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EE/CA SOUTH PLUME
U.S. DOE FERNALD
OH6 890 008 976

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USEPA/DOE-FMPC
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~~**LETTER**~~ comments
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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 5
230 SOUTH DEARBORN ST.
CHICAGO, ILLINOIS 60604

REPLY TO THE ATTENTION OF:

5HR-12

MAR 30 1990

Mr. Raymond J. Hansen
Acting Site Manager
U.S. Department of Energy
Feed Materials Production Center
P.O. Box 398705
Cincinnati, Ohio 45239-8705

Re: EE/CA South Plume
U.S. DOE Fernald
OH6 890 008 976

Dear Mr. Hansen:

On January 3, 1990, the United States Department of Energy (U.S. DOE) submitted to the United States Environmental Protection Agency (U.S. EPA) a preliminary version of a draft Engineering Evaluation/Cost Analysis (EE/CA) for a removal action for the south groundwater contaminant plume at the Feed Materials Production Center (FMPC) site in Fernald, Ohio. The United States Environmental Protection Agency has reviewed this preliminary document and is providing the following comments to assist in preparation of the final draft EE/CA that is to be submitted to U.S. EPA by April 15, 1990.

General Comments:

1. The major areas of the EE/CA that require more detailed information include cost analysis, the contaminant transport model that was used, NPDES requirements, and discharge limits.

2. The assumptions used in calculating risks to potential receptors were not presented.

3. The two documents used in developing risk estimates, U.S. DOE documents 5400.XX and 5480.XX, were not submitted with the EE/CA. A copy of all reference materials should be provided with the final draft EE/CA, so that U.S. EPA can complete the review within thirty (30) days.

Specific Comments:

4. Section ES, Page ES-13: Table ES-1 should address compliance with Applicable or Relevant and Appropriate Requirements (ARARs).

5. Section 2.4.1, Page 2-43: The EE/CA's definition of an operable unit is not consistent with the National Contingency Plan (NCP), which defines an operable unit as a discrete part of an entire response action that decreases a release, threat of release, or pathway of exposure. The EE/CA defines the operable units as geographic areas.

6. Section 1.2.1, Page 2-5: The existing effluent line was installed in 1952, is 4,200 feet long, made of 16-inch diameter cast iron pipe, with a minimum and maximum slope of 0.1% and 12.7%, respectively. The second paragraph states that the same pipeline has a capacity of 6.5 mgd, or 10 cfs. This capacity calculation is not consistent with a minimum slope of 0.1%. The minimum slope required to handle 10 cfs is approximately 2%.

7. Section 2.3, Page 2-29: The uranium concentration presented in Table 2.3 is not consistent with concentrations listed in the analytical database. Uranium concentrations in the database for monitoring well 2015 (round 2) is 175 ug/l, for monitoring well 2068 (round 2 and round 3) is 2 ug/l.

8. Section 2.3, Page 2-34: The concentration contours for observed uranium concentrations shown on Figure 2-11 do not closely match the simulated present-time uranium concentration predicted by the groundwater-contaminant transport model shown in Figure A-2. Since the predictive model does not match, the conclusions of the contaminant transport model are suspect.

9. Section 2.4.3.1, Page 2-45: The statement that organic chemicals in the groundwater are not persistent and are far below MCLs is not sufficiently supported. The data submitted to U.S. EPA indicates that only six out of 29 2000-series wells were sampled for organic analytes and only one was sampled for organics more than once. In addition, none of the 3000-series wells or 4000-series wells were sampled for organics.

10. Section 2.4.3.1, Page 2-45: It is unclear why a concentration of 292 ug/l for well 2061 was used instead of 309 ug/l or 850 ug/l from well 2046.

11. Section 2.4.3.1, Page 2-46: The EE/CA does not present any data to support the statement that uranium is the only contaminant of concern in the south plume.

12. Section 2.4.3.2, Page 2-47: Information on the location and estimated time that contaminated surface waters will discharge to the Great Miami River is necessary to evaluate the passive response actions (Alternatives 1, 2, and 3), as well as active response actions (Alternatives 4 and 5), if project delays become a factor.

13. Section 2.4.3.3, Page 2-47: The statement that potential receptors along "Paddys Run Road to the west reportedly use cisterns with imported water..." does not completely describe the drinking water situation considering the level of contamination and public concern. From the report, it is not clear if a door-to-door survey of private wells was performed. If such a survey was performed, documentation should be presented. The report should include a description of all private wells including those that may be used only for irrigation or animals.

14. Section 2.4.3.3, Page 2-47, Paragraph 3: A justification for the first sentence needs to be presented. The conclusion is questionable. Figure 2-17 and Table 2.3 show that uranium was found in monitoring well 2127 at a concentration of 37 ug/l, above the "derived" concentration of 33 ug/l. This well lies outside the south plume as defined by the EE/CA. There may be other areas outside the plume with groundwater concentrations of uranium above 33 ug/l and groundwater may be used for drinking water, feed-stock watering, or crop irrigation.

15. Section 2.4.3.3, Page 2-47: The EE/CA should provide supporting groundwater monitoring data from the residential and commercial wells which are discussed.

16. Section 3.2, Page 3-2: The identification of a source for uranium from the on-site areas north of the south plume is not consistent with the statement on page 2-44.

17. Section 4.2.3, Page 4-3: Siting a replacement well within the same aquifer, even if it is screened below the expected depth of contamination, is questionable. If this is permitted, extreme care must be taken to ensure well integrity, so that deeper portions of the aquifer are not affected. This option assumes that hydrogeologic conditions are extremely well understood and static, a situation that is not completely supported by current data.

18. Section 4.2.4.1, Page 4-7: The fact that Alternative 5 would generate uranium-containing sludges is not a significant negative factor. The wastewater treatment plant planned for FMPC will generate similar sludges for which treatment and disposal provisions will also have to be made.

19. Section 4.2.4.1, Page 4-7: Two sets of extraction wells should be considered, one near the center of the plume to extract more highly contaminated groundwater and one near the southern edge of the plume to prevent further contaminant migration.

20. Section 4.2.4.1, Page 4-7: The third sentence requires further explanation. It is not clear why "future reliance on...additional remedial action under the RI/FS....would no longer be required."

21. Section 4.2.4.4, Page 4-10: The meaning of the last sentence is not clear. To what level does the present industry treat the groundwater?

22. Section 4.2.4.4, Page 4-11: Any treatment scheme should minimally achieve a net reduction in uranium discharged by FMPC to the Great Miami River. As indicated on page 5-19, current release rates for uranium exceed discharge limits.

23. Section 4.2.4.5, Page 4-11: The definition of the southern plume boundary and the location of proposed extraction wells are not justified by the data presented in Table 2.3 and the well locations in Figures 2-11 and 2-17. Figure 2-11 shows a gap of approximately 4,000 feet in the monitoring well network between wells 2061 and 2094, making it difficult to identify the southern plume boundary. In addition, well 2127, with uranium concentrations of 37 ug/l, is approximately 2,000 feet south of the proposed extraction wells. Finally, Figure 2-17 shows that several residential and commercial wells are located adjacent to and immediately upgradient of the proposed extraction wells.

24. Section 4.2.4.5, Page 4-13: The existing effluent line was constructed in 1952 and may not be large enough to accommodate the additional flow. The pressure and exfiltration test and the surrounding borings should be completed.

25. Section 4.2.4.5, Page 4-13: The EE/CA should present the rationale for pumping groundwater uphill to Manhole 175. The sampling point could be relocated to one of the manholes further down the line, such as Manhole 180. The option of creating a new discharge point should be further developed.

26. Section 4.2.4.5, Page 4-13: It is unclear why recovery wells should have 40-foot screens at the top of the aquifer when data from 3000-series wells indicates groundwater contamination at depths of 75 to 100 feet. The recovery well system should be designed with well screens installed from the top of the aquifer to the bottom of the existing plume in order to increase efficiency in the recovery of contaminants.

27. Section 4.2.4.5, Page 4-13: The last line of the page indicates that six (6) monitoring well clusters will be installed. Figure 4-3 indicates 11 well clusters.

28. Section 4.2.4.6, Page 4-14: Provisions should be made to sample prior to treatment. Central valves and bypasses should be installed so that when contaminant concentrations are below the discharge limits, the flow can bypass the treatment system and increased pumping of recovery wells may occur.

29. Section 4.2.4.6, Page 4-14: If the treatment system is to be operated at 700 gpm when the extraction wells will be producing 1,500 to 2,000 gpm, not all of the contaminated groundwater will be treated. This is not consistent with the intent of the treatment alternative.

30. Section 5.1.1, Page 5-2: The EE/CA does not provide data to support the focus on uranium alone.

31. Section 5.1.1, Page 5-22: The exposure pathway analysis, along with all data and sample calculations, is not included and should be presented in a separate appendix. Section 5 measures the effectiveness of each alternative in protecting public health, using estimated doses to potentially exposed populations. It is not clear how the uranium doses were calculated for: (1) drinking groundwater from the south plume; (2) other exposures to groundwater from the south plume; and (3) exposure to uranium via water from the Great Miami River. The EE/CA should clearly present the assumptions and procedures used to calculate these doses so that the calculations can be independently verified.

32. Section 5.1.1, Page 5-2: The environmental transport model discussed should be presented in an appendix to the document.

33. Section 5.1.1, Page 5-2: References listed (NRC, 1977; USDA, 1970) are not included in the reference list on page R-1.

34. Section 5.1.1, Page 5-3: References listed in this paragraph (DOE, 1988; IT, 1989) are not included in the reference list on page R-1.

35. Section 5.1.1, Page 5-3: An explanation of the assumptions used to derive the acceptable daily intake of 2.7 ug/kg/day should be presented.

36. Section 5.1.1, Page 5-3: An explanation of the assumptions used to convert U.S. DOE guidelines of 4 mrem/yr into groundwater concentrations of 33 ug/l should be presented.

37. Section 5.1.1, Page 5-5: A regulatory citation for the 100 mrem limit should be provided.

38. Section 5.1.2, Page 5-6: The first and second sentences in the second paragraph are contradictory. If the plumes have already mixed, it is not clear how the model results can show otherwise.

39. Section 5.1.2, Page 5-6: The meaning of the last sentence of the second paragraph is unclear.

40. Section 5.1.4, Page 5-7: The discount rate used in the EE/CA is five percent. EE/CA guidance dictates that ten percent be used.

41. Section 5.2.1, Page 5-7: The EE/CA should indicate what groundwater results were used to calculate the maximum dose of 36 mrem.

42. Section 5.2.1, Page 5-8: List the mass of uranium discharge by each user of contaminated groundwater.

43. Section 5.2.1, Page 5-9: Provide the uranium concentration and assumptions used to calculate the hypothetical maximum and average exposures to off-site receptors.

44. Section 5.3.1, Page 5-12: Indicate the groundwater concentrations used to calculate doses for the drinking water pathway. It appears that the concentration is approximately 2.5 ug/l for maximum exposure. Since Alternative 2 is designed only to prevent exposure to concentrations above 33 ug/l, there is no justification for using this concentration as a maximum exposure level.

45. Section 5.3.4, Page 5-13: The third paragraph implies that additional monitoring wells would be installed as a component of Alternative 2. Costs for these wells are not included in the cost estimates.

46. Section 5.3.4, Page 5-13: Cost estimates should be explained in detail in an appendix.

47. Section 5.4.1, Page 5-14: The assumptions concerning the relative amounts of uranium discharges by FMPC and the industries along Paddys Run is not described earlier in the EE/CA as stated in the second paragraph.

48. Section 5.4.1, Page 5-14: Alternative 3 will further decrease uranium releases to the Great Miami River, compared to Alternatives 1 and 2. It is therefore not clear why average doses from exposure to river water (0.5 mrem) are higher for Alternative 3 than for Alternatives 1 and 2 (0.4 mrem -- see pages 5-9 and 5-11).

49. Section 5.4.1, Page 4-15: Alternative 3 includes an alternate water supply and is more protective than Alternative 2. It is not clear why maximum and average doses from drinking groundwater are the same for both alternatives.

50. Section 5.4.4, Page 5-18: Capital costs should include the cost of additional monitoring wells.

51. Section 5.5.1, Page 5-19: The estimated uranium discharge for the first year is too low. Figure A-8 indicates that the average uranium concentration in water withdrawn from the aquifer will be approximately 10 ug/l, assuming equal pumping of all four wells. Assuming continuous operation, and using the relationship between ug/l and pCi/l on page 5-3, the annual loading discharged into the river will increase approximately 27 mCi rather than 6 mCi.

52. Section 5.5.1, Page 5-19: Figure A-9 shows the annual uranium loading to the Great Miami River during the fifth year will be 2,150 pounds, not 1,750 pounds as stated on page 5-19.

53. Section 5.5.1, Page 5-19: Current release estimates for uranium in paragraph 1 (440 mCi/1500 pounds) differs from estimates on page 5-8 (448 mCi/1500 pounds).

54. Section 5.5.1, Page 5-19: The information on actual current releases should have been presented in an earlier subsection of Section 5. Exposure estimates should be based on these actual releases, rather than on discharge limits that may or may not be attained in the future.

55. Section 5.5.1, Page 5-19: Diluting the current FMPC discharge with contaminated water extracted from the aquifer will lower the release concentration, but it will increase the total mass of uranium discharged.

56. Section 5.5.1, Page 5-19: Under Alternative 4, the amount of uranium entering the Great Miami River will increase, compared to Alternative 1 (no action). It is therefore not clear how doses from exposure to river water can decrease from 0.8/0.4 mrem to 0.7/0.3 mrem.

57. Section 5.5.1, Page 5-19: Alternative 4 involves extracting contaminated water from the aquifer. If the amount of contaminated water decreases, it is not clear why maximum doses for the drinking water pathway should increase compared to Alternatives 2 and 3.

58. Section 5.5.2, Page 5-20: The basis for the conclusion that there will be an "improve environmental condition for aquatic biota" is not clear. Under Alternative 4, the amount of

uranium discharged to the Great Miami River will increase, even if the concentration of the discharge will be lower. Any hypothetical concentration effect will be negligible given the flow rate of the discharge (4.5 cfs) compared to the river flow (3,460 cfs).

59. Section 5.5.2, Page 5-21: The decision to locate proposed extraction well so close to residential and commercial properties should be reconsidered. The EE/CA states that existing wells within the principal zone of drawdown for the extraction system are believed to be screened in a deeper aquifer. The screen intervals should be confirmed before finalizing extraction well locations.

60. Section 5.5.3, Page 5-22: Groundwater should be tested for any problematic chemicals.

61. Section 5.5.4, Page 5-22: The cost estimate provided is not adequate. A sufficient amount of supporting information to allow evaluation must be provided.

62. Section 5.6.1, Page 5-24: It is not clear why hazard indices for Alternative 5 (which includes treatment and reduced uranium loadings to the Great Miami River) exceed the hazard indices for Alternative 4 (Page 5-20).

63. Section 5.6.1, Page 5-24: The second sentence of the fifth paragraph should be changed to indicate that the total mass of uranium will not exceed FMPC's discharge limit, rather than the "existing FMPC release value". Existing releases already exceed the discharge limit.

64. Section 5.6.2, Page 5-25: The mass of uranium in the sludge will be less than the mass of uranium in the untreated water pumped to the river under Alternative 4. Proposed techniques for handling the sludge should be outlined.

65. Section 5.6.2, Page 5-25: The amount of uranium sludge generated by Alternative 5 should be relatively small. If handled properly, the sludge should not pose a significant public health or environmental threat.

66. Table 5.1, Page 5-31: The EE/CA should not consider any alternatives that includes the re-injection of groundwater or no action alternative.

67. Table 5.1, Page 5-32: Define Operable Unit 6 under the sixth ARAR.

68. Section 6: The cost figures for each alternative should be justified. The estimates seem to be high.

69. Section 6.3, Page 6-2: Section 5 does not present sufficient data to support or independently verify the last sentence on this page.

70. Section 6.3, Page 6-3: The discharge needs to be treated. Current discharges already exceeds limits and it is a regulatory requirement to meet ARARs. The NCP states that there should be a preference for permanent solutions using treatment technologies.

71. Section 6.3, Page 6-4: The third paragraph should further describe "ongoing plans for a more comprehensive and effective treatment facility" and should state when the facility will be completed. Documentation that this facility will provide effective treatment should also be provided.

72. Section 6.4, Page 6-5: The generation of highly concentrated uranium sludge (third bullet) is not a sufficient reason to reject Alternative 5.

The final draft EE/CA should be submitted to U.S. EPA and the Ohio Environmental Protection Agency by April 15, 1990.

Please contact me at (312 or FTS) 886-4436, if you have any questions.

Sincerely,

Catherine A. McCord
On-Scene Coordinator

cc: Graham Mitchell, OEPA - SWDO