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**Department of Energy**  
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MAY 18 1995

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Department of Ecology  
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Mr. Douglas R. Sherwood  
Hanford Project Manager  
U.S. Environmental Protection Agency  
712 Swift Boulevard, Suite 5  
Richland, Washington 99352

Dear Messrs. Alexander and Sherwood:

TRANSMITTAL OF THE FINALIZED REMEDIAL INVESTIGATION/FEASIBILITY STUDY REPORT  
FOR THE 300-FF-5 OPERABLE UNIT, REV. 0 (DOE/RL-94-85)

The U.S. Department of Energy (DOE), Richland Operations Office (RL), is transmitting the finalized subject document (Enclosure 1). The document incorporates U.S. Environmental Protection Agency (EPA) and State of Washington Department of Ecology (Ecology) comments as documented in "Responses to EPA and Ecology Comments" (Enclosure 2).

If you have any questions regarding the subject document or responses to comments, please contact Mr. R. G. McLeod on (509) 372-0096.

Sincerely,  
  
K. Michael Thompson  
Acting Hanford Project Manager

- Enclosures:  
1. 300-FF-5 RI/FS Report  
2. Comment Dispositions

cc: See page 2



Messrs. Alexander and Sherwood

-2-

MAY 18 1995

cc w/encl. 1 only:

M. Bauer, YIN  
L. Block, USFW  
R. Buck, Wanapum  
C. Burford, CTUIR  
J. Carlton, WDFW  
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J. Jakabosky, BLM  
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D. Einan, EPA (4 copies)  
W. Soper, Ecology (4 copies)

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H. Rueben, Nez Perce  
R. Stanley, Ecology

**RESPONSES TO EPA AND ECOLOGY COMMENTS  
REMEDIAL INVESTIGATION/FEASIBILITY STUDY REPORT  
FOR THE 300-FF-5 OPERABLE UNIT  
May 8, 1995**

1. **Executive Summary, page ES-8, last paragraph**

Change the last full sentence on the page to read ". . . groundwater containing contaminants above MCLs will continue to discharge to the Columbia . . ."

**Response: Comment accepted.**

2. **Executive Summary, page ES-2, first bullet**

How will connecting to the Richland Sewer system eliminate the source of coliform bacteria?

**Response: Comment accepted.**

3. **Executive Summary, page ES-4, first bullet**

Show on a map well 399-1-16B and the DCE plume.

**Response: Accept in part. The well is shown on Figure 2-2; a reference to this figure will be included. Plume maps are not practical because significant DCE concentrations are seen at only one well cluster location. Low concentrations are sporadic in a few other wells.**

4. **Executive Summary, page ES-10**

The concluding paragraph raises more questions and red flags than it answers. The paragraph should either be completely rewritten or deleted entirely.

**Response: Comment accepted.**

5. **Section 2.1.4**

Provide a table summarizing the soil sampling results.

**Response: Comment accepted in part. The information in Section 2.1.4 refers to the Phase I RI. Additional soil investigation was not performed for the Phase II RI; therefore, no new information was generated for inclusion here. References to the Phase I RI for 300-FF-5 and the RI for 300-FF-1 will be included.**

6. **Section 2.1.5.1, page 2-4**

Reference Figures 2-7 through 2-9.

**Response: Comment accepted.**

7. **Section 2.1.5.5, page 2-5**

Need to discuss the modeling effort in much more detail, e.g., which models were used, what were the results, etc. Provide references to these models.

**Response: Accept in part. The model is discussed in Section 2.4; this reference will be included.**

8. **Section 2.1.7.1, page 2-6**

Provide a summary of the results of the biological surveys.

**Response: Accept in part. References to those sections in the document where this information is discussed will be included.**

9. **Section 2.2, page 2-7, last two bullets**

Provide figures showing plumes and concentration contours.

**Response: Accept in part. The plumes are discussed in Section 2.3.2 and the general shapes and locations of the plumes are shown on Figure 2-18. This figure will be referenced.**

10. **Section 2.2.2, page 2-8**

Reference Figures 2-7 through 2-9.

**Response: No change. These figures are referenced in the next to the last sentence of the first paragraph of this section.**

11. **Section 2.2.3, page 2-9, third paragraph**

Please elaborate on the preferential groundwater flow paths and show on a figure.

**Response: No change. This information is included in the referenced document. The FS contains a summary of the information; details can be obtained through the reference.**

12. **Section 2.2.3, page 2-9, fourth paragraph**

Remove the reference to dilution.

**Response: Comment accepted.**

13. **Section 2.2.9, page 2-26, first paragraph**

The last sentence states that "The Columbia River may be considered a sensitive environment . . .". Is this a true statement and does this trigger additional NEPA considerations?

**Response:** Comment accepted in part. The paragraph was clarified. According to PNL-6415, Rev. 4 (Cushing 1994), the Hanford Reach of the Columbia River is considered to be a culturally sensitive area because of the extensive use of this area by Native American communities and the large number of cultural resources found in this region.

14. Section 2.4.1, page 2-31, first paragraph

The last sentence of this paragraph is misleading. The referenced strategy document is not addressing tritium remediation strategies. Tritium remediation strategies are being evaluated a separate TPA milestone M-26-05.

**Response:** Comment accepted.

15. Section 2.4.1, page 2-31, last paragraph

Don't we know from soil samples what form the uranium is in, solid or floc?

**Response:** Comment accepted in part. The sentence is confusing and will be edited for clarity. Additional discussions are presented in Section 4.3.2.

16. Section 2.4.2, page 2-32, last paragraph

Show these calculations.

**Response:** Accept in part. This information is presented in its entirety in the referenced document. The average and maximum proportionality factors will be listed on Table 2-14.

17. Section 2.5.1, page 2-35, first paragraph

What is the HQ of 0.2 for?

**Response:** Comment accepted.

18. Section 2.1.5.1, page 2-35, fourth paragraph

Delete the sentence beginning "It is unreasonable to identify . . . ."

**Response:** Comment accepted.

19. Section 2.5.2, page 2-37, first paragraph

Provide more information on the "aquatic receptors"

**Response:** Comment accepted. Additionally, a figure representing Columbia River food web will be added.



20. **Section 2.6.2, page 2-39, sixth paragraph**

Expand the whole discussion about Chromium. As with the 100 areas, if chromium is detected in the groundwater, it should be evaluated as Chromium (VI). If this is the case, is Chromium (VI) now a eco-driver in the 300 area?

**Response:** Comment accepted in part. Chromium is not considered an eco-driver for the 300 Area. Information supporting this position was discussed in 300-FF-1 and will be incorporated in FF-5.

21. **Figures 2-7 through 2-9. pages 2F-7 to 2F-9**

The Hanford Formation (Fm) has a considerably higher hydraulic conductivity than the underlying Ringold Fm therefore the velocity and direction of ground-water flow is highly dependant on whether or not the Hanford Fm is saturated. If these figures were drawn with a vertical exaggeration of 20X (or so), and the water table shown, it would be easier to conceptualize ground-water flow in the Operable Unit. An alternative would be to include a map of the approximate distribution and thickness of the saturated Hanford materials (a graphical representation of the data in Table 2-7). An average river stage could be used for that map.

**Response:** Comment accepted in part. Figures 3-17 through 3-20 in the Phase I RI show the structure and thickness of various units, including the Hanford/Ringold contact. These figures contain the requested information and will be referenced at the callout to Figures 2-7 through 2-9.

22. **Section 4.2.1.2, page 4-4**

More information is needed on the blank adjustment process.

**Response:** Comment accepted.

23. **Section 4.2.2, page 4-6, second paragraph**

Should Chromium (VI) be included in this list?

**Response:** No change. See response to Comment 20.

24. **Section 4.2.3.1.1, page 4-9, second paragraph**

Is there a need to do any more sampling for Ru-106? Will it be added (put back in) to the list of contaminants to be analyzed for? Is it necessary to know the occurrence and concentration distribution?

**Response:** No change. The need to do additional analysis for ruthenium-106 is not anticipated because of the short half-life of the radionuclide (approximately 1 year).

25. Section 4.2.3.2, pages 4-10 through 4-12

This section discusses procedures used to refine the list of contaminants of potential concern (COPCs). These procedures are in addition to the risk-based screening procedure discussed in Section 3.1 of the Hanford Site Risk Assessment Methodology (HSRAM). The additional screening criteria include eliminating contaminants from consideration if the maximum detected concentration is less than a hazard quotient or the contaminant's MCL. These additional screening criteria are not presented in HSRAM and should not be used to screen out COPCs in this or future risk assessments. Removing a contaminant based on a hazard quotient of 1.0 eliminates the discussion of multiple contaminants with hazard quotients of less than 1.0. This does not present a problem for this particular risk assessment because of the limited number of COPCs, but could be a concern for future risk assessments. MCLs and other potential applicable or relevant and appropriate requirements (ARAR) and risk-based screening concentrations are compared to the maximum detected contaminants concentration. A contaminant is retained if it is above *any* of the risk-based benchmark concentrations; the maximum detected concentration does not have to exceed all the risk-based benchmark concentrations.

**Response:** No change.

26. Section 4.3.1, page 4-17

The text references Figures 4-6 and 4-7, but those figures are missing.

**Response:** Comment accepted.

27. Section 4.3.3, page 4-19, sixth paragraph

In discussing the adsorption tests, the text describes the results on the coarse material in some detail. It goes on to say that "sorption on the fine-grained sample was considerably higher . . ." This leaves the reader in need of more information as to what those results are and what bearing they have on 300-FF-5.

**Response:** Comment accepted.

28. Section 4.4.1.1, page 4-24, second paragraph

This paragraph discusses the removal of antimony as a COPC. The text states that as long as Well 399-4-12 is not used as a drinking water source, antimony does not present a risk. However, according to the Phase I remedial investigation report, future industrial exposures to groundwater are evaluated for ingestion, dermal contact, and inhalation of volatiles. Therefore, antimony should be retained as a COPC.

**Response:** Comment accepted in part. The text will be revised to state that the reason antimony is not a COPC is because of infrequent detection i.e, only 2 detections out of 88 samples in rounds 5 through 7 and only 2 out of 209 samples for all the sampling rounds. Antimony was detected in round 7 in wells 399-4-12 and 399-3-12; however, both detections were associated with filtered samples. The associated unfiltered samples were nondetects.

29. **Section 4.4.2, page 4-25, second paragraph**

The text states that groundwater concentrations were used to "represent Columbia River concentrations". This is incorrect. Groundwater concentrations were used to represent **exposure point** concentrations. Furthermore, relying on the dilution of the river in this context is inappropriate.

**Response:** Comment accepted in part. The term "exposure point" will be substituted; however, the statement on dilution is a statement of actual natural processes.

30. **Section 4.4.2, page 4-26**

In general, the text on this page seems pointless. In particular, the prediction of groundwater concentrations in 2018 without discussing the concentration profile until then is useless. Delete the text.

**Response:** Comment accepted in part. The discussion of the RI modeling will be removed.

31. **Section 5.1.2, page 5-5, first bullet**

A reference to a figure would be very helpful.

**Response:** Comment accepted in part. Figure 2-2 will be referenced. However, because the DCE, TCE, and nickel are associated mainly with single well locations, plume maps are not practical.

32. **Section 5.1.2, page 5-6, third bullet**

Delete the phrase "by the year 2018" from this RAO. Then, in the text, add that concentrations will be achieved as quickly as practical, not later than 2018.

**Response:** Comment accepted.

33. **Section 5.1.2, page 5-5 to 5-6**

A remedial action objective of "Protect the Columbia River" needs to be added.

**Response:** Comment accepted. An RAO will be added as follows:

4. **Protect the Columbia River such that 300-FF-5 discharges do not result in concentrations in the river above human health and environmental criteria.**

34. **Section 6.0, page 6-1, fourth paragraph**

This paragraph describes that assumptions were used to develop the conceptual designs of some of the potential alternatives. That is acceptable, but, are the assumptions representative of the potential actions? Do they represent bounding conditions? The RI/FS (including remedy cost estimates) will be used to prepare budget requests and therefore the potential alternatives described must, at a minimum, be bounding conditions. Better still, they should be representative so that costs are not over-estimated.



**Response:** No change. The costs are representative for the FS level of detail for alternative design. Costs will be refined as conceptual models are refined.

**35. Section 6.3.3.1, page 6-25, last paragraph**

The paragraph describes detectable concentrations in springs and near-shore water. Are the concentrations such that institutional controls are necessary? Are institutional controls feasible? Should other actions be pursued? A bunch of signs that say "Don't come close or you'll get crapped up" would be "bad press." This also applies to the third full paragraph on page 6-27.

**Response:** Comment accepted in part. The paragraph will be eliminated.

**36. Section 6.3.4.2, page 6-30, first paragraph**

The text states that groundwater concentrations of uranium would be reduced to below MCLs upon completion of remedial action, in an estimated 3 to 10 years (from late 1993) for the selective hydraulic containment alternative (Alternative C). For Alternatives A (no action) and B (institutional controls), the same time frame (3 to 10 years) is said to reduce the groundwater concentrations of uranium below the MCL (Sections 6.3.2.2 and 6.3.3.2.) The remediation time frame for Alternative C may be less than that for Alternatives A and B. If Alternative C takes the same time to meet the remediation goal for uranium as do Alternatives A and B, then the purpose of proposing an expensive alternative (costing anywhere from \$6 to \$39 million) is not clearly explained, but should be. This comment is applicable to Alternative D (Section 6.3.5.2) as well.

**Response:** Comment noted. This fact points to the ineffectiveness of pump and treat in the hydrologic environment of the 300 Area. The detailed analysis will be reviewed to ensure that this point is clear. In addition, the list of remedial alternatives was agreed upon in the early stages of development of the FS.

**37. Section 6.3.6.2, page 6-35, first paragraph**

This paragraph states, "Groundwater extraction would eventually reduce groundwater contaminant concentrations to below remediation goals, but would take a long time (possibly exceeding 100 years)." This alternative (selective slurry wall containment) does not meet the RAO of achieving acceptable groundwater concentrations by the year 2018. Also, under the "threshold" criterion of overall protection of human health and the environment, alternatives that do not achieve adequate protection of human health or the environment are eliminated from further consideration. The purpose of retaining this alternative for detailed evaluation should therefore be clearly explained. This comment is applicable to Alternative F (extensive slurry wall containment) in Section 6.3.7 as well.

**Response:** Comment accepted in part. The purpose of retaining this alternative will be discussed in the text.

## 38. Section 6.4.1, page 6-41, fourth paragraph

Alternative A (no action) is ranked equal with Alternatives C and D (hydraulic containment). This is not appropriate since no institutional controls are included in the no-action alternative and exposure from residual contamination would not be prevented under this alternative. Alternatives C and D include institutional controls (such as restrictions on groundwater withdrawal and use) that will reduce or eliminate risk from residual contamination by preventing exposure to contaminants. Therefore, the no-action alternative should not be ranked along with Alternatives C and D, but should be ranked at the bottom of all other alternatives.

**Response:** Comment accepted.

## 39. Section 6.4.2, page 6-42, first paragraph

The alternatives ranking in terms of the reduction of toxicity, mobility, or volume through treatment is not correct. There are significant differences between Alternatives C, D, E, and F in the reduction of toxicity, mobility, or volume through treatment. The groundwater extraction rate using Alternative D (2,600 gallons per minute [gal/min]) is 52 times greater than the extraction rate using Alternative F (50 gal/min). The reduction in contaminant volume through extraction and treatment using Alternative D is therefore substantially greater than that associated with Alternative F. Similarly, the groundwater extraction rate using selective hydraulic containment (Alternative C) (300 gal/min) is 6 times greater than the extraction rate using Alternative F (50 gal/min). The reduction in contaminant volume through extraction and treatment under Alternative C is therefore greater than that associated with Alternative F. Alternatives A (no action) and B (institutional controls) do not provide treatment. The alternatives should therefore be ranked as follows for this criterion (most to least treatment):

- |   |   |                      |
|---|---|----------------------|
| 1 | - | Alternative D        |
| 2 | - | Alternative C        |
| 3 | - | Alternative F        |
| 4 | - | Alternative E        |
| 5 | - | Alternatives A and B |

Table 7-1 should be revised accordingly as well.

**Response:** Comment accepted.

## 40. Section 6.4.6.2, page 6-46, fourth paragraph

The second-to-last sentence says "capping 300-FF-1". We have not reached that decision. An alternative site may be ERDF.

**Response:** Comment accepted in part. The implication of the parenthetical statement is that the cap at 300-FF-1 would require significantly larger volumes of borrow material than 300-FF-5. This will be modified, however, to state "e.g., potential soil cover at 300-FF-1."

41. **Section 6.4.6.8, page 6-48, second paragraph**

Why are wildlife habitat and recreation incompatible with potential remedies at 300-FF-5? They had better not be.

**Response: Comment accepted. The last part of the sentence will be removed.**

42. **Section 6.4.6.11, page 6-50, second paragraph**

This paragraph states that alternatives will "continue to restrict public access to the Columbia River shoreline." DOE does not currently have the authority to restrict access to the shoreline so how will this be implemented?. Also, the paragraph should specify 300-FF-5 shoreline.

**Response: Comment accepted in part. The paragraph will be removed.**

43. **Section 7.1.1, page 7-1, second paragraph**

The second sentence ("There is no evidence of an imminent and substantial . . .") must be deleted!

**Response: Comment accepted.**

44. **Section 7.2, page 7-3, first paragraph**

List number of the production well.

**Response: Comment accepted.**

45. **Table 7-1, page 7T-1**

Include, as a footnote, the discount rate and evaluation period.

**Response: Comment accepted.**

46. **Appendix E, Table E-1, page E-3**

This table should include as a to-be-considered requirement the RCRA Subpart S, Corrective Action, action levels. Although the action levels have not been promulgated, they can be used as guidance for determining when contaminant levels should be further assessed.

**Response: Comment accepted.**

47. **Appendix E, Table E-1, page E-5**

Table E-1 identifies the Wild and Scenic Rivers Act as a to-be-considered requirement because of the proposed inclusion of the Hanford Reach on the national list of wild and scenic rivers. Because this act is in effect and the Hanford Reach is proposed for inclusion on the national list it would seem more appropriate to classify this act as relevant and appropriate. The classification of this act as to-be-considered and not relevant and appropriate should be explained in detail.

Table E-1 identifies the Hanford Reach Comprehensive River Protection Study and Interim Protection act as a to-be-considered requirement. However, the comment section describes the act as applicable to remedial actions performed at 300-FF-5 since the operable unit shoreline is within the study area. This apparent discrepancy should be further explained in the text or corrected on the table.

**Response:** Comment accepted in part. Because the section of the Hanford Reach adjacent to or affected by the 300-FF-5 Operable Unit has not been proposed for inclusion on the national list of wild and scenic rivers, these acts are not applicable; however, because of the close proximity to the study, these acts are relevant and appropriate for 300-FF-5 Operable Unit. This will be clarified in the ARAR table.

The following comments are typographical in nature. While they should be addressed, they are provided for information only and do not require a written response.

**Response:** Comments accepted except as noted.

1. Executive Summary, page ES-7

Under Alternative 1, the last phrase should be "...expected decrease..." rather than "exported"

2. Section 2.1.1, page 2-1, last paragraph

Change "200-FF-5" to "300-FF-5"

3. Section 2.2.5, page 2-11, second paragraph

The second-to-last sentence discussing precipitation during December and February has no verb.

4. Page 2-24, last paragraph

There is an extra parenthesis in the latin names for crappie "(Pomoxis annularsis) and nigromaculatus)"

5. Section 2.3, page 2-26

This section introduces the term contaminants of potential concern and assigns an acronym of "CsOPC". This is incorrect. An acceptable acronym is COPCs. This applies throughout the document.

6. Section 2.4.1, page 2-31, last paragraph

The second sentence states "The possibility exists that uranium flow ...." It should be uranium floo.

**Response:** Comment accepted in part. The term will be eliminated.

7. **Section 2.4.1, page 2-32, first full paragraph**  
Delete the English conversions (lb/gal) from the concentrations in  $\mu\text{g/L}$ .
8. **Section 3.1, page 3-1, first paragraph**  
Delete the acronym PUD. It is not used again in the document and therefore not necessary.
9. **Section 4.2.1.5, page 4-5, second full paragraph**  
Change the acronym LICR to simply ICR.
10. **Section 4.2.3.1.1, page 4-8, fifth paragraph**  
The last sentence in this paragraph references Section 4.2.3.3, which does not discuss TCE/DCE.
11. **Section 4.2.3.1.1, page 4-9, fifth paragraph**  
The bold heading "Tritium" is missing from this paragraph.
12. **Section 4.2.3.1.3, page 4-9**  
The third sentence states that 0.5 'slightly above' 0.55.
13. **Section 4.3.4, page 4-21, second line**  
It is inappropriate to use "1.00 E-06". Should use simply "1 E-06" or " $1 \times 10^{-6}$ ".
14. **Figure 4-3, page 4F-3**  
The figure shows DCE concentrations but is titled "TCE Concentrations . . . ."
15. **Table 5-4, page 5T-4**  
The unit " $\mu\text{g/L}$ " should be substituted for " $\mu\text{/L}$ " in footnote a.
16. **Section 6.2.8, page 6-19, eleventh bullet**  
This should be re-worded to "Establish buffer zones and use temporal restrictions to minimize conflicts with wildlife.
17. **Section 6.4.6.1, page 6-46, top of page**  
There should be a comma after "minimal"