S00023096
SUPERFUND RECORDS

MAR 16 1989

Neil Geitner, Ph.D.
CH2M Hill
6060 S. Willow Drive
Greenwood Village, Colorado 80111-5112

Dear Dr. Geitner:

Enclosed are the U.S. Environmental Protection Agency's (EPA) and the Kansas Department of Health and Environment's (KDHE) comments on the February 25, 1989, draft of the Cherokee County - Galena Subsite Ground Water/Surface Water Operable Unit Supplemental Feasibility Study Report. Additional comments are expected from another reviewer in the near future. Please incorporate the comments into the final report.

As of yet, we have received only one of the five Appendixes. We need to receive and review these documents as soon as possible.

Sincerely yours,

Alice C. Fuerst
Remedial Section
Superfund Branch
Waste Management Division

Enclosure

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REMD ~~SPFD~~
Wright ~~Sanderson~~
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EPA Comments on the Cherokee County Site - Galena GW/SW
OU Supplemental FS Document, February 25, 1989

1. Care should be taken when using the words "mine wastes" and "chat". When discussing the preferred remedy of 1988, both mine wastes and chat should be included.

2. Be sure it is clear in the report that the preferred plan discussed is the February 1988 preferred plan, and that this supplement is not recommending a preferred plan. Also be sure to distinguish between the 1988 OUFS and this supplement to that report.

3. EP toxicity is not an ARAR for the site, but we would like to use the 700 ppm (the equivalent of the EP tox number) as an action level for disposal of wastes at the site. For wastes remaining onsite, we want to use an action level of 1,000 ppm (the health-based criteria). These action levels should be defined in the report. That way the term "action level" can be used instead of "EP toxicity criteria" throughout the report.

4. Be sure to clearly define chat and mine waste rock.

5. A definitions section at the beginning of the report would be useful.

6. Page 1-1, paragraph 1 - State that the ROD was issued in December 1987, and the construction of the water system is expected to be completed by the summer of 1990.

7. Page 1-1, paragraph 2 - The EPA preferred remedy did not include rehabilitating or plugging boreholes, only wells. A correction in the wording is needed.

8. Page 1-1, paragraph 3 - It is not necessary to state that several meetings were held between the PRPs and EPA. Simply state that the PRPs conducted additional field and test work and submitted a new alternative for EPA's consideration. State that work plan for the test work was developed by EPA and that the testing was monitored by EPA.

9. Page 1-2, sentence 1 - a) The sentence should be revised as follows: The results of the additional field work and test work <u>conducted by the EPA and the PRPs</u> led to <u>the decision to review</u> the preferred remedy ... b) Do not use the word "parties" when referring to the EPA and the PRPs in this report. It sounds too adversaral. We would prefer it to be neutral.

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10. Page 1-2, paragraph 1, last sentence - There is not "a comparison of the detailed analyses to the guidance used in the OUFS". There is a comparative analysis using the criteria that was in effect when the OUFS report was written. A correction in the wording is needed.

11. Page 1-2, Background - The background should very briefly explain the public health and environmental risks at the site.

12. Page 1-2, paragraph 3 - The last sentence needs to be reworded. The word "reduced" is inappropriate in the sentence.

13. Page 1-2, paragraph 4 - a) The preferred remedy included the processing of both the mine waste and the milling waste (chat). This should be stated. b) The last sentence should be removed. The quantities should be discussed later in the text.

14. Page 1-3, paragraph 2 - a) The paragraph needs to be reworded because EPA assumed all the mine wastes were a problem, we did not exclude the chat from the remedy. b) The reason "materials from selected waste rock piles were screened to better estimate the fine-size fraction" should be explained. c) The third paragraph explains some conclusions of the analytical work conducted on the chat, but paragraph 2 only discusses the testing done on the waste rock, not any conclusions. The paragraph could report the conclusions on the size distributions and homogeneity of the piles, and the results of the testing of the screened waste rock. d) Be sure the XRF results are in the appendix.

15. Page 1-3, paragraph 3 - a) The second sentence should be revised to remove the statement concerning what was "anticipated". b) The minus 400 mesh is not a problem with inhalation. About 10 microns and less sized particles are a problem with inhalation. A change is needed. c) The last part of the paragraph on page 1-4 needs to be reworded. The paragraph does not have to state that the metallurgical test program was modified, only state that both types of mine wastes were included in the testing.

16. Page 1-4, first full paragraph - The reader should be referred to the appendix that explains the test work conducted.

17. Page 1-4, second full paragraph - a) Do not state that there are criteria for the disposal for the testings. EP toxicity standards can be used in the report, but do not infer that they are standards or criteria for mine sites. EP toxicity standards are the action levels set a this site. b) Explain where the 700

ppm comes from. c) Chat was included in the preferred plan, therefore, the wording in sentences three and five needs to be revised. d) Are the oxides in both the waste rock and the chat. This should be explained.

18. Page 1-4, third full paragraph - Were new chat samples collected in November or were samples in storage onsite used for the testing? Make corrections as appropriate.

19. Page 1-5, paragraph 1 - a) If the chat assays for lead ranged from about 500 to 1,000 ppm, why are we talking about the chat? I assume the 500 to 1,000 ppm is in the total chat and the higher concentrations are in the fines. That should be explained. b) The number of piles tested should be stated along something that will give the reader on idea of what percent of the piles were tested. As written, it infers that all piles were tested.

20. Page 1-5, first full paragraph - a) Remove the following from the first sentence, "led by AMAX". b) There is no need to discuss meetings or workshops between the EPA and PRPs in this report, therefore, remove reference to any meetings or workshops.

21. Page 1-5, first bullet - a) Remove the word "nominal" in the third line. It is unnecessary b) The OUFS reported 327,000 tons of mine wastes and chat, not just mine wastes. A correction is needed.

22. Page 1-6, first bullet - Is the conclusion in the last sentence a conclusion reached by AMAX in their report, or is it CH2M Hill's interpretation of the data? Include it only if it is AMAX's interpretation.

23. Page 1-5, second bullet - It might be useful to state that EPA's sampling also indicated wide variations in metals content of the waste rock and chat.

24. Page 1-6, last paragraph - a) The paragraph should state that the hydrochloric acid pH adjusted water simulated the ground water conditions. b) I assume that waste rock, not chat, was used in the jar tests. That should be specified. c) Explain why rock less than two inches was used in the testing.

25. Page 1-7, paragraph 2 - Remove the words "developed by both parties".

26. Page 1-7, paragraph 4 - a) Chapter 8 of the OUFS report is not being "revised", only "supplemented". This change in the wording should be made. b) A reference for the former criteria should be given.

27. Page 2-1 - A list of the remediation objectives (goals) should be included in this supplement.

28. Page 2-1, paragraph 2 - The selection of the preferred remedy did take into account the health threat due to ingestion of the mine wastes; however, at that time, we did not have the data that defines that it was the "fine-sized" metal bearing fraction. Therefore, this report should just state that the preferred remedy did take into account the health threat posed by the ingestion of the mine wastes, not the " fine-sized, metal bearing fraction".

29. Page 2-2, first full paragraph - a) The discussion on the review of the technologies is confusing. It sounds like the data were available during the initial formulation of technologies during the original OUFS development. The steps should be clarified. b) The discussion on the inclusion of a new technology is unclear. Is subsurface disposal a general response action under "disposal of sulfide minerals" or something else? It should be clear that surface disposal is a new technology developed in the supplemental FS. c) Was subsurface disposal reviewed in the original OUFS? If so, why was this eliminated? Please clarify.

30. Page 2-2, second full paragraph - The last sentence should be revised as follows: ...contain lead levels that exceed EPA action levels...

31. Page 2-2, third full paragraph - Explain why there will be less infiltration, i.e., reduced pore space (?), more runoff, less ponding.

32. Page 2-3, paragraph 1 - Based on the current information, is it possible to state that subsurface disposal will exacerbate the mass metal loadings? The PRP's interpretation of their data did not state this. More explanation is needed. Further information on the potential metal loadings should be included in this paragraph. As it is written, it is not reasonable to continue to include the disposal in the alternatives development because it appears only to cause a problem.

33. Page 2-3, paragraph 3 - a) The proposed plan was published in February 1988, not the spring of 1988. This correction should be made. b) In all the discussions of the flotation process, only zinc and lead are discussed as being removed. I assume the cadmium is also removed. This should be discussed in appropriate parts of this supplemental report. c) Remediation of boreholes was not included in the proposed plan. Only deep wells were included in the proposed plan. A correction is needed.

34. Table 2-1 - a) This table is confusing and difficult to relate to the current OUFS report. The actions in the first column should use the same terms as in the current OUFS, i.e., "Removal-Mining/Hauling" should be "Remove Surface Mine Waste". The "treatment" action of "sizing" was not an action in the current OUFS report, therefore, it needs to be introduced into this report as a new response action to be evaluated. b) The technology for recontouring should include recontouring with clean chat and/or clean dirt. Alternative 2 includes recontouring. b) The text needs to further explain the technologies. The difference between "chat (all)" and "chat (dirty)" is not explained. "Sizing" is not clear. c) Do not use the word "landfill". d) Since none of the terms are defined before the table is inserted into the report, it would be more appropriate and easier to understand the table if the table was at the end of the Section 2.

35. Page 2-5, paragraph 1 - The no-action alternative is required by the NCP, not CERCLA. A correction is needed.

36. Page 2-5, paragraph 2 - Alternative 2 as described on pages 2-6 through 2-10 is not the proposed plan. The proposed plan included all the chat and other mine wastes, and included recontouring. One of the alternative, preferably Alternative 2, should be the proposed plan. Is there any need to include an alternative like Alternative 2 (without chat) since we know the chat must be dealt with? I do not believe it is needed.

37. Page 2-5, paragraph 3 - It is not clear that the PRP alternative did not include the remedial actions common to all the other alternatives. A clear statement should be included.

38 Page 2-6, paragraph 1 - Alternative 2 (proposed plan) also includes recontouring and revegetation. This should be added.

39. Page 2-6, Description of Alternatives - The description of each of the alternatives should be more detailed. Please review the current OUFS and add in the detail that was included in that report (see page 6-9 through 6-15). Each of the descriptions should give the objective of the alternative. The initial part of the description should summarize the action and explain the purpose of each part of the action. There should be at least one figure for all the alternatives that shows where all the mine waste areas are located and the locations of the channelization and diversion work included in the alternatives. The descriptions should explain the amount of wastes to be removed and the amount of contaminants present in the wastes. The descriptions should define the amount of time needed to complete

the action and the assumptions made in the amount of waste to be handled per day, how many days worked per week, and how many hours worked per day. The text should explain whether dewatering of the mines is necessary before disposal of tailings. The description of the well remediation should explain how the integrity of the wells will be checked and what type of remediation is possible. The recontouring and revegetation description should define the size of the area to be recontoured and describe what type of work will be done (see page 6-14 of the current OUFS report). O&M requirements for each of the alternatives should be included in the descriptions.

40. Page 2-6, paragraph 2 - a) CERCLA requires a review every five years if hazardous substances are left onsite, not just one review as implied by this paragraph. A revision is needed. b) The no-action alternative is required by the NCP, not mandated by CERCLA. A correction is needed.

41. Page 2-6, paragraph 3 - It should be made clear that mining means the removal of the surface wastes. Mining should be defined in the definitions section.

42. Figure 2-1 - a) Change the word "sale" to "resource recovery" in the third block. b) Other actions also include recontouring and revegetation. c) Does the word "classification" mean "sizing"? The text does not use the word "classification". Use the word "sizing", if appropriate. If it is not appropriate, make the text and figure consistent.

43. Page 2-8, paragraph 1 - a) The proposed plan included both chat and other mine wastes, just the volumes were incorrect. This paragraph should be reworded to include all the wastes and the correct volume estimates in Alternative 2. b) There appears to be a conflict in stating that special care will be needed in working in Hell's Half Acre, but then also stating that the central mill will be in that area. It would appear that the land surface would not be stable enough for the mill and all the traffic moving wastes to the mill. Think about this.

44. Page 2-8, paragraph 2 - a) This is the first mention of the mine rock stock pile. Is it located adjacent to the mill? Please clarify. b) Where are the "appropriate locations" for the removal of the plastic and metal parts? Does this mean as the material is being picked up or somewhere in the processing circuit? Please be more specific. c) Explain what happens to the greater than 5/8 inch portion of the material from the crusher plant.

45. Page 2-8, paragraph 3 - Is the slurry pumped to the flotation circuit for lead, zinc and cadmium removal, or just lead and zinc removal? Please specify if the cadmium is also removed.

46. Page 2-8, paragraph 4, last line - Is the "lead concentrate" a lead sulfide concentrate? Please state it this way if it is correct to use that term.

47. Page 2-9, paragraph 1 - We understood that the concentrates coming out of the oxide circuit would not be saleable and, therefore, would have to be disposed. This should be discussed. The paragraph also should explain that the lead and zinc concentrates would be of saleable quality.

48. Page 2-9, first full paragraph - The first sentence contradicts itself and should be revised. The tailings material will not be barren of lead and zinc, but will be at acceptable concentrations.

49. Page 2-9, second full paragraph - The proposed plan does include recontouring and revegetation. A correction is needed. See page 6-14 of the current OUFS for a better description of the recontouring and revegetation work.

50. Page 2-9, third full paragraph - The proposed plan also includes diversion of Owl Branch to Tributary C. This should be included in Alternative 2. See page 6-17 of the current OUFS for a better description of the surface water actions.

51. Page 2-10, paragraph 1 - Base the cost estimate for the well remediation on the same assumptions that were used in the current OUFS. I believe the current OUFS assumed remediation on seven wells.

52. Page 2-10, last paragraph - Explain why there is a separate chat processing circuit and why the chat is added at the ball mill stage.

53. Figure 2-2 - a) The figure uses the word "classification", but the text uses the word "sizing". Be consistent. b) There will be a metals oxide concentrate to be disposed. This step should be included. c) Other actions also should include recontouring and revegetation. d) See previous comments on the figures and incorporate appropriate comments.

54. Page 2-12, first full paragraph - a) This section needs to explain what could happen to the drummed concentrates. I understand that the lead and zinc concentrates will be of

saleable quality and the oxides may have to be disposed in a RCRA facility. These things must be discussed and included in the cost estimates. b) It should be made clear that the assumption that the minus 35 mesh fraction contains the bulk of the metal contamination is based of field screening and laboratory analyses. c) What percentage of the contaminates are included in the 35 mesh fraction, i.e., define bulk?

55. Page 2-13, line 1 - The clean chat could be used in recontouring. Do not state that it would be saved for construction material.

56. Page 2-13, Recontouring - I do not understand why it is stated that there would be no recontouring. After the milling, there will be soil and clean chat to recontour with and recontouring will be necessary. The recontouring also includes revegetation. Recontouring and revegetation should be included in this alternative.

57. Page 2-13, Channelization - The diversion of Owl Branch to Tributary C was omitted from the discussion and should be included.

58. Page 2-13, Deep Well Remediation - See previous comments on deep well remediation.

59. Page 2-14, second full paragraph - a) As written, Alternative 3 does not assume all the chat is dirty. It assumes all will need to be processed, but only 20% of the chat contains the contamination. This statement should be revised to make it more accurate. b) "Contaminated" would be a more appropriate word to used instead of "dirty".

60. Page 2-14, third full paragraph - This paragraph should be removed.

61. Page 2-14, Recontouring - The purpose of the recontouring is to promote runoff not just to fill void spaces. Recontouring and revegetation would be conducted with this alternative.

62. Figure 2-3 - See comments on previous figures and make revisions as appropriate.

63. Page 2-16, Channelization - See previous comments on channelization and make revisions as appropriate.

64. Page 2-16, Deep Well Remediation - See previous comments on deep well remediation and make revisions as appropriate.

65. Page 2-16, Alternative 5 - The description of the alternative should explain why disposing of the dirty chat, as opposed to treating it, would be safe.

66. Page 2-16, last paragraph - Much more description of this action is necessary.

67. Figure 2-4 - a) See previous comments on the figures and make revisions as appropriate. b) The waste rock and chat processes are totally separate, therefore, they should not be intermingled of the flow chart.

68. Page 2-18, paragraph 1 - What areas will be used for the disposal? This should be explained.

69. Page 2-18, Recontouring - Explain how much material will be used in recontouring, how much area will be recontoured, and how it would be conducted.

70. Page 2-18, Channelization - See previous comments on channelization and make revisions as appropriate.

71. Page 2-18, Deep Well Remediation - See previous comments on deep well remediation and made revisions as appropriate.

72. Page 2-19, paragraph 1 -a) Please review the PRP proposal to be sure it is being described correctly. Please describe the alternative exactly the way the PRPs proposed it and then add in any extra information needed on how to implement the alternative. The report submitted by ABC pertaining to the review of the PRP alternative in comparison to the nine criteria has a good description. b) If there are pieces added by CH2M Hill on how the alternative would be implemented, please make it clear that it is an expansion on the PRP proposal. c) A full description on how the alternative will be implemented is needed. d) Field screening XRF can only be used for the chat, not the mine waste rock and chat as specified in the first sentence. This needs to be explained.

73. Page 2-19, Channelization - See previous comments on channelization and revise as appropriate.

74. Page 2-19, Deep Well Remediation - See previous comments on deep well remediation and revise as appropriate.

75. Figure 2-5 - See previous comments on the figures and make revisions as appropriate.

76. Page 2-21, Alternative 7 - On the description of this alternative and all alternatives, do not separate the description of the mine waste action and chat action. It is too confusing. As an example, within the "Mining, Screening, and Disposal of Waste Rock" section the chat is discussed. The chat is again discussed, in more detail, in the following section.

77. Page 2-21, first full paragraph - a) The alternative and its implementation must be explained in much more detail. b) Explain why two-inch waste rock was selected as opposed to three-inch or four-inch. What is significant about two-inch? c) Is there more that can be said on why the different sized materials are more or less reactive? Please describe more completely, if possible. d) Explain the field screening with the XRF.

78. Page 2-21, second full paragraph - Where will the clean chat come from? This should be explained.

79. Figure 2-6 - See previous comments on the figures and revise as appropriate.

80. Page 2-23, paragraph 1 - a) Explain why dirt chat can be disposed below the water table. b) Explain why the chat is not heavily mineralized and why not as geochemically active as the mine waste rock.

81. Page 2-23, Recontouring - Give a much more complete description of the recontouring and revegetation.

82. Page 2-23, Channelization - See previous comments on channelization and revise as appropriate.

83. Page 2-23, Deep Well Remediation - See previous comments and revise as appropriate.

84. Page 2-24, Alternative 8 - a) The description of the alternative and how it would be implemented need to be described in much more detail. b) The text should explain that the location of the containment unit in this report is only a general location and only for purposes of cost estimating. c) This OUFS only involves contaminate mining wastes, not contaminated soils . The sixth line must be changed. d) Channelization and Deep Well Remediation - See the previous comments made on channelization and deep well remediation and incorporate those comments as appropriate. e) Recontouring and revegetation should be part of this alternative.

85. Page 3-1, paragraph 2 - It would be better to give the title of the guidance rather than the OSWER directive number. Reference to the guidance in the next few paragraphs is confusing because it is referred to as the directive, by title name and by EPA guidance (EPA, 1988b). It looks like there are three different guidance documents. Please revise and make less confusing.

86. Table 3-1 - a) The criteria "Whether the statutory preference for treatment is satisfied" should be included under "Reduction of toxicity, mobility and volume through treatment". b) The criteria "Availability of services and material" should be added under "Implementability".

87. Page 3-2, Alternative Evaluation Criteria - Somewhere the reader needs to be referred to the OUFS report for a discussion on the ARARs in Chapter 4.

88. Page 3-2, first bullet - Further explanation is needed to explain why we are confident in the PRPs' volume estimates. Explain the amount of work the PRPs put into the volume estimates.

89. Page 3-4, paragraph 3 - Wrong, revegetation is included in the alternatives. CH2M Hill should use the cost estimate of $1,000 per acre for revegetation of approximately 600 acres.

90. Page 3-4, paragraph 4 - How was it determined that some areas were "insignificant"? Use the word "minor" as opposed to "insignificant".

91. Page 3-4, paragraph 7 - a) The paragraph should be rewritten to state that RCRA is not an ARAR. The paragraph should state that the EPA action level at the site will be 700 ppm, which is the material that will pass EP toxicity tests. b) A very brief description of the Bevill Amendment would be useful.

92. Table 3-2 - See previous comments on the table in section 2 and make the same revisions.

93. Page 3-8, paragraph 2 - The costs of the five-year reviews should be estimated (see page 6-25 of the RI/FS guidance).

94. Page 3-8, paragraph 4 - Plugging of boreholes is not included as part of the well remediation actions as described in Section 2. We do not know of any boreholes, therefore, they should not be included in the remedy.

95. Page 3-9, line 1 - This is the first mention of institutional controls. If they are discussed here as being needed, they need to be discussed in the description of the action in Section 2.

96. Page 3-9, last paragraph - a) Does this action really reduce metal loadings or just the rate of metal loading? Since the channelization and diversion by themselves do not remove any of the contaminants from the site, it would seem as if only the rate of loading would be reduced. Please think about this and revise as appropriate. b) The explanation of the reduction in loadings should be related back to how that will provide some protection to the environment (relate it to the criterion).

97. Page 3-10, paragraph 4 - a) This paragraph states that there will be no risks to the environment in the short term. Diverting streams and channelizing streams is going to cause some disruption during construction that should be discussed. b) Coordination with other agencies will be necessary for the work. This should be stated.

98. Page 3-10, last paragraph - a) Be sure the costs include the cost of the diversion of Owl Branch to Trib C that was left out of the description of the action. b) The text of the description in Section 2 should explain how the $3,800 per year would be spent on the O&M.

99. Page 3-11, Overall Protection of Human Health and the Environment - This paragraph should state that implementation of this alternative would result in the improvement of the water quality of the surface water, but that the surface water will continue to exceed ambient water quality criteria for the protection of aquatic life.

100. Page 3-11, last paragraph - EP toxicity is not an ARAR for this site, but is a "to be considered". This paragraph should make the distinction between the two. Refer to the EP toxicity as the "action level" for disposal. The CDC health based criteria also is only a "to be considered", not an ARAR, and should be referred to as an action level for wastes left onsite..

101. Page 3-12, Long-Term Effectiveness - We question how ground water monitoring could be conducted effectively so that the effectiveness of the action can be monitored. We agree on the stream monitoring. We do believe ground water monitoring should be done but not as a measure of effectiveness. The ground water monitoring would be as a protection system to ground water well users in the area. Remove the ground water monitoring for use a measure of effectiveness.

102. Page 3-12, Reduction of Toxicity, Mobility, and Volume - The mobility and volume of the contaminants from the waste rock would be reduced by this alternative. Why does this paragraph say it would not be reduced? None of the alternatives will reduce the toxicity of the contaminants.

103. Page 3-13, Costs - If there is an O&M cost of $31,300 annually, that needs to be defined in Section 2 under the description of the alternative. The surface water diversion and channelization O&M is only $3,800 annually. Is the remainder for ground water and surface water monitoring?

104. Page 3-14, first full paragraph - a) Remove the word "well" in line 6. b) It is inappropriate to explain a future use of the coarse fraction in this paragraph, and therefore, it should be removed.

105. Page 3-14, last paragraph - There is not an ARAR for the disposal of the tailings, therefore, remove such statements from this paragraph.

106. Page 3-15, second full paragraph - See previous discussion on ground water monitoring and incorporate the comments into this paragraph.

107. Page 3-15, third full paragraph - a) None of the alternatives will reduce the toxicity of the contaminants. This needs to be changed on this alternative and the following alternatives. b) When the volume will not be reduced by an alternative, state that in the discuss under the appropriate alternatives. c) This paragraph states that 85% to 99% of the metals will be removed from the mine wastes. Does this include the removal from the chat? If not, the percent of metals removed from the chat should be included.

108. Page 3-15, fourth full paragraph - Explain why the mobility would be reduced.

109. Page 3-18, paragraph 1 - Incorporate previous comments concerning disposal levels and action levels in the ARARs sections.

110. Page 3-18, paragraph 2 - See previous comments on ground water monitoring.

111. Page 3-18, paragraph 4 - Explain how the mobility will be reduced.

112. Many of the previous comments on the evaluation of the alternatives also pertain to the evaluations of the other alternatives. Where appropriate, those comments should be incorporated into the evaluations of the other alternatives.

113. Page 3-22, Reduction of Toxicity, Mobility, and Volume - The toxicity of the contaminants in the waste rock and chat will not be reduced. These statements need to be corrected.

114. Page 3-23, Alternative 6 - The review of the PRP alternative is much more critical than the review of the other alternatives. All of the alternatives should undergo the same degree critical review and evaluation.

115. Page 3-24, first full paragraph - a) It needs to be explained why we believe the PRP alternative may exacerbate the metal loadings. If it is explained in an appendix, refer the reader to the appendix. b) You should state that the alternative "may" result in further detrimental impact to the Spring River "basin" aquatic environment, not just the Spring River.

116. Page 3-24 second full paragraph - Review the wording of the paragraph and compare it to the wording in the "Compliance with ARARs" sections on the other alternatives. Do you really mean to state that the PRP alternative will not "significantly" reduce the metal loadings and that the other alternatives will reduce the metal loadings? Is the word "significantly" really appropriate? Think about this and modify as appropriate.

117. Page 3-24, third full paragraph - You are much more critical of the PRP alternative than the other alternatives. Be consistent in the evaluations.

118. Page 3-25, Reduction of Toxicity, Mobility, and Volume - a) The PRPs discussed the reduction of mobility via surface erosion. That should be discussed in this paragraph as a benefit and should be added to the other alternatives where appropriate. b) The PRPs discussed reduction of mobility via wind erosion and inhalation, but we should not include those because wind erosion and inhalation are not problems. c) Since we state that the alternative will exacerbate the contaminant mobility and the PRPs state that it will not, this should be discussed. The reader could be referred to the appendix for the discussion.

119. Page 3-25, last paragraph - Did the PRPs state that the ground water and surface water quality would be monitored in order to evaluate effectiveness? If they did not, you must state that we added that to the alternative.

120. Page 3-26, Costs - Include a description of the PRPs' cost estimate and refer the reader to the discussion of the estimate in the appendix.

121. Page 3-30, Reduction of Toxicity, Mobility, and Volume - The discussion should explain how the mobility will be reduced. It should also include a statement that the toxicity and volume of the contaminants will not be reduced.

122. Page 3-32, last paragraph - Make the following revisions: The detailed analysis of alternatives in the Ground Water/ Surface Water OUFS was developed under a previous EPA RI/FS guidance (cite reference). The details of some of the assessment criteria as presented in the most recent guidance (cite reference) have been modified from the former guidance. Table 3-4 summarizes the detailed analysis presented in this supplement to the OUFS using the requirements in the former guidance that were used in the OUFS. This format allows a direct comparison of the detailed analysis for the alternatives developed in both the OUFS and this supplement to the OUFS.

123. Table 3-3 - a) The criterion under "Human Health Protection "should be "direct contact/waste ingestion". The soils are not discussed in this document. Please make this change. b) Do not abbreviate "chemical specific", "location specific", or "action specific". b) The criterion under Long-Term Effectiveness should be revised to remove "soil ingestion" and to include "waste ingestion". c) The "need for five-year review " should be included as a separate criterion under Long-Term Effectiveness. d) The "statutory preference for treatment" criterion should be added under Reduction of Toxicity, Mobility, and Volume. e) Change the wording under Alternative 1, Action-Specific ARARS to " Not Relevant" or "Not Applicable". f) The cost of the five-year reviews should be factored into the costs of Alternative 1. g) Since RCRA is not an ARAR for the site, the discussion on "Action Specific ARARs" must be revised for all the alternatives. The action levels should be discussed under "Other Criteria and Guidance". h) Remove the discussion of EP toxicity under the "Amount Destroyed or Treated" criterion of "Reduction of Toxicity, Mobility, and Volume" for all alternatives. The table only needs to state the percentage of the contaminants to be removed. i) Toxicity is not reduced in any of the alternatives. This should be revised in all the alternatives under the "Degree of Expected Reduction of Toxicity, Mobility, or Volume" under "Reduction of Toxicity, Mobility, and Volume". j) In Alternative 2, the statement under the "Ability to Construct/Operate Technology" criterion under Implementability should be changed to remove the word "RCRA" and replace it with "action levels". k)

The other actions included in the alternatives, i.e., channelization, diversions, well remediation, recontouring, revegetating, should be included in the discussions on this table. Places where those discussions should be added include: Implementability - Ability to Construct, Reliability of the Technology, Ability to Obtain Approvals, Technology Availability. l) Throughout the table, the word "RCRA" should be changed to "Action Level". The 1,000 ppm action level should be referred to as "EPA Action Level", not "CDC/EPA Action Level". m) Review the evaluation of the PRP Alternative very thoroughly and be sure everything can be supported. n) The description of the "Chemical-Specific ARARs" under Alternative 7 is much more complete then the description on the other alternatives. Provide the same amount of detail on all alternatives. Be consistent. o) Inhalation is not a pathway of exposure and, therefore, should by removed from the discussion under the Alternative 6 and 7 under the "Adequacy and Reliability of Controls" criterion. p) Chat isolation will not be reversible as stated under Alternative 5 under "Irreversible Treatment" criterion. Once it is underground, we will not be able to retrieve it. q) I am not comfortable stating anything other than "None" under the "Amount Destroyed or Treated" on Alternative 7. r) The statement under "Ease of doing more action" under Alternative 4 should be "Could remove additional surface solids" because the action only addresses 50 % of the chat.

124. Table 3-4 - a) The criteria under costs need to be the same as in the OUFS. b) The comments made on Table 3-3 should be incorporated into this table.