, and 200-PO-5.

Hence, the recommended investigation prioritization is not acceptable and should be revised. The waste management units should be prioritized within each operable unit using numerical scores based on existing waste inventories and facility construction or operational information by professional judgement. Then, the operable units should be ranked from the total score of the WMUs for each operable unit. This will help to prioritize the operable units and the WMUs within the operable units.

92. **Section 9.5, page 9-24**
The text states that Section 7.3 contains an outline of treatability testing needs, however Section 7.3 contains no such summary. Treatability testing needs should be clearly identified and presented in this section for the technologies retained (Table 7-3) that are applicable to most waste management units. Treatability studies for technologies identified for on-site treatment are not discussed in this section and should be. Treatment technologies for soil-treatment by-products should be identified, and treatability studies should be proposed for these technologies.

93. **Table 9-1, page 9T-1a to 9T-1d**
The candidate sites recommended for evaluation and implementation under other AAMSs or programs such as RCRA and Hanford Surplus Facilities Program should be listed in this table under a separate column.

94. **Section 10.0, page 10-4**
References should be included for EPA (1989b).

REFERENCES

DOE 1991. Hanford Site Baseline Risk Assessment Methodology. DOE/RL-91-45. Decisional Draft. September 1991. U.S. Department of Energy.

EPA 1989a. Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual (Part A). Interim Final. EPA/540/1-89/002. December 1989. U.S. Environmental Protection Agency.

EPA 1989b. Risk Assessment Guidance for Superfund, Volume 2, Environmental Evaluation Manual. Interim Final. EPA/540/1-89/001. March 1989. U.S. Environmental Protection Agency.

EPA 1991. EPA Region 10 Supplemental Risk Assessment Guidance for Superfund. August 16, 1992. U.S. Environmental Protection Agency.

INEL, 1992. Warm Waste Pond Phase I Preliminary Design Report WAG2 Operable Unit 2-10, March 1992.

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