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STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

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July 15, 1992



Mr. Paul Pak
U.S. Department of Energy
P.O. Box 550, A5-19
Richland, WA 99352

Dear Mr. Pak:

Re: PUREX SOURCE Aggregate Area Management Study Report Review

Ecology, along with the U.S. Environmental Protection Agency (EPA) as a support agency, has completed the review of the PUREX Source Aggregate Area Management Study Report. Attached are the general and chapter-specific comments. A diskette containing these comments is provided, in WordPerfect 5.1 format.

Overall the report is thorough. However, as our review comments indicate, clarification of certain areas and additional technical information is necessary to fulfill the scope of the study. It is recommended that these comments be incorporated into the next draft of this report.

We expect to evaluate progress on comment resolution on August 14, 1992. At that time a comment resolution meeting can be scheduled. Draft B of this document is expected for review 30 days after receiving and agreeing to the disposition of the comments as stated on the Comment Record Form.

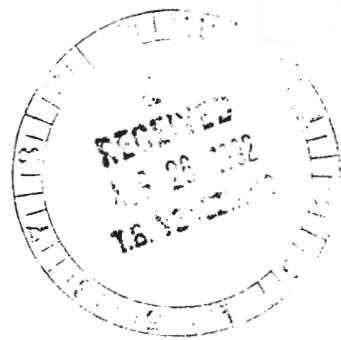
If you have any questions, please do not hesitate to call.

Sincerely,

Nancy Uziemblo

Nancy Uziemblo
Unit Manager
Nuclear and Mixed Waste

- cc: Steve Wisness, DOE
- Richard Carlson, WHC
- Laurence Gadbois, EPA
- Dave Jansen, Ecology
- Larry Goldstein, Ecology
- Darci Teel, Ecology
- Tim Veneziano, WHC



REVIEW OF THE PUREX SOURCE AGGREGATE AREA MANAGEMENT STUDY REPORT

DOE/RL-92-04 DRAFT A

General Comments

1. This document contains extensive sections of incorrect generic text. This suggests that comments submitted and accepted in previously reviewed Management Study Reports have not been incorporated into this document. In addition, there are numerous typographical errors, format inconsistencies, and unit labels missing. This report should be reexamined by an editor and the spelling checked. These findings suggest that the report submitted for milestone M-27-06 is a draft report still under internal review. Multiple drafts and prolonged delays in approving the final document are likely to result due to asking the regulators to review incomplete reports.

All future Management Study Reports must be complete, reasonably accurate, and satisfy the intent of the milestone before being submitted to the regulators for review.

2. 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 of the 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.

3. 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.
4. 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,

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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.

5. 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 identified for each contaminated medium. The identification of potential technologies at this stage will help ensure that the 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 timely 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.

6. 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 sites 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.

7. The logic used to select representative WMWs for limited field investigations (LFI) is not clearly justified.
8. 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 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.

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REVIEW OF THE PUREX SOURCE
AGGREGATE AREA MANAGEMENT STUDY REPORT

DOE/RL-92-04 DRAFT A

Specific comments

9. Table of Contents
The executive summary is not listed in the table of contents. The titles for Appendices A and D are not consistent with the appendices title pages. These discrepancies should be resolved.
10. Executive Summary Page ES-5, lines 17-25
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.
- CHAPTER 1
11. Section 1.1.2, Page 1-3, lines 30-35
A Focused Feasibility Study must be prepared discussing remedial alternatives for each type of waste unit. For each waste unit, a proposed plan followed by an Interim Record of Decision will be required.
12. Section 1.1.1, Page 1-4, lines 18-21
Figures 1-3 and 1-4 are referred to as showing the eight source aggregate areas in the aggregate area management study (AAMS) program. The eight source aggregate areas include the source operable unit 200-NO-1, which is located in the 200 North aggregate area (Table 1-1). The cited figures (Figures 1-3 and 1-4) show only the 200 East and West aggregate areas. A separate figure for the 200 North aggregate areas, showing the 200-NO-1 source operable unit, should be included and referenced in the text.
13. Section 1.2.2, Page 1-5, lines 28-32
The text states that a separate report for step 3 (conduct limited field characterization activities) will be prepared. Since step 3 is included in the scope of the AAMS and is a parallel effort in the AAMS, the completion date for step 3 should be indicated in this report.
14. Section 1.2.2, Page 1-6, line 3
The word physiography is obsolete and its meaning has changed in the U.S. A more descriptive word describing the configuration

of the earth's surface is geomorphology. (reference: Dictionary of Geological Terms, Bates and Jackson, 1984).

15. Section 1.2.2, Page 1-7, lines 25-38
A reference document for regulatory agency approval for expanded groundwater monitoring programs and in situ assaying of gamma-emitting radionuclides as part of the AAMS process should be cited. The date for submission of field characterization results topical reports for each AAMS should be presented.
16. Section 1.2.2, Page 1-8, line 18
The word "retain" should be "remain".
17. Section 1.3, Page 1-9, lines 27-28
Since field screening activities are a part of the AAMS process (page 1-7, line 25), deliverables for an AAMS should also include topical reports for field characterization results.
18. Section 1.4, Page 1-11, first paragraph
This section should reference where in this report information concerning ongoing field characterization is discussed. The text on quality assurance should also reference standard EPA documents e.g., Contract Laboratory Program Statement of Work for Organic analysis (EPA August 1991), and the Quality Assurance Project Plan (EPA, QAMS-005/80) being written for 100 Area work plans.
19. Section 1.5, Page 1-12, line 27
The actual title of Appendix D is Information Management Overview.
20. Figure 1-5, Page 1F-5
The 200-NO-1 source operable unit is incorrectly identified as an isolated operable unit. This discrepancy should be corrected.

CHAPTER 2

21. Figure 1-3 (200 East Aggregate Areas) should be referenced in the text when there is discussion on the 200 East area, not Figure 1-4 (200 West Aggregate Areas). This occurs predominantly in Chapter 2.
22. Section 2.1, Page 2-1, lines 30-33
Text discusses the operable units and aggregate areas in the 200 East Area; however, the referenced figure, Figure 1-4, shows 200 West Aggregate Areas. Figure 1-3, 200 East Aggregate Areas, should be appropriately referenced.
23. Section 2.2, Pages 2-1, 2-2, lines 42, 1
Names of all the reactors need to be provided. This will help in tracking the history of the Hanford Site.

24. Section 2.2, Page 2-3, lines 11-12
Explain if the ... "detailed description of the initial stabilization process ... discussed in Section 2.3.2" applies to all tanks or only tanks in the 241-C Tank Farm. This sentence only appears in the general discussion for the 241-C Tank Farm.
25. Section 2.3, Page 2-7, lines 27-29
Explain if the 242-A Evaporator Process Condensate will be re-sampled for volatile organic identification.
26. Section 2.3.1, Page 2-9, lines 11-25
Provide a schedule for discussion of closure process for buildings and structures located within the aggregate area but not addressed in this document.
27. Section 2.3.1.1, Page 2-11, lines 8-10
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.
28. Section 2.3.1.2.3, Pages 2-12 to 2-13
Provide dates of proposed grout campaigns.
29. Section 2.3.2, Page 2-15, lines 13-14
Explain how the tanks will be determined to be classified with > or < 99% confidence so that the tank is sound.
30. Section 2.3.2, Page 2-15, lines 24-26
Define "partial interim isolation".

Explain if partial interim isolation will be changed to interim isolation or has removal ceased.
31. Section 2.3.2.1.2, Page 2-17, line 14
As discussed here and throughout Chapter 2, define "sound".
32. Section 2.3.2.1.5, Page 2-18, lines 18-19
Heat load is supplied for the 241-A-105 Single-Shell tank.
Provide heat load for all other tanks.
33. Section 2.3.2.2, Page 2-19, line 5
Supply number of airlift circulator assemblies installed in tanks other than 241-AN-107 and working order status.
34. Section 2.3.2.2, Page 2-19, lines 37-39
This list of 241-AN Tank Farm wastes does not include the 100/300 Area customer waste (Page 2-20, line 18) and 1-N Area waste (Page 2-21, line 29) for the 241-AN-101 and -106 tanks, respectively. Supply complete listing of waste in the 241-AN Tank Farm in Section 2.3.2.2.

35. Section 2.3.2.2, Page 2-20, lines 4-7
Locate and quantify "Several dry wells within the tank farm ..." and ..."groundwater monitoring well around the ... Tank Farms." This appears several times throughout the rest of the document.
36. Section 2.3.2.3.2, Page 2-23, line 30
Describe plan after initial waste transfer to this unit.
37. Section 2.3.2.7.1, Page 2-33, lines 28-30
The listed contents of the 241-AZ-101 tank (3,651,480 L supernatant liquid and 132,300 L of sludge) exceeds the stated capacity for this tank (3,704,000 L [Section 2.3.2, Page 2-14, lines 18-19]).
38. Section 2.3.2.8, Page 2-34, line 20
Clearly state capacity for 241-C tanks as number, not "over" value.
39. Section 2.3.2.8, Page 2-34, line 33
Tanks 201-204 are cascaded in a group of four. Change line 33 to read "groups of three or four".
40. Section 2.3.2.8, Page 2-34, lines 33-40
Text implies that after the first tank, waste cascaded to fill remaining two or three tanks. The discussion on each tank suggests that each tank was individually filled as well as received "cascaded" waste from other tanks. Explain.
41. Section 2.3.2.8, Page 2-35, lines 30-31
Detail results of ammonia and organic vapor sampling.
42. Section 2.3.2.8.2, Page 2-36, lines 13-14
Describe why none of the radiation monitoring wells are active around 241-C-102 tank.
43. Section 2.3.2.8.13, Page 2-41, lines 12-13
Describe why none of the radiation monitoring wells are active around 241-C-201 tank, especially since this tank is "an 'assumed leaker'" (line 22).
44. Section 2.3.2.8.14, Page 2-41, lines 27-28
Describe why none of the radiation monitoring wells are active around 241-C-202 tank, especially since this tank is "an 'assumed leaker'" (line 38).
45. Section 2.3.2.8.15, Page 2-42, lines 1-2
Describe why none of the radiation monitoring wells are active around 241-C-203 tank, especially since this tank is "an 'assumed leaker'" (line 10).

46. Section 2.3.2.8.15, Page 2-41, line 6 and Section 2.3.2.8.16 Page 2-42, line 20.
The text states that tanks 241-C-203 and 204 received PUREX high-level waste. Explain if this was the only waste in the tanks or did these tanks also receive cascaded waste from tanks 201 and 202.
47. Section 2.3.2.11, Page 2-43, lines 7-10
Identify the current contents of 241-A-350 Catch Tank.
48. Section 2.3.2.16, Page 2-44
Provide volume of 244-AR Vault.
49. Section 2.3.2.16, Page 2-44
Provide discussion of UPR-200-E-70.
50. Section 2.3.2.17, Page 2-44
Provide volume of 244-CR Vault.
51. Section 2.3.3, Page 2-45, lines 13-31
Referenced figures do not match figures provided. Change text to state Figure 2-8 instead of 2-6, 2-9 instead of 2-7, and 2-10 instead of 2-8.
52. Section 2.3.3, Page 2-45, line 17
Move definition of sisalkraft paper liner from page 2-46, line 5 to page 2-45, line 17.
53. Section 2.3.3.1, Page 2-45, lines 39-41
The text describes 216-A-1 crib with a 1:1.5 slope from the surface to 2 m and a 1:2 slope from 2.1 m to 5 m. Figure 2-9 illustrates a typical crib with a surface to first level slope equal to 2:1 and second level slope of 1.5:1. Explain why 216-A-1 crib may not be designed as a typical crib.

Review all other crib descriptions for accuracy.
54. Section 2.3.3.1, Page 2-46, line 4
Provide thickness of "two layers of sisalkraft paper".
55. Section 2.3.3.1, Page 2-46, line 11
Explain how specific retention capacity is determined.
56. Section 2.3.3.3, Page 2-47
Describe how 216-A-3 Crib is marked.

Other crib descriptions are missing details of area markings for crib delineation.
57. Section 2.3.3.3, Page 2-47, line 2
Text states that "...Between 1967 and 1970, the unit discontinued receiving discharge from silica-gel regeneration wastes. However,

page 2-46, lines 38-40, it is stated that ... "From the beginning of operation until November 1967, the waste management unit received wastes from the silica-gel regeneration in the 203-A Building, ...". Does this imply that the unit received silica-gel regeneration wastes till 1970? Please clarify.

58. Section 2.3.3.5, Page 2-48, line 1
Detail over what years the crib received waste.
59. Section 2.3.3.6, Page 2-48, line 17
Define SCD. Add to acronyms list.
60. Section 2.3.3.7, Page 2-49, line 10
Provide date of deactivation of 216-A-7 Crib.
61. Section 2.3.3.3, Page 2-49, line 36
Define radionuclide capacity and how it is determined.
62. Section 2.3.3.8, Page 2-50, line 2
Remove "take".
63. Section 2.3.3.10, Page 2-51
State when 216-A-10 Crib was closed.
64. Section 2.3.3.12, Page 2-52, line 6
Define neutral/basic.
65. Section 2.3.3.12, Page 2-52, line 9
Describe how 216-A-24 Crib was stabilized.
66. Section 2.3.3.12, Page 2-52, line 10
Describe how the concrete marking posts are marking the unit.
67. Section 2.3.3.16, Page 2-54, line 6
Provide reference source for activity expectation.
68. Section 2.3.3.17, Page 2-54, line 24
Define "too radioactively contaminated".
69. Section 2.3.5 and subsequent sections
Figures referenced in the text do not correspond to figures provided at end of chapter.
70. 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.

71. 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.

72. Figure 2-8 Page 2F-8
Add street names to figure since they are referenced in the text.

CHAPTER 3

73. Section 3.2.1, Pages 3-2 and 3-3
The description should include information concerning seasonal storm events. This would lead into more detailed discussions in sections 3.5.1 and 3.5.2 concerning potential impact of storm water runoff on recharge and the spread of contamination.
74. Section 3.3.1, Page 3-3
It is noted that surface drainage from the Horse Heaven Basin enters the Pasco Basin. As shown in the Figure 3-7, the Horse Heaven Basin does not drain into the Pasco Basin. Clarify.
75. Section 3.3.3, Page 3-5, last paragraph
Identify if any well-defined drainage channels exist in the Purex Source Aggregate Area. It was mentioned in 2nd paragraph, page 3-5 that approximately one-third of the Hanford site is drained by the Yakima River system. Provide information on whether or not the Purex Source Aggregate Area belongs to the Yakima River system.
76. Section 3.4.1.1, Page 3-7, line 10
This sentence refers to "... Neogene- to Quaternary- age sediments." Paleogene and Neogene, and Tertiary and Quaternary are two different sets of nomenclature for the periods within Cenozoic Era. It would be more correct to use one nomenclature or the other and not mix the two.
77. Section 3.4.2.3, Pages 3-11 and 3-12
The text describes five separate intervals identified as A, B, C, D, and E within the lower half of the Ringold Formation. Lindsey and Gaylord (1990) and Lindsey (1991a and b) also have recognized five separate sand and gravel fluvial sequences in the Lower Ringold, which are designated as FSA, FSB, FSC, FSD1, and FSE. Explain if these two classifications correlate. Revision of the stratigraphy of the Ringold Formation should be made in context with the recent publications wherever applicable.
78. Section 3.4.3.3, Pages 3-15 to 3-17
See comment #77.

79. Section 3.4.2.6, Page 3-11 and Section 3.4.3.4, Page 3-15
As mentioned in the text, Figures 3-11 and 3-12 do not indicate Early "Palouse" Soil. The Figure 3-12 must show the stratigraphic position of the Early "Palouse" Soil. Some of your previous reports (eg. S-plant Aggregate Area Report) describe the unit as a part of the Hanford Formation. This discrepancy must be solved and reported with a reference. Provide a reference for the information found in Figure 3-12, page 3F-12.
80. Section 3.4.2.7.1, Page 3-13
As per the stratigraphic Figure 3-12, the gravel dominated facies is the Pasco Gravel. The Pasco Gravel has been identified in the stratigraphy and the words "Gravel Dominated Facies" should be replaced by Pasco Gravel.
81. Section 3.4.2.7.2 and 3.4.2.7.3, Pages 3-13 to 3-14
As per the stratigraphic figure 3-12, the Touchol bed seems to correspond to the sand dominated facies and slack water facies. These need to be checked with the latest publication(s) and if so, appropriate changes are to be made, i.e., instead of calling them sand dominated facies, etc., it should be named "Touchol beds".
82. Section 3.4.2.8, Page 3-13 and Section 3.4.3.6
Remove the word Holocene from "Holocene Surficial Deposits".
83. Section 3.5.2.1, Page 3-23, 3rd paragraph
References to UNSAT-H and PORFLO-3 are missing in the text.
84. Section 3.5.2.1.2, Page 3-24, lines 28-29
The water table is defined as the zone where the fluid pressure in the pores of the porous medium is exactly atmospheric. The pressure head at the water table is equal to zero. It would be more correct to say that "... capillary pressure within the horizon may exceed atmospheric, i.e., saturated conditions may develop."
85. Section 3.5.2.1.3, Page 3-22, lines 20-25
The term "confined" is not appropriate since there is evidence of direct communication of Unit A with Unit E. The term "semi-confined" seems to be the most appropriate name for the Unit A aquifer. Also when we use any of these terms, it should end with the term "aquifer" not by "groundwater" as used in the text (e.g., semi-confined groundwater in line 24, p 3-25, should be semi-confined aquifer).
86. Section 3.5.2.2, Page 3-22
This section should be titled as "Natural Groundwater Recharge and Discharge" and should identify if there is any discharge of groundwater. For example, shallow groundwater discharges to the

Columbia River along the northern margin of the 100 area have been documented by many investigators. This needs to be investigated for Purex Source Aggregate Area and mentioned.

87. Section 3.5.3.2, Page 3-30
See comment #86.

88. Section 3.5.2.2, Page 3-26, 3rd paragraph onward
The conclusion that less than 25% of the precipitation falling on typical Hanford site soil actually infiltrates to any depth (page 3-23, lines 28-30) is contrary to the previous conclusion made in Section 3.5.1, page 3-20. Clarify.

89. Section 3.5.2.2, Pages 3-27 and 28
Examples of precipitation recharge studies showing different recharge rates need more explanation on evapotranspiration. Some of the results seemed to be the opposite of what Gee (1987) and Rouston and Johnson (1990) have found. Explain.

90. 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. Convert the moisture contents listed by weight percent on page 3-30 to a volume percent if the data is available to support this conversion.

91. Section 3.5.3.2, Page 3-30
Higher infiltration rates would also be expected in areas where the topography is flatter. Add this information.

92. Section 3.6, Pages 3-31 to 3-36
There is a great deal of information in this section. Unfortunately, there are no references provided to simplify additional data collection.

For example, it would be helpful for planning field work to know the location of sensitive or threatened flora. Reference is made to badgers (section 3.6.3.1) and harvester ants (section 3.6.1.3.4), and data indicating these fauna can spread contamination. A key data objective for this and subsequent studies is to quantify environmental pathways; this report should consistently support satisfying this objective.

The text notes that there are no "domestic" groundwater supply wells within the aggregate area. State if there any public groundwater supply wells. The text should explain where on-site workers derive their potable water.

The text also notes that the nearest domestic well is over 20 miles distant from the study area. Wells 699-24-94 and 66-52-C

are located approximately 5 miles WSW of the 200 West Area. The text should be modified.

93. 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.
94. 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.
95. Section 3.6.1.2, Pages 3-33 and 3-34
Scientific names of all species should be included in this section.
96. Section 3.6.2, Page 3-36
Access to the entire Hanford site is administratively controlled and is expected to remain this way for the foreseeable future to ensure public health and safety and for reasons of national security. This information needs to be incorporated in the text.
97. Section 3.7.2, Page 3-33
The text needs details in regards to references, especially on publications by Rice, 1980, and Chatter, 1989.
Chatters, J., 1989, *Hanford Cultural Resources Management Plan*, PNL-6942, Pacific Northwest Laboratory, Richland, Washington.

Rice, D.G., 1980, *Cultural Resources Assessment of the Hanford Reach of the Columbia River, State of Washington*, U.S. Army Corps of Engineers, Seattle District, Seattle, Washington.
98. 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.
99. 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.

CHAPTER 4

100. 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.
101. Section 4.1.1.2.1, Page 4-4, lines 31-32
It is not clear why it is "nearly impossible" to convert gross gamma counts to a meaningful exposure rate due to "complex distribution of radionuclides on the site". It would be better to attempt to make sense of what the data does indicate, with limitations, rather than explaining what it does not tell us.
102. Section 4.1.1.2.2, Page 4-6, 2nd paragraph
The text mentions the twenty-five new dosimeter sites installed in 1990. State what happened to the forty old sites. State if these sites are totally abandoned at those locations. Explain if any information is being obtained from these old sites.
103. 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.
104. Section 4.1.1.2.2, Page 4-6, Table 4-7
The relationship of the Total to maximum and minimum values shown in Table 4-7 should be clarified.
105. Section 4.1.1.2.3, Page 4-7, 2nd paragraph
The plate 3 depicts only 17 locations instead of 18 as mentioned in the text. This discrepancy must be corrected.
106. Section 4.1.1.5, Page 4-8, lines 10-13
According to the text, gross gamma-ray logs were used to evaluate radionuclide migration in the vadose zone beneath the selected waste management units. However, the text does not mention anything on the results of these evaluation of migration of radionuclides. A brief description of the result of the evaluation is necessary and should be provided.
107. Section 4.1.1.5, Page 4-8, Table 4-13
The rationale used for the interpretation of potential migration to unconfined aquifer as shown in Table 4-13 must be given in the text.
108. Section 4.1.2.1, Page 4-9
The text refers to 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.

109. Section 4.1.2.2.1.4, Page 4-12

The text should mention that geophysical logging showed new tank leaks and migration of contamination to the soil.

110. 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 should provide the actual measurement of the distribution.

111. 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.

112. 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.

113. Section 4.1.2.5.1, Page 4-25

The text states in the first paragraph that it is "inactive", but then notes in the third paragraph, under the DOE/RL "plan" (undefined) general steps, "discontinue discharges of hazardous materials to the facility." Describe the plan and if it is active or not.

114. 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 ⁹⁰Sr spread detectable contamination over approximately a 2 mi² (square miles) area.
- A release associated with 241-C-152 Diversion Box

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

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115. 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.

116. Section 4.2, Page 4-30

The text should acknowledge increased risk to on-site workers during investigative and remedial activities.

117. 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.

118. Section 4.2.2.1.4, Page 4-36, lines 10-12

A reference is not, but should be given for the information presented on the leaching of americium.

119. Section 4.2.2.3, Page 4-37, lines 29-33

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.

120. Section 4.2.3, Page 4-38, line 1; Figures 4-3

The conceptual model figures depict arrows in both directions between humans and biota through the ingestion exposure route. The arrow should only indicate a transfer from biota to humans.

121. Section 4.2.3, Page 4-39, lines 10-11

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 should be provided.

122. Section 4.2.4, Page 4-40

The rationale or reference for using the second criterion is not presented, and contaminants appear to be inappropriately eliminated by the use of the third screening criteria.

The second criterion indicates that buildup of short lived radionuclide daughter activity to a level of 1 percent or greater of the parent radionuclide activity causes the daughter to be included on the contaminant-of-concern list. However, the rationale or reference for this criterion is not included, and should be. If the parent activity is extremely high, 1 percent may not be a conservative screening level.

The third criterion indicates that contaminants were placed on the contaminant-of-concern list if they are known or suspected carcinogens or have an EPA noncarcinogenic toxicity factor. It appears that contaminants not meeting such criteria are eliminated from the contaminant list. This screening fails to follow the

contaminant screening process outlined in DOE (1991) methodology. This criterion should be deleted.

123. 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).

124. 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.

125. Section 4.2.4.5.1, Page 4-46, lines 1-5

The text states that genetic and teratogenic effects occur at higher exposure levels than those required to cause cancer. A reference and dose levels should be provided.

126. 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.

127. Section 4.2.4.5.1, Page 4-46, lines 25-29

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.

128. Section 4.2.4.5.2, Page 4-47, lines 11-12

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.

129. Section 4.2.4.5.2, Page 4-47, lines 15-16

This paragraph states that many chemicals lacking toxicity criteria have "... negligible toxicity or are necessary nutrients in human diet." There is no citation provided for this assertion, and it is of questionable validity.

Many trace metals are necessary in the human diet, and most are highly toxic, some acutely so, in sufficient levels. Clarify the point of this statement.

130. Figure 4-1, Page 4F-1

"the results are displayed as relative levels of man-made radionuclide activity." Does this mean that background was subtracted? If so, how and where was background measured?

131. 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.

132. Table 4-5, Pages 4T-5a through 4T-5i

This table is unclear. For example:

- 1) Why is there a column for both counts-per-minute and disintegration-per-minute?
- 2) There are many places where the radiation type is unknown. The type of instrument used for the survey will usually tell you the type of radiation that is being measured.

133. 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.

CHAPTER 5

134. Section 5.0, Page 5-1, line 15

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

135. 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.

136. Section 5.2.1, Page 5-4, line 26:

The current absence of radiological survey data should not imply the absence of contamination levels or dose rates requiring access control. Explain association other than as a data gap.

137. Section 5.2.2, Page 5-5

This section should include a discussion on wind erosion as a fugitive dust contributor. Ecological migration of contaminants should be discussed.

138. 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.

139. Section 5.3, Page 5-6

The reference in the first paragraph of Section 5.3 to the Site Characterization Plan does not seem to be correct. Provide the volume and page number of the reference.

140. 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.

141. 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."

142. Section 5.3, Page 5-6, fourth paragraph, lines 27-28

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.

143. Section 5.3, fifth paragraph

It is not specified who assigned the scores in Table 5-1. Table 5-1 does not indicate which of the rankings were derived from an

authoritative reference, and which were assigned based on similarity. The table should clarify these points, and specify which ranked unit was used as the analog.

144. Section 5.3, sixth paragraph

The discharge volume used for assigning a qualitative indicator of migration potential is not quantitatively specified. Provide this value. An additional criteria of radioactive inventory should be added to determine priority of sites.

145. Section 5.3, Page 5-7, lines 16 and 34

Only three units appear to have WEPG scores of seven or greater. Clarify where seven units were counted.

146. Section 5.4, Page 5-7, lines 24 and 26

Only 25 total sites on Table 5-1 are designated as high priority. Explain if the total sites with high priority were counted using Table 5-1, under Priority column (where yes=high and no=low).

147. Table 5-1, Page 5T-1a:

The year in which data were collected for determining the HRS score should be provided.

Ecology personnel will conduct a site-by-site review of Table 5-1 when all above points are clarified.

CHAPTER 6

148. Sections 6.2, 6.3, & 6.4:

These sections do not adequately represent the proposed ARAR's for the PUREX Plant aggregate area. All laws, regulations, and guidance documents are potential ARAR's until they are finalized in the Record of Decision (ROD).

Incorporate the following list of Hanford Site-applicable ARARs:

STATE ARAR's

1. CHEMICAL SPECIFIC

WAC 173-303 Dangerous Waste Regulations APPLICABLE

Chapter 173-303 WAC establishes procedures for characterizing hazardous waste as Dangerous Waste (DW) or Extremely Hazardous Waste (EHW). Additional distinction is based on Persistence, carcinogenicity, mutagenicity, tetratogenicity, concentration of certain compounds, and

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9 2 1 2 0 8 1 5 1 3

toxicity as defined by WAC 173-303-070 to 110. Wastes excavated on sites which upon testing designates as DW or EHW must be handled under this regulation. Other sections not identified here should be considered relevant and appropriate.

WAC 173-340 MTCA Cleanup Regulations APPLICABLE

Chapter 173-340 WAC defines specific cleanup levels for numerous contaminants and point of compliance.

WAC 173-400 General Regulations for Air Pollution Sources APPLICABLE

Chapter 173-400 WAC establishes standards that are technically feasible and reasonably attainable for air pollution sources.

WAC 173-460 Controls for New Sources of Toxic Air Pollutants RELEVANT AND APPROPRIATE

Chapter 173-460 WAC establishes the systematic control of new sources emitting toxic air pollutants.

WAC 173-475 Ambient Air Quality Standards for Carbon Monoxide, Ozone, and Nitrogen Dioxide APPLICABLE

Chapter 173-475 WAC defines state wide air quality standards for carbon monoxide, ozone, and nitrogen dioxide.

WAC 173-480 Ambient Air Quality Standards and Emission Limits for Radionuclides APPLICABLE

Chapter 173-480 WAC defines maximum allowable levels for radionuclides in the ambient air.

WAC 173-490 Emission Standards and Controls for Sources Emitting Volatile Organic Compounds (VOC) APPLICABLE

Chapter 173-490 WAC establishes technically feasible and reasonable attainable standards for sources emitting VOC's.

Soil Cleanup/Remediation at Hanford February 1992 To Be Considered

The Department of Ecology, Nuclear and Mixed Waste Management Program's Soil Cleanup Policy became effective

February 5, 1992. The purpose of this policy is to provide a basis for consistent cleanups, remediations, and closures at the Hanford Site.

2. ACTION SPECIFIC

RCW 18.104 Water Well Construction RELEVANT AND APPROPRIATE

This regulation establishes authority for Ecology to require the licensing of water well contractors and operators and for the regulation of water well construction.

RCW 70.94 Washington Clean Air Act APPLICABLE

Chapter 70.94 RCW directs the state to secure and maintain levels of air quality that will protect human health and prevent injury to plant and animal life.

RCW 70.95 Solid Waste Management RELEVANT AND APPROPRIATE

Chapter 70.95 RCW establishes a state wide program for solid waste handling, and solid waste recovery and/or recycling which will prevent land, air, and water pollution and conserve the natural, economic, and energy resource of this state.

RCW 70.98 Nuclear Energy and Radiation RELEVANT AND APPROPRIATE

Chapter 70.98 RCW establishes a program to establish procedures for assumption and performance of certain regulatory responsibilities with respect to byproduct, source, and special nuclear materials.

RCW 70.105 Hazardous Waste Management APPLICABLE

The purpose of Chapter 70.105 RCW is to establish a comprehensive state-wide framework for planning, regulation, control, and management of hazardous waste which will prevent land, air, and water pollution and conserve the natural, economic, and energy resources of the state.

RCW 70.105D Hazardous Waste Cleanup, Model Toxics Control Act (MTCA) APPLICABLE

Chapter 70.105D RCW provides Ecology with the authority to investigate and conduct remedial actions upon releases of hazardous substances.

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WAC 173-303-670 Incinerators RELEVANT AND APPROPRIATE

If incinerators are used as a remedial technology this regulation would be applicable.

WAC 173-304 Minimum Functional Standards for Solid Waste Handling RELEVANT AND APPROPRIATE

Chapter 173-304 WAC establishes minimum functional performance standards for the proper handling of all solid waste materials.

WAC 173-403 Implementation of Regulations for Air Contaminant Sources RELEVANT AND APPROPRIATE

Chapter 173-403 WAC establishes procedures for the implementation of regulations and rules generally applicable to control and/or prevent the emission of air contaminants.

WAC 173-470 Ambient Air Quality Standards for Particulate Matter RELEVANT AND APPROPRIATE

Chapter 173-470 WAC establishes concentrations for particle fallout standards for all areas within the State of Washington.

WAC 173-480 Ambient Air Quality Standards and Emission Limits for Radionuclides APPLICABLE

Chapter 173-480 WAC establishes a 25 mrem/y whole body or 75 mrem/y critical organ dose to any member of the public. The point of compliance is all portions of the site.

WAC 246-221 Radiation Protection Standards APPLICABLE

Chapter 246-221 WAC establishes standards for protection against radiation hazards.

WAC 246-247 Radiation Protection -- Air Emissions APPLICABLE

Chapter 246-247 WAC establishes a 25 mrem/y whole body or 75 mrem/y critical organ dose to any member of the public. It also requires registration of the source with Ecology.

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3. LOCATION SPECIFIC

RCW 90.03 & RCW 90.14 State Water Code and Water Rights
RELEVANT AND APPROPRIATE

Water code and water rights laws specify conditions for extracting surface water or ground water for non-domestic uses. In essence, the laws provide that water extraction must be consistent with beneficial uses of the resource and must not be wasteful.

WAC 296-62 Washington Industrial Safety and Health Act
Occupational Health Standards--Safety Standards for
Carcinogens RELEVANT AND APPROPRIATE

State health and safety regulations are generally similar to those espoused by the federal regulations (i.e., OSHA), and are applicable to all remedial actions involving potential human exposure to hazardous materials.

WAC 173-154 Protection of Upper Aquifer Zones RELEVANT AND
APPROPRIATE

Chapter 173-154 WAC provides for protection of the upper aquifers and upper aquifer zones to avoid depletions, excessive water level declines, or reductions in water quality. State regulations for upper aquifer zones are applicable to remedial alternatives that involve treating ground water or presenting risks of ground water contamination.

WAC 173-201 Water Quality Standards for the State of
Washington APPLICABLE

Ecology classifies surface waters according to their water quality and uses of the water body. The surface waters of the Columbia River are classified as Class A.

WAC 173-220 National Pollutant Discharge Elimination System
Permit Program RELEVANT AND APPROPRIATE

The purpose of this chapter is to establish a state permit program, applicable to the discharge of pollutants and other wastes and materials to surface waters of the state.

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WAC 173-240 Submissions of Plans and Reports for Construction of Waste Water Facilities RELEVANT AND APPROPRIATE

Chapter 173-240 WAC regulations require that Ecology review and approve plans and for waste water treatment facilities that discharge to ground water.

WAC 173-300 Certification of Operators of Solid Waste Incinerator and Landfill Facilities RELEVANT AND APPROPRIATE

Chapter 173-300 WAC defines when certification of operators is necessary at incinerators and landfills.

WAC 173-304 Minimum Functional Standards for Solid Waste Handling APPLICABLE

Chapter 173-304 WAC regulations pertain to solid waste handling facilities (e.g., municipal landfills). They contain provisions for facility design, maintenance, and closure.

WAC 173-434 Solid Waste Incinerator Facilities RELEVANT AND APPROPRIATE

This regulation defines emission standards and design and operation of solid waste incinerator facilities.

WAC 232-12 Wildlife Classification RELEVANT AND APPROPRIATE

Chapter 232-12 WAC identifies endangered, threatened, and sensitive species of fauna.

WAC 248-54 Public Water Supplies RELEVANT AND APPROPRIATE

Chapter 248-54 WAC identifies the requirements of public water supply systems.

WAC 446-50 Transport of Hazardous Materials APPLICABLE

Chapter 446-50 WAC regulations are generally analogous to the corresponding federal regulations 49 CFR. Transport regulations are applicable to any off-site transportation of hazardous materials.

FEDERAL ARARs

4. CHEMICAL SPECIFIC

33 U.S.C. 1251 Clean Water Act APPLICABLE

40 CFR 131 Water Quality Standards APPLICABLE

42 U.S.C. 300 (f), 40 CFR 141 Safe Drinking Water Act
APPLICABLE

40 CFR 264 Subpart F Concentration Limits TO BE CONSIDERED

40 CFR 264.521 Corrective Action at Solid Waste Management
Units TO BE CONSIDERED

40 C.F.R 141.13 Maximum Contaminant Levels for Turbidity
RELEVANT AND APPROPRIATE

40 C.F.R 141.3 Secondary Maximum Contaminant Levels for
Drinking Water RELEVANT AND APPROPRIATE

E.P.A Directive 9355-.4-01FS 1990 Guide on Remedial Actions
at Superfund Sites with PCB Contamination TO BE CONSIDERED

Richland City Ordinance 35-84 Public Owned Treatment Works
TO BE CONSIDERED

5. ACTION SPECIFIC

42 U.S.C. 6901 Resource Conservation and Recovery Act
APPLICABLE

29 CFR 1910 Occupational Safety and Health Act APPLICABLE

40 CFR 122 Discharge of Treated Effluent APPLICABLE

40 CFR 141.13 Maximum Contaminant Levels for Turbidity
RELEVANT AND APPROPRIATE

40 CFR 261 Identification and Listing of Hazardous Waste
RELEVANT AND APPROPRIATE

40 CFR 262 Standards for Generators of Hazardous Waste
APPLICABLE

40 CFR 263 Standards Applicable to Transporters of
Hazardous Waste RELEVANT AND APPROPRIATE

40 C.F.R 264 Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities APPLICABLE

40 CFR 268.44 Land Disposal Restrictions APPLICABLE

40 CFR 761.30 PCBs Storage and Disposal RELEVANT AND APPROPRIATE

40 CFR 761.60 Alternative Technology to Incineration RELEVANT AND APPROPRIATE

40 CFR 761.70 Chemical Waste Landfill RELEVANT AND APPROPRIATE

40 CFR 50 Air Quality Standards RELEVANT AND APPROPRIATE

40 CFR 58 Ambient Air Quality Surveillance RELEVANT AND APPROPRIATE

40 CFR 60 New Source Performance Standards RELEVANT AND APPROPRIATE

40 CFR 61 National Emissions Standards for Hazardous Air Pollutants RELEVANT AND APPROPRIATE

40 CFR 122 NPDES Permit Program RELEVANT AND APPROPRIATE

6. LOCATION SPECIFIC

16 U.S.C 461 Historic Sites, Buildings, and Antiquities Act RELEVANT AND APPROPRIATE

16 U.S.C. 742 Fish and Wildlife Improvement Act RELEVANT AND APPROPRIATE

16 U.S.C. 2901 Fish and Wildlife Conservation Act RELEVANT AND APPROPRIATE

167 U.S.C. 1271 Wild and Scenic Rivers Act RELEVANT AND APPROPRIATE

50 CFR 17 Endangered Species Act RELEVANT AND APPROPRIATE

149. Section 6.2.1.3, Page 6-4, lines 12-13

RCRA is APPLICABLE at PUREX. The text should be rewritten so it does not preclude the permitting requirements on RCRA closures and TSD's as required by Chapter 70.105 RCW and Chapter 173-303 WAC the dangerous waste regulations.

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150. Section 6.2.1.3, Page 6-4, lines 15-16
The concept of "Area of Contamination" has not been resolved, and should not appear in this Work Plan.
151. Section 6.2.2.1, Pages 6-5 and 6-6
Hanford is not a routine cleanup site nor are there relatively few contaminants; therefore, Method A cleanup standards should not be applied.
- Method A tables have been developed for specific purposes. They are intended to provide conservative cleanup levels for sites undergoing routine cleanup actions or those sites with relatively few hazardous substances. The tables may not be appropriate for defining cleanup levels at other sites. For these reasons, the values in these tables should not automatically be used to define cleanup levels that must be met for financial, real estate, insurance coverage or placement, or similar transactions or purposes. Exceeding the values in these tables does not necessarily trigger requirements for cleanup action under this chapter.
152. Section 6.2.2.1, Page 6-6
Planning to use Method C cleanup levels is premature and unwarranted. All references to cleanup scenarios under MTCA should be under Method B.
153. Section 6.2.2.1, Page 6-6, lines 25-30
The last paragraph "In addition to . . . waste management unit." should be eliminated from this document. This paragraph is stating an opinion that Ecology cannot accept. Remove this information.
154. Section 6.2.2.6, Page 6-7, second paragraph:
This paragraph should be eliminated from the text. Dilution zones are not automatic. All Known And Reasonable methods of Treatment (AKART) must be applied to the waste stream then water diffusers are designed and approved by Ecology. After all this occurs, dilution zones are then considered.
155. Section 6.4.1.1, Page 6-10, lines 31-35
State standards will apply at Hanford. If there is an existing state law that disallows land disposal of certain chemicals then it applies at Hanford. Include this information in the text.
156. Section 6.6, Page 6-17, second paragraph:
Point of compliance is defined in WAC 173-340-740(6) a-d. For soil cleanup levels based on human exposure via direct contact, the point of compliance shall be established in the soils throughout the site from the ground surface to fifteen feet below the ground surface. This represents a reasonable estimate of the

remediation will automatically provide biota remediation. Listing the RAO for biota is not necessary and should be deleted.

162. 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.

163. Section 7.4.1, Pages 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 such a degree that the soil radioactivity 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 complexing agents to extract the radioactive contaminants from the soil.

164. Section 7.4.1, Page 7-7, lines 35-36

Technologies with process options proven effective at industrial waste sites and also pertinent technologies being developed should be specified.

165. Section 7.4.1, Page 7-8, lines 36-38

A reference for EPA guidance on feasibility studies for uncontrolled waste management units is not listed in Section 10.0 and should be included.

166. Section 7.4.1, Page 7-8, lines 36-39

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.

167. 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.

168. 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. Alternative 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.

169. 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.

170. 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.

171. 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.

172. 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.

173. 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 potentially be used to treat both volatile and semivolatile compounds. The text should be changed to include volatile organic compounds in Alternative 3.

174. 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 the 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 the 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".

175. Table 7-2, Pages 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.

176. 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 remediate 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).

CHAPTER 8

177. 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.

9 2 1 2 6 5 8 1 6 2 6

178. 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.

Reproducibility of results does not "validate" the data, this only indicates that the methodology can be reproduced, whether it is reproduced correctly or not. To truly "validate" data, instrument calibrations, standards, matrix spikes, and other QA/QC protocols should be followed.

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).

179. Section 8.1.3, Page 8-11, line 3.

This should read "...possible, where contamination may or may not be present."

180. 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.

181. Section 8.1.5, Page 8-12, lines 36 through 39.

Data obtained through field investigations should be more fully defined. Clarify if this will be strictly radionuclides, or will there also be chemical field data obtained.

182. 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.

183. 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.

184. Section 8.2.1, Page 8-15, line 33.
A "T" should be added to beginning of the sentence.
185. Section 8.2.1, Page 8-16, line 3.
It is stated that unplanned releases in particular are lacking in information for locating the sites. Give more information or references that will address how these will be located and handled.
186. Section 8.2.1, Page 8-16, line 13.
This sentence should read "The likely depth of radiation contaminants--this...."
187. Section 8.2.1, Page 8-16, line 29.
A reference is made to table 8-1 for data needs, this reference should be 8-2.
188. Section 8.2.2.1, Page 8-17, line 4.
This sentence should read "...not be limited to chemical and radionuclide parameters, but should also include necessary physical parameters ..."
189. Section 8.2.2.2, Page 8-17, lines 30-32.
The text states that "Individual DQO analytical PARCC parameters for Level III or IV analytical data are given Table 8-4."; the only methodology called out in Table 8-4 inorganics and organics is Level III methods. Both methodologies should be listed.
190. Section 8.2.2.2, Pages 8-17 and 8-18.
This section should also incorporate the concepts and requirements defined in the Quality Assurance Project Plan (QAMS-005). This generic document will be used in 100 Area investigations and should be used in the 200 Areas.
191. Section 8.2.2.3, Page 8-19, lines 4 through 6.
Any screening investigations should also include screening for chemical (inorganic or organic) contaminants also.
192. 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.
193. Section 8.2.2.4, Page 8-19, line 25.
The reference for CLP is out-of-date, reference the most current SOW's.
194. Section 8.2.2.5, Page 8-19, line 33.
The reference should be made to Section 8.1.3 not Section 8.1.2.

195. Section 8.2.2.5, Page 8-19, lines 39 through 41.
The statement that analysis of arsenic to much lower levels is "impossible because of the limitations of analytical methods" should be explained. Most CLP procedures, e.g., Method 200.62-C-CLP, can analyze to 500 ppb. We do agree however, than background levels may make this point moot.
196. Section 8.3.1, Page 8-22, line 15.
The sentence should read "Although existing data are unvalidatable, the data ..."
197. Section 8.3.2, Page 8-23.
The possibility of using a mobile lab for organics and inorganics should also be addressed here.
198. Section 8.3.3.6, Page 8-27, lines 34-38
This section on ecological investigation but should include a brief statement that data collected through the ecological investigation will be used to conduct the ecological risk assessment.
199. Table 8-1, Pages 8T-1a to 8T-1c
The indication of the (*) in Table 8-1 should be defined in the footnote section.
200. Table 8-4, Pages 8T-4a to 8T-4e
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.
- The organic and inorganic analysis methods should list both SW-846 and CLP methodologies.

CHAPTER 9

201. Section 9.0, Page 9-2, first two paragraphs
Provide more information describing the interaction among various RL programs. The integration of RCRA, CERCLA and D&D activities is critical to ensure timely and cost-effective program management. Simple references to remedial activities under RARA, or "other programs" is inadequate.
- Additional, concise text should describe in specific terms: 1) which other programs are responsible for site remediation, and where; 2) how the Offices of Operation, Waste Management and Environmental Restoration are integrating activities, and 3) how data will be integrated. Cite references or source documents.

202. Section 9.1. Page 9-2. first paragraph

The criteria for an ERA should include an important additional criterion, which is expediency/cost-savings. Many of the ERA candidate sites (and 618-9) are being considered because: 1) the site is relatively easy to remediate, 2) taking action now will likely result in considerable cost-savings or increased safety for site-workers, or 3) site clean-up will result in some near-term benefit such as increased public use.

203. 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.

204. Section 9.1.1. Page 9-5. lines 28-41

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 rationale 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.

205. Section 9.1.1. Page 9-6. lines 4-8

The text is confusing. The first sentence states that the ERA screening criteria in addition (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.

206. Section 9.1.1. Page 9-6. lines 10-15

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 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.

207. Section 9.1.1, Page 9-6, lines 28-30

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.

208. Section 9.1.1, Page 9-7, lines 1-3

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.

209. 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.

210. Section 9.2.1.1, Page 9-9

If these 15 cribs are ERA candidates, and of 'immediate' concern, state what the RARA program is doing today to address the release of radionuclides to on-site workers and biota? Describe what action is planned, and when.

211. 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

212. Section 9.2.1.2, Page 9-11, lines 9-11

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.

213. 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 do not match with the values in Section 5.0 and Table 5-1. The discrepancy should be corrected and the text changed accordingly.

214. Section 9.2.2., Page 9-11, first paragraph

Explain why septic tanks and drain fields were categorically excluded from consideration along the ERA and IRM paths. State if the decision is based on an assumption of relatively innocuous discharges, lack of data, or both.

215. Section 9.2.3.1, Page 9-14, lines 1-7 and lines 30-37

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 is also different. Hence, the data obtained from one or two cribs

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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.

216. Section 9.2.3.1, Page 9-14, lines 9-13

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.

217. 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.

218. Section 9.2.3.2., Page 9-16, second paragraph

Substitute "burial grounds" for "cribs".

219. 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. Please provide.

This comment is applicable for sections 9.2.4.1.3 through 9.2.4.1.6.

220. Section 9.2.4.1.2, Page 9-17

Clarify how Well 299-E24-111 moved from consideration as an ERA to becoming a "low-priority" site to be evaluated along the IRM path. If lack of a driving force is the prime criterion, then additional data should be collected to confirm there is no problem, which should occur during an LFI.

221. Section 9.2.4.1.5, Page 9-18

Provide information on how, when, or if the RARA program will remediate these basins.

- 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.

226. Section 9.3.4, Page 9-22, first paragraph

State that remediation of these cribs under CERCLA can be provided such that remediation occurs no later than it would under the existing RCRA milestones.

227. 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.

228. Table 9-1, Page 9T-1a to 9T-1d

The candidate sites recommended for evaluation and implementation under other AAMs or programs such as RCRA and Hanford Surplus Facilities Program should be listed in this table under a separate column.

CHAPTER 10

229. Section 10.0, Page 10-4

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

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