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Dedicated to protecting and improving the health and environment of the people of Colorado

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Colorado Department
of Public Health
and Environment

February 8, 2005

Joseph A. Legare
Director, Project Management Division
U.S. Department of Energy
Rocky Flats Field Office
10808 Highway 93, Unit A
Golden, Colorado 80403-8200

RE: Draft IM/IRA for Groundwater at RFETS

Dear Mr. Legare:

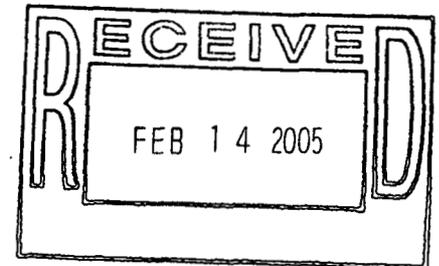
The Colorado Department of Public Health and Environment, Hazardous Materials and Waste Management Division has reviewed this draft document and provides the attached comments to revise it. This document represents a good effort to address the many aspects of understanding and evaluating the site ground water contamination with the goal of protecting surface water. However, comments on many supporting documents have not yet been resolved therefore it is not as complete as we expected.

If you have any questions regarding this correspondence please contact me at (303) 692-3367 or Elizabeth Pottorff at 303-692-3429.

Sincerely,

Steven H. Gunderson
RFCA Project Coordinator

cc: Mark Aguilar, EPA
Dave Shelton, K-H
Mark Sattelberg, U.S. F&W
Norma Castaneda, DOE
Karen Wiemelt, K-H
Larry Kimmel, EPA
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Christine Dayton, K-H



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**Colorado Department of Public Health and Environment
Comments on the Draft IM/IRA for Groundwater at the Rocky Flats
Environmental Technology Site**

General Comments

This document represents a good effort to address the many aspects of understanding and evaluating the site ground water contamination with the goal of protecting surface water. However several new protocols for assessing data outside the structure of Standards or the RFCA agreement for ground water were used that made it difficult to understand the logical progression. Use of the SW PRG and 10 times the SW PRG made it difficult to assess whether or not the Surface Water Standard would be met. Supporting documents were not completed, such as the Soil and Groundwater Technical Memorandum, the Final Fate and Transport Modeling Report, and the Plume Treatment System Report, that might have helped assess this document.

Another area of difficulty with this document is the lack of coordination with the ER investigation of soil contamination. A number of ER RSOP Data Summary Reports or Closeout Reports deferred evaluation of the soil contamination to this document; however, a crosscheck of those deferrals was not included. The previous soil removal actions for the Mound and East Trenches are not evaluated despite the lack of decreasing trends in performance monitoring wells. The State and EPA suggested evaluation of reduction in long-term operation of the treatment systems by additional source remediation in the scoping meetings for this document.

This document needs to be strengthened by the inclusion of the compliance structure developed in the IMP process. Goals are not set for any of the remedial activities nor are any contingency plans offered.

Specific Comments

1. Section 1.6 (page 1-5)

This section never seems to establish RAOs, but rather "evaluation criteria", which are the RAOs from the *Groundwater and Soil Remediation Action Objectives Technical Memorandum*. It is unclear why this decision document does not call these specific criteria RAOs. Because the purpose of this IM/IRA (to determine appropriate accelerated actions) is different than the Tech Memo (to establish final objectives), the RAOs should be compatible, but not necessarily the same. The Tech Memo is currently being reviewed and changes have been proposed for some of the groundwater RAOs.

The first objective is for groundwater to meet surface water standards at AOC boundary wells. The purpose of the AOC boundary wells is to monitor the potential spread of

contaminant plumes from an uncontaminated location outside the plume. They are, therefore, not appropriate as a measurement to drive accelerated actions.

If the second objective allows 10^{-5} risk from the groundwater ingestion pathway, and a WRW receives another 10^{-5} risk from pathways related to surface soil, a total risk of 2×10^{-5} is possible. The "regulatory criteria" to measure this objective are so much higher than other criteria (see Section 3.5) that this objective would never trigger an action that was not already triggered by another objective.

The last paragraph in this section implies that the AAESE will evaluate risks to ecological receptors from seep water. The AAESE is not designed to do that separate evaluation and there is likely not enough data from seep water to perform a meaningful risk assessment.

2. Section 2.2 (page 2-2)

Please revise statement to explain that utility corridor backfill will not be disrupted when it is similar to the surrounding soils but preferential pathways through less permeable materials such as bedrock materials will be disrupted.

3. Section 2.4.2 (page 2-4)

Please reference investigations that assessed the influence of the known and inferred faults on ground water flow and contaminant transport.

4. Figure 3-11

Please provide information about the Solar Pond and East Trenches area wells with U concentrations above the SW PRG.

5. Table 3-3 (page 3-12)

Only the Surface Water Standard is a regulatory criteria, the ground water action levels from RFCA may have some regulatory basis but are not used to make decisions in this document, the SWPRG and 10 X SWPRG are decision criteria without regulatory basis for ground water.

6. Section 4.3.2 (page 4-6)

The original Attachment 5 to RFCA contained Tier II soil action levels that were based on potential impacts to ground water. Use of the Wildlife Refuge Worker risk based approach revising those action levels was supposed to be compensated by the subsurface soil risk screen. That assessment deferred investigation further of potential ground water sources to this IM/IRA. The generic approach used here assumes all chemical behavior in soil is the same, regardless of chemical properties. This section adds yet another screening tool, a logarithmic scale used to display the thousands of subsurface soil results. The discussion says the figures were intentionally not keyed to RFCA soil action levels because they are not pertinent to the ground water IM/IRA, which is true, but the discussion does not say why the logarithmic screening method is appropriate.

7. Section 4.4.2 (page 4-8)

The text references K-H, 20004f, which is listed as the "Final Fate and Transport Modeling of Volatile Organic Compounds at RFETS", issued in April. We were not aware this report had been finalized from the Draft Final we reviewed and commented on in March 2004.

8. Section 4.3.3

The expected links between subsurface soil contamination information derived from the IABZ SAP and ERRSOP process to characterize sources of ground water contamination have not been thorough enough. The promise has been to defer investigation further of potential ground water sources to this IM/IRA. There have been 2 areas where further investigation was handed off to K-H Water Programs for further investigation as appropriate, 300-1 and 900-2, this is not documented in this section. There is another area that has not been handed off for further investigation despite our comments in November of 2003:

"IHSS 182 results indicate the presence of chlorinated organics in the surface and sub-surface soils. Section 3.1.1, Characterization of IHSSs, PACs and UBC Sites, of the IABZSAP in Study Boundaries 3 states, "Soil will be considered from the land surface to the top of the saturated zone or top of bedrock, as appropriate." In Decision Rules 3. "If each PCOC has been adequately documented with respect to concentrations and three-dimensional locations for IHSSs, PACs, or UBC Sites, the nature and extent are adequately defined. Otherwise PCOCs have not been adequately characterized, and additional sampling and analysis are necessary." The Division remains concerned that contaminated ground water was sourced from, or adjacent to, this IHSS but that investigations to date have not adequately identified the source. Ground water Tier I levels of VOC are known at well 40099. Depth to ground water in this area is about 17 feet. The low levels of PCE in sample locations BX36-002 and -003 at 0.5 to 2.5 indicate VOCs may be present and could be at higher concentration at greater depth. The soil in this IHSS has not been adequately characterized to a depth consistent with the known transport behavior of PCE in soil. RFETS must address this issue in the context of this investigation."

The response to that comment is in the following text from Page 68 of the 400-3 Data Summary Report in the Subsurface Soil Risk Screen:

"Low levels of VOCs (above detection limits but below ALs) found in the soil samples west of building 444 could be related to groundwater contamination in the area. These results will be addressed as part of the Sitewide groundwater decision document."

Appendix E is referenced for additional information but it does not capture the areas where further investigation of ground water was deferred to the GW IM/IRA. This was a specific request we made of this document that the deferrals made in the ER RSOP process be covered.

The concluding text says several source areas have been addressed with accelerated action discussed in section 4.6 that briefly summarizes the actions in Table 4-2. This whole section needs to be strengthened with inclusion of the IA Characterization document place-holders, this is where the detailed evaluation of soil sampling and analysis took place, or not. In the case of 400-3, the criticism of incomplete characterization might change the need for further evaluation. The evaluation track of the IM/IRA goes on to cite the modeling, which used assumed source concentrations. Somewhere buried in the details of that report are the details of the source concentration used to simulate that PSA. But, no matter how well it appears to reproduce what is seen today if there is a soil source left there and all the asphalt in the area is removed there is strong possibility that the sentinel wells left in place are going to trigger action in a few years.

9. Table 4-1 (page 4-7)

This table was not corrected from the previous draft. If the locations listed under Nitrate greater than 10,000 mg/kg below the Present Landfill Pond and Uranium greater than 1000 pCi/g at the Ash Pits are correct, then impacts to ground water have not been adequately evaluated for these areas. These areas are not mentioned in section 4.4.1.2 or listed in Table 4.3.

10. Section 4.4.4 (page 4-14)

The Annual Plume Treatment System Report for 2003 data was not received in time to aid in the assessment of this IM/IRA. If modeling has not been used to assess the performance of the plume treatment systems, how has this assessment we requested been done and when will it be delivered?

11. Section 4.4.4.2 (page 4-15)

Modeling is usually performed for a calendar year, please detail the conditions used in modeling Fiscal Year 2003.

12. Section 4.4.4.2 (page 4-16)

One of our comments on the Fate and Transport Modeling Report requested modeling results above the surface water standards at ground water discharge areas. That information would be helpful to us in the evaluation of this IM/IRA.

13. Section 4.6 (page 4-17)

There is no evaluation of the effectiveness of previously completed accelerated actions. Soils were excavated to various action levels and ground water monitoring installed downgradient to monitor for improvements to ground water quality. The lack of improvement in some areas is one of the drivers for several of the proposed actions in this IM/IRA.

14. Table 4-3

A column in this table would be a good place to bring in the information from the Closeout Reports and Data Summary reports that defer possible ground water impacts to the IM/IRA.

15. Figures 4-24 through 4-33

Please choose a better color alternative than blue and green. As printed, they are very difficult to distinguish.

16. Section 5.1 (page 5-1)

Somewhere in this logic the question needs to be asked, "has the plume been sufficiently characterized?" Additional logic that should be added is an evaluation of the length of time a plume treatment system will be needed to control contaminant flux to surface water discharge locations. This would allow consideration of further source reduction upgradient of plume collection and treatment systems that could reduce the long-term stewardship costs for those systems. Page 5-2: The summary does not mention RAO 3 screening also includes modeled data.

17. Section 5.3.1 (page 5-4)

2. We support this use of the ICP/MS data.

18. Section 5.4.2.2 (page 5-7)

The average of all the sensitivity runs done in the VOC transport modeling should not be the value used in this assessment. We would suggest using the number of the analyses that were above the 10 X SW PRG of the total runs for that PSA and analyte.

19. Section 5.5.2.2 (page 5-9)

We suggest a similar comparison to surface water standards for all the model runs, not just the average of the runs.

20. Section 6.2.1.1 (page 6-4)

Compliance with ARARs should say that under RFCA, surface water at all locations in Segment 5 will meet surface water standards and compliance will be measured the Ground Water AOC well located downgradient of the plume pathway from this remedial action. This comment applies also in Section 6.2.2.1, page 6-7, Section 6.2.3.1, page 6-8 and Section 6.2.4.1, page 6-9.

This text was written under the assumption that Building 771 footing drains would be disrupted but recent events have made evident the consequences of a change in that decision. Closeout reports for all ER Accelerated Actions require documentation of pipes, slabs and residual contamination, similar information should be provided from D&D. This information should be developed into a GIS accessible database for use in evaluating future exceedances at long term monitoring wells.

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21. Section 6.3.1.1 (page 6-13)

What is the basis for the 5-year time frame for compliance with surface water standards? The AOC well for this plume is located above Pond B-5. A goal of this remedial action should be to meet surface water standards in well 23296. The AOC compliance comment also applies to Section 6.3.2.1, page 6-14.

22. Section 6.3.2 (page 6-14)

This section discusses the ETP project, not the SPP project. Please state that the Fish & Wildlife Service will be included in the consultative process to develop this work plan. Concerns have been raised about the number of trees available on short notice to proceed with Spring '05 planting. An AOC well has also been designated for the Solar Ponds plume in North Walnut Creek. A goal of the remediation should be to meet surface water standards at all locations.

Appendix D does not directly reference the modeling predicting stream flow/ underflow in South Walnut Creek.

23. Section 6.4 (page 6-16)

Please provide data cited supporting the location of the residual plume. The next paragraph is confusing, it discusses the existing collection system then seems to switch gears and offer reasons why an additional collection system in this location is impractical. A typographical error referencing Woman Creek rather than North Walnut Creek adds additional confusion.

25. Section 6.4.1 (page 6-16)

Again, please state that the Fish & Wildlife Service will be included in the consultative process to develop this work plan. Please discuss existing vegetation. This area is prime PMJM habitat. Please quantitatively assess the expected benefits versus takings costs. Concerns have been raised about the number of trees available on short notice to proceed with Spring '05 planting.

26. Section 6.4.1.1 (page 6-17)

An AOC well has also been designated for the Solar Ponds plume in North Walnut Creek. A goal of the remediation should be to meet surface water standards at all locations.

27. Section 6.5 (page 6-18)

The VOC fate and transport modeling for this source area shows a distinct flow path to the northwest that is not captured by the Mound Plume collection system or the French drain. Although this could be due to a lack of subsurface data in the model this needs to be resolved by revisiting the model with top of bedrock data, residual contamination from the RSOP accelerated action, and the final design of Functional Channel # 5.

28. Section 6.5.1.1 (page 6-19)

Compliance with Surface Water Standards must be demonstrated at the AOC well in South Walnut Creek. A goal of the remediation should be to meet surface water

standards below the treatment system in South Walnut Creek. This comment applies to Section 6.5.2.1, page 6-20, and Section 6.5.3.2, page 6-23.

29. Section 6.5.3.1 (page 6-22)

Experience with site construction would indicate that the relationship of the French drain to the bedrock surface may not be consistent. While it may capture most of the water it was designed to drain, it may not capture contaminants migrating along the top of bedrock interface. Please provide additional information on how this French drain can be assessed.

30. Section 6.5.3.2 (page 6-22)

We disagree that the effectiveness of the MPTS has been demonstrated for the Oil Burn Pit. Further evaluation as requested above is necessary. Compliance with Surface Water Standards must be demonstrated at the AOC well in South Walnut Creek.

31. Section 6.6.1.4 (page 6-26)

Section 1.4 of Appendix H would indicate a decision has been made about the depth of a source for this alternative. Please include discussion of this decision here.

32. Section 6.6.2.1 (page 6-27)

Surface water standards should be met at the AOC well downgradient of the Ryan's Pit/903 Pad plume.

33. Section 6.6.2.2 (page 6-28)

It would be helpful to discuss the injection method into boreholes and whether any screen or casing will be left in place.

34. Section 7.4 (page 7-8)

PCBs have been found in well 91204. A sample from that well shows Aroclor 1254 at 17 ppb.

35. Section 7.6 (page 7-13)

Please add the possibility that new technologies could be considered if future action is needed.

36. Section 7.7 (page 7-13)

What are the DQOs for the performance monitoring wells? Table 7-2: Well 18299 should also be used for long term monitoring of the 118.1 plume. It is also screened in the Arapahoe Sandstone and covers flow to the northeast of the IHSS. Ponds B-2 and B-3 are more impacted by the East Trenches residual plume, they should be the locations used to assess the goal of meeting surface water standards. Figure 7-6 also posts wells 95099 and 95299 downgradient of the ETPTS. Page 7-14: Well 70299 is posted on Figure 7-6 and should be included as a Solar Ponds PM well. PCBs and dioxin-like compounds should be monitored in the PM well and in surface water (SW056) downgradient of the Mound/Oil Burn Pit. Well 10304 in Figure 7-6 is posted

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downgradient of the 903 Pad/Ryan's Pit plume. Please make Table 7-2 consistent with Figure 7-6.

37. Figure 7-6

Wells 18199, B210489, and 07391 are missing. Please make this figure consistent with Table 7-2.

38. Section 9.1 (page 9-2)

The last sentence in the 4th paragraph refers to CWQC Reg. 41.5.C.5. However, Reg. 41.6 deals more specifically with POCs, including flexibility.

39. Section 9.1 (page 9-3)

Please state that the surface water quality standards include the Water Supply Use designation, which is protective of drinking water use.

40. Section 9.2 (page 9-3)

Contrary to the second sentence in the first paragraph, the promulgated state surface water and groundwater quality standards are not the same. Most of the surface water standards listed in ALF Table 1 are less than or equal to the equivalent groundwater standards; a few are larger.

Change "Technical Memorandum" in the footnote on page 9-3 to "IM/IRA".

41. Section 9.3.1.2 (page 9-4)

Straw mulch may contain objectionable seeds that interfere with establishing desired vegetation.

42. Appendix D

The Fate & Transport Modeling Report was a stand-alone document supporting this decision document; however to the best of our knowledge it has not been issued in final format. The information presented in this appendix is helpful although it is not a thorough documentation of the modeling done to support building closure. Is it actually referenced in the GW IM/IRA text? What conclusions of the decision document is this information intended to support? Will more thorough documentation of this modeling be published in other site documents, particularly those documenting building D&D decisions?

43. Section 4.1.2 (page D-7)

Please relate this modeling to the GW IM/IRA. Please relate to the AOC well that will demonstrate compliance with surface water standards. Figure D-6, page D-8: Carbon Tetrachloride is the primary contaminant for this PSA, why is only the PCE data shown?

45. Section 4.4.2 (page D-9)

Please relate this modeling this modeling to the GW IM/IRA. Figure D-8 is difficult to understand, are the ground water depths below ground surface or above weathered

bedrock? A recommendation from this modeling was to leave the Building 881 walls impermeable to prevent transport of the Building 883 plume to the south. The explosive demolition of Building 881 most likely made the walls more permeable. The implication is that a preferential flow pathway has been created for this plume. Should this plume be re-evaluated with up to date assumptions in the model? Please relate to the AOC well that will demonstrate compliance with surface water standards.

46. Section 4.3.2 (page D-13)

Please relate this modeling to the GW IM/IRA and tie to the decision dropping this area from further consideration. Please relate to the AOC well that will demonstrate compliance with surface water standards.

47. Section 4.4.2 (page D-17)

Please relate this modeling to the GW IM/IRA and tie to the decision dropping this area from further consideration. Please relate to the AOC well that will demonstrate compliance with surface water standards.

48. Appendix E, Section 1.1 (page E-2?)

Second paragraph discusses simulated discharge areas in the Woman Creek drainage, Figure E-1 shows discharge areas in the Walnut Creek drainage, please correct. Please relate discharge concentrations to surface water standards at the discharge locations.

49. Section 1.2 (page E-3?)

Please note that this model does not contain the Mound Plume treatment system or assess its efficacy. Please provide a figure showing the extent and depth of the Arapahoe Sandstone. Please relate concentrations to surface water standards.

50. Appendix G

As agreed at a consultative process meeting on 2/3/05, this area will be re-modeled to assess the capture of the Mound Plume treatment system and intercepted French drain using the most current data developed from the Oil Burn Pit excavation, including the newly discovered alignment of the storm sewer line.

51. Appendix H, Section 1.2 (page H-2)

The discussion suggests this area (903 Pad?) is not a major contributor to ground water contamination based on the modeling results. The Fate and Transport modeling results suggest that the DNAPL has moved into the weathered bedrock, becoming a diffuse source of VOC contamination for 100s of years with concentrations at groundwater discharge locations along Woman Creek exceeding the surface water standard. At what point does the cost of long term monitoring become less cost effective than source reduction?

52. Section 1.4 (page H-3)

The preliminary remediation approach discussed here, to remove soils above action levels in the upper 3 feet and use HRC on contamination as indicated by the Subsurface Soil

Risk Screen, is part of the alternatives analysis and should be incorporated into Section 6.6.3. However the SSRS does not have a defined method for evaluating contaminant levels that would impact ground water and defers the evaluation to the Ground Water IM/IRA. This is either a dead end or an endless loop. Please identify an approvable document beyond this IM/IRA to provide the results of the 903 Pad/ Ryan's Pit investigation and accelerated action decisions. The performance monitoring wells installed for this remediation should be designated sentinel wells and become part of the Closure monitoring network.