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LETTER REGARDING FINAL RESPONSE TO COMMENTS FOR REMEDIAL INVESTIGATION REPORT FOR SITE 15 NAS WHITING FIELD FL
5/16/1999
HARDING LAWSON ASSOCIATES

Harding Lawson Associates

2534-2015

May 16, 1999

Mr. Craig Benedikt, Remedial Project Manager
Federal Facilities Branch
USEPA Region IV
61 Forsyth Street
Atlanta, Georgia 30303

Subject: **Final Response to Comments for the Remedial Investigation Report**
Site 15, Southwest Landfill
Naval Air Station Whiting Field, Milton, Florida
Contract No. N62467-89D-0317/116

Dear Craig:

On behalf of Southern Division Naval Facilities Engineering Command (SOUTHNAVFACENGCOM), Harding Lawson Associates is pleased to submit the revised response to comments for your review and comments. Copies of the revised response to comments have also been forwarded to the Naval Air Station Whiting Field Partnering team.

If you have any questions please call me at (850) 656-1293.

Sincerely,

HARDING LAWSON ASSOCIATES

Rao Angara
Principal Project Manager

enclosure

cc: Ms. L. Martin, SDIV (1 copy)
Ms. A. Twitty, CH2M Hill (1 copy)
Mr. J. Cason, FDEP (1 copy)
Mr. T. Conrad, BEI (1 copy)
Mr. T. Hansen, TtNUS (1 copy)
Mr. G. Walker, TtNUS (1 copy)
Mr. P. Ottinger, TtNUS (1 copy)
Mr. J. Holland, NASWF (1 copy)
Mr. E. Blomberg, HLA (1 copy)
File

Final Response to Review Comments
For Remedial Investigation Report
Site 15, Southwest Landfill

Florida Department of Environmental Protection

1. As we have previously discussed for other sites at NAS Whiting Field, please insure that the soil, surface water and ground water are evaluated with respect to the soil, surface and ground water (Table 1 and Table 3b) values in Chapter 62-785, F.A.C. Please note that the evaluation for soil should be the lower of either the direct exposure or the leachability level, if ground water is indicated to be contaminated. Please modify the appropriate tables to reflect this change. Please reevaluate the existing COPC, risk evaluation, etc., as necessary to also reflect this change. Table G-1 should be corrected to reflect the screening concentrations for those contaminants that were detected in significant concentrations in the groundwater, for example, the screening value for total xylenes is 300 ug/kg, not 100 ug/kg. Note that Table G-3 lists incorrect Florida groundwater guidance concentrations for 1,2-dichloroethene, chlorobenzene, naphthalene, xylenes and cyanide. Some of the TCLs in the Department's former guidelines, 1994 Ground Water Guidance Concentrations, have been superseded by the values in Chapter 62-785, F.A.C. (Table 3b). Finally, the previous Soil Cleanup Goals Memoranda from Mr. John Ruddell and others should not be used since they have also been superseded by Chapter 62-785, F.A.C. The use of the TCLs from Chapter 62-785, F>A.C. will eliminate the errors such as those seen in copper, vanadium, and others presently noted in Tables 5-9 and 5-10. Finally, footnote 12 in Table 5-10 (page 5-44) is incorrect in that the 1998 FDEP document is not appended and my name in the references (page Ref-3) is misspelled.

   Response: As recommended by the reviewer, all data will be compared against the criteria specified in Chapter 62-785, F.A.C. All relevant tables will be updated as necessary.

2. Please present a modified version of Figure 3-4 which shows the analytical values for significant contaminants in the site ground water such as benzene and TCE. If the ground water contaminant data are plotted as requested, there is the suggestion that some of the TCE contamination that is observed may originate from Site 15. The figure will also illustrate the areal distribution of contaminants at Site 15 and also the fact that TCE and petroleum compounds are found in the ground water between Site 15 and the base boundary. I suggest that this be included and discussed in Section 9.1, Conclusions. In addition, a statement should be added which relates the contaminants in the soil and ground water, including exceedances of leaching values from Chapter 62-785, F.A.C., if any are present. All of the previous suggestions will help make the final report more comprehensive and help link data from Site 15, which has significant ground water contamination, to the information that will be obtained in the basewide ground water study.

   Response: As recommended by the reviewer, a modified version of Figure 3-4 will be presented showing significant contaminants in the site ground water. Discussion

of areal distribution of contaminants will be provided in section 9.1, as well as statements relating soil and ground water contamination.

3. Please provide a discussion for the use of the terms, "shallow," "intermediate" and "deep" when discussing monitoring wells. A summary table which explains the depth ranges for each type and which groups the various wells into those classifications would be good. A cross-section diagram similar to the one presently used for the Clear Creek area would also help the reader understand the situation, especially if the diagram can be related to the figure that was requested in comment 2.

Response: As recommended by the reviewer, discussion of use of terms "shallow," "intermediate," and "deep" will be provided when discussing monitoring wells. A summary table and cross-section diagram will also be provided.

4. I have concerns as to whether the characterization of the subsurface soil for Site 15 is adequate since only five samples were obtained and there was no testing to determine if the landfill is a continuing source of contamination to the ground water. If a cap is determined to be a potential remedy in the future, additional information regarding the groundwater levels and how they may interact with the base of the landfill will also be required in order to assess the adequacy of the cap. In this regard, a review of the Test Pit and CPT Logs data in Appendix C is quite informative, especially Test Pit 15-06, which notes the presence of "solvent cans with solvent." With respect to those CPT logs, there is much information to be obtained from it and I respectfully suggest that prior to preparing a focused feasibility study (which I think is not appropriate at this time), the author of that study should carefully review it.

Response: *Notes in the field log book state that at a depth of 12-13 feet bls, solvent cans were found in test pit TP-15-06. The logbook describes municipal and industrial (aircraft parts, motor cycle muffler, etc) waste as being found in the test pits. Although collection of additional samples will enable the Navy to better characterize the site, the presumptive remedy for the Site 15 landfill is to cap the area. With capping as a remedial alternative, additional data will not be necessary.*

5. Figure 6-6: please correct this figure, placing the FDEP acceptable level as 1E-06.

Response: Figure 6-6 will be revised as recommended.

Final Response to Review Comments
For Remedial Investigation Report
Site 15, Southwest Landfill

U.S. Environmental Protection Agency

GENERAL COMMENTS

1. In each of the statistical summary tables presented in the report, the mean of the detected concentrations is presented. Since any exceedances of the screening criteria should be based on the maximum detected concentrations, it is not clear why the mean of the detected concentrations are presented. This purpose of presenting the mean of the detected concentrations should be clarified.

   Response: The mean of the detected concentrations is a byproduct of the statistical analysis for the risk assessment and has been included in the tables. The maximum detected concentration is also represented in the tables under the detected concentration range.

2. The Soil Cleanup Goals for Florida (FSCGs) Memorandum from John M. Ruddell, dated September 29, 1995 states in the first paragraph that "If there is groundwater contamination above Florida standards and minimum criteria or if there was a recent discharge, the leachability-based cleanup goals should also be considered using the applicable direct contact scenario (residential and industrial). The lowest of the two should be the final cleanup goal for the upper two feet of soil. For below two feet, the leachability based-goal should be applied if the parameters of concern are detected above the Florida criteria." It is not apparent that this procedure was followed in the screening process. This should be clarified. It should also be noted that the FSCGs usually only apply to the upper two feet of soil as stated in the Applicability of Soil Cleanup Goals for Florida from John M. Ruddell, dated January 19, 1996. However, the report uses these goals for comparison to subsurface soils collected from depths to 12 feet below ground surface. This apparent deviation from the procedures specified in the RSCGs should be addressed.

   Response: As recommended by the reviewer, the leachability-based cleanup target levels will also be considered during the screening process, due to ground water contamination.

3. Surface soil samples were collected from 0 to 12 inches. However, Florida guidance (as referenced in the previous comment) suggests that surface soil is defined as the upper two feet of soil. The rationale for collecting samples from 0 to 12 inches should be provided.

   Response: *At the time the surface soil samples were collected the EPA sample depth requirement was 0-1 foot bls which was adopted by the Whiting Field team.*

4. The statistical summary tables should identify the exceedances of the screening criteria

by highlighting or bolding the analytes and/or the concentrations. In addition, figures should be provided to show the locations of the exceedances.

Response: As recommended by the reviewer, exceedances of the screening criteria will be bolded in the statistical summary tables. Figures will also be provided to show the locations of the exceedances.

5. Several errors were noted in the text of the report including changes in font and redundant page numbers (for an example, see Page 5-46). The report should be reviewed carefully by the Navy.

Response: Errors in the text of the report, including font changes and redundant page numbering will be corrected, as requested.

SPECIFIC COMMENTS

6. **Page 1-1, Fifth Paragraph**. The depth of the trenches and information on whether the waste is located beneath the water table should be provided, if known (note that the test pit and monitoring well logs do not provide this information). This information is relevant to the Feasibility Study and the selection of alternatives and/or the design of the selected alternative. If not presently known, this information should be determined.

Response: There is no documentation available on the depth of the trenches at Site 15. Based on the depth to the water table (approximately 16 to 90 feet bls) it is not anticipated that the trenches intersect the water table.

7. **Page 3-1, Eighth Paragraph**. Subsurface soil samples were collected in October 1992 and a soil gas survey for methane and total VOCs was conducted in September 1995. Figures 5-7 through 5-10 show the results of the screening at 1.5 feet and 3.0 feet below land surface. The following comments concern these soil gas survey results:

It is not clear why subsurface soil samples were not collected during Phase IIB in the area from soil gas survey locations 17, 6, 97 and 98 (see Figures 5-7 and 5-9) on the western part of the site, or sample location 20 (Figure 5-9) on the northern part of the site. This additional information would have been useful in attempting to identify the source and nature of the VOCs which were shown by the soil gas concentrations as being in excess of 5,000 ppm. Justification for not collecting these subsurface soil samples should be provided.

Groundwater samples collected downgradient of these elevated VOC areas (e.g., from WHF-15-1, WHF-15-6S, and WHF-15-6D) in 1996 and 1997 do not appear to

substantiate the elevated VOC levels detected during the soil gas survey. Potential explanations for this anomaly should be provided.

Response: *Data presented on Figures 5-7 through 5-10 provide soil gas surveys as total organic vapor readings including methane. For most of the samples, methane contributed 100% to the reading. These results support a general absence of VOCs in monitoring wells CEF-15-1S, CEF-15-6S, and CEF-15-6D.*

8. **Page 3-5, Sixth Paragraph**. This paragraph does not continue logically to the next page of text (Page 3-7). It appears that a number of words are missing. This discrepancy should be corrected.

Response: The text in question will be revised to include the missing words.

9. **Page 5-2, Figure 5-1**. It is recommended that an additional downgradient geologic cross-section be constructed. For example, WHF-1466-6 to WHF-15-7 to WH-15-6 to WHF-15-8 would be a good selection for constructing the additional geologic cross-section.

Response: It appears that the existing cross-sections provide an adequate profile of the subsurface geology at Site 15. Therefore, additional cross-sections are not necessary.

10. **Pages 5-16 and 5-17, Table 5-3**. Monitoring wells WHF-15-8S, WHF-15-8I, WHF-15-8D, WHF-16-7S, WHF-16-7I, and WHF-16-7D should be added to this table to provide vertical hydraulic gradients between Sites 15 & 16 and Clear Creek. In particular, the gradient for WHF- 16-7 may indicate whether the groundwater was discharging to Clear Creek on the date(s) that the measurements were collected.

Response: From a hydrogeologic standpoint it is known that groundwater discharges to Clear Creek. Vertical gradients in Site 16 monitoring wells are not relevant to the Site 15 RI as they are cross-gradient from the site. Groundwater flow issues will be further addressed in the basewide groundwater investigation.

11. **Page 5-19, First Paragraph**. This paragraph presents seepage velocities for the shallow zone of the aquifer only. The seepage velocities for the intermediate and deep zones should also be discussed.

Response: Seepage velocities for other parts of the aquifer will be addressed in the basewide groundwater investigation.

12. **Page 5-20, Table 5-5**. The seepage velocities presented in this table only apply to the shallow zone of the sand and gravel aquifer. The seepage velocities for the intermediate and deep zones should also be presented in this table.

Response: Seepage velocities for other parts of the aquifer will be addressed in the basewide groundwater investigation.

13. **Page 5-45, Second Paragraph**. This paragraph should be checked for accuracy (it appears that a sentence was repeated). In addition, a concentration of 1,7000 is listed. This should be corrected to 1,700, 17,000, or whatever is correct.

Response: As recommended, the repeated sentence will be removed and the concentration will be changed to 1,700.

14. **Page 5-51, Table 5-14**. It seems highly coincidental that the mean of the detected concentrations is the same as the background concentrations for mercury through zinc. These numbers should be confirmed.

Response: The values will be confirmed and modified if necessary.

15. **Page 5-53, Fifth Paragraph**. It is stated that the preferred groundwater data set is from the Phase IIB sampling event since low-flow sampling methodology was applied. This statement is acceptable. However, Table 5-20 and 5-21 only present the statistics from the second Phase IIB sampling event in 1997. It is not clear why the data from the first Phase IIB sampling event in 1996 was not included. This should be explained and, if appropriate, the 1996 data should be added to the data set. In addition, note that the reference to Tables 6-20 and 6-21 in this paragraph should be Tables 5-20 and 5-21.

Response: The 1996 data was not used in Tables 5-20 and 5-21 because the 1997 was the most current data set and represents the most current condition of groundwater quality. The 1996 data will be used as appropriate to discuss groundwater concentration trends and distribution. The reference to the tables will be changed as suggested.

16. **Page 5-79, Fourth Paragraph**. With respect to the filtered and non-filtered samples, this paragraph should also note that, in several instances, the filtered samples contained higher concentrations of the same analytes than non-filtered samples. In addition, the authors of the RI report should be aware that EPA Region 4 will not consider the use of filtered samples in any steps of the CERCLA decision making process, including risk assessment determinations.

Response: The text will be revised to include a discussion comparing filtered and unfiltered data. Only unfiltered data was used in the RI including the risk assessment.

17. **Page 5-74, Table 5-20**. The reporting limit ranges for several analytes exceeded the screening criteria including 1,1-dichloroethene, 1,2-dichloroethane, benzene, trichloroethene, naphthalene, and bis-(2-ethylhexyl)phthalate. This should be noted in

the text of the report.

Response: It will be noted in the text that the reporting limit ranges for the above analytes exceeded the screening criteria.

18. **Page 5-76, Table 5-21**. The reporting limit range for antimony exceeded the screening criteria. This should be noted in the text of the report.

Response: It will be noted in the text that the reporting limit range for antimony exceeded the screening criteria.

19. **Page 8-12, Sixth Paragraph**. It is noted in this paragraph that subsurface soil is discussed with respect to fate and transport. However, this discussion is missing from this section. A discussion of the fate and transport of contaminants in the subsurface soil should be added.

Response: The subsurface soil fate and transport section will be added to this section.

20. **Page 8-13, Second Paragraph**. This paragraph (regarding surface soil) states that the metals in the soil are not likely to be mobile since metal analytes readily adsorb to, or are natural constituents of, clays and other minerals. While the statement may be true, it is not apparent that it is highly applicable to the conditions at Site 15. The test pits and monitoring well logs show that the surface soil is predominantly sand. This paragraph should be modified or removed from the report.

Response: The paragraph will be removed from the report.

21. **Page 8-13, Third Paragraph**. In addition to surface water contamination via runoff from contaminated surface soil, the potential for the contamination of Clear Creek via groundwater discharge should be discussed.

Response: The potential for groundwater discharge to Clear Creek will be included in this paragraph.

22. **Page 8-13, Seventh Paragraph**. According to this paragraph, contaminated sediment transport to Clear Creek is not believed possible. It should be stated that this hypothesis will be evaluated during the Site 39, Clear Creek Flood Plain investigation. Additionally, the surface transport of contaminated sediment to the ditch along the southern end of the site, and potential ecological exposure, should be discussed.

Response: Text will be included to identify that sediment transport to Clear Creek will be addressed during the Clear Creek Flood Plain investigation. Transport of sediment to the ditch at the southern end of the site will be included in the report.

23. **Page 8-14, First Paragraph**. The last sentence states that Clear Creek is located 1500 feet southwest of the site. This is inconsistent with other statements in the report which specify the distance as 1200 feet (e.g., Page vi, Bullet 6). This discrepancy should be corrected.

Response: The last sentence has been changed to state that Clear Creek is located 1200 feet southwest of the site.

24. **Page 8-14, Fifth Paragraph**. In the second sentence, it is stated that a seepage velocity of 139 feet/year was calculated for the surficial aquifer from eight monitoring wells at Site 15. This sentence should be clarified since:

- the identification of discrete aquifers ("surficial aquifer" implies that there are deeper aquifers) has not been made in the report, and
- the seepage velocity was calculated from four monitoring wells at Site 15 and four monitoring wells at Site 16.

Additionally, the seepage velocity of 139 feet/year was calculated based on data from shallow monitoring wells and does not represent the seepage velocity of the deeper aquifer zones. Information on the seepage velocities in the deeper aquifer zones should be added. Also, it should be noted that WHF-15-2I and WHF-15-3I had significantly higher hydraulic conductivities (see Page 5-18, Table 5-4) than the shallow wells at Site 15.

It is not clear why the last sentence contains the phrase "50-year time frame". The distance of 4,587 feet for potential contaminant migration is calculated based on the seepage velocity of 139 feet/year and a 33-year time frame. To avoid confusion, the "50-year time frame" should be removed. Furthermore, the calculation of the distance of potential contaminant migration should be based on the "worst-case scenario" using the maximum seepage velocity from the shallow, intermediate, and deep zones.

Response: Seepage velocities in deeper zones of the aquifer will be addressed in the basewide groundwater investigation. The "50-year time frame" phrase will be removed from the text.

25. **Page 8-14, Seventh Paragraph**. It should be clarified whether additional sediment and surface water samples will be collected from Clear Creek in the RI for Site 39, Clear Creek Flood Plain, to evaluate the potential impacts of Site 15.

Response: Text will be added to indicate that additional surface water and sediment samples will be collected during the RI for Site *39 to evaluate potential impacts of the IR sites on Clear Creek.*

26. **Page 9-1, First Paragraph**. The second bullet refers to "total organic carbon" which is not relevant with respect to the soil gas survey. "Total organic carbon" should be replaced with "total VOCs".

The fifth bullet incorrectly states that the detected concentrations of arsenic in surface soil did not exceed the FDEP-approved site-specific non-residential goal of 4.2 ug/l (note that ug/l is not the correct units for soil samples). Table 5-10 on page 5-43 shows that arsenic concentrations ranged from 0.75 mg/kg to 6.8 mg/kg. In addition, the FDEP-approved site specific non-residential goal is shown as 4.62 mg/kg in Table 5-10 and not 4.2 ug/l as stated in this paragraph. These discrepancies should be corrected.

The first sentence of the sixth bullet should refer to "subsurface soil" samples and not "surface soil" samples. In addition, it is stated that the concentration of Arochlor-1242 exceeded the Florida industrial-use soil cleanup goal. However, the detected concentration was 2,200 ug/kg and the Florida industrial-use soil cleanup goal is 3,500 ug/kg (see Page 5-49, Table 5-13). The Region III RBC (industrial) was exceeded, as stated. These discrepancies should be corrected.

Response: *The reference to "total organic carbon" in the second bullet will be replaced with "total VOCs."*

The fifth bullet will be changed to include arsenic's correct FDEP-approved site-specific target level of 4.62 mg/kg. Text stating that arsenic did exceed the site-specific non-residential target level will be added.

The sixth bullet will be changed to refer to "subsurface soil." Aroclor-1242 has exceeded the Florida SCTL for leachability instead of the industrial value and will be changed accordingly.

Site 15 Human Health and Ecological Risk Review Comments:

GENERAL COMMENTS

27. The results of investigations conducted at Site 15 are presented in Section 5 (Investigative Results section) of the document. Throughout the chapter, the analytical results and the various screening criteria are presented in table form for each media evaluated. Generally, it appears that USEPA Region III Risk-Based Concentrations (RBCs) are not adjusted by 0.1 for noncarcinogenic constituents. However, this does not

seem to be consistent throughout the section. For example, it appears that the values have been adjusted on Table 5-14. The RBCs have been appropriately adjusted during screening in the risk assessment section of the document. Therefore, it is acceptable for the values to remain unadjusted in the Investigative Results section since they are presented for informational purposes only. However, the information that is presented should be consistent. Section 5 of the document should be reviewed and corrected accordingly.

Response: Section 5 tables will be revised to be consistent in the presentation of USEPA Region III Risk-Based Concentrations.

SPECIFIC COMMENTS

28. **Section 5.5, Page 5-45**. The section presents a discussion of the surface soil analytical results for Site 15. The text states that dibutylphthalate was detected in six samples at concentrations ranging from 730 to 1,100 ug/kg. This is inconsistent with the information presented on Table 5-9. According to the table, the range of dibutylphthalate concentrations is 560 to 1,100 ug/kg. The discrepancy between the text and table should be corrected.

Response: The range of dibutylphthalate will be changed to 560 to 1,100 ug/kg as shown in Table 5-9.

29. **Table 6-8**. The table presents a summary of the risks calculated for receptors identified under future land use. According to Table 6-8, the hazard indices calculated for ingestion of groundwater for the adult and child are three and seven, respectively. However, this is inconsistent with the values presented in Tables G-24 and G-25. These tables indicate that adult and child hazard indices are four and eight, respectively. The discrepancy should be corrected.

Response: Table 6-8 has been reviewed and the hazard indices for ingestion of groundwater for the adult and child will be changed, according to Tables G-24 and G-25, to four and eight, respectively.

30. **Section 6.8, Page 6-34**. It is stated in the text that the human health contaminants of potential concern (HHCPCs) detected in subsurface soil do not pose unacceptable carcinogenic risk to the receptors evaluated. However, no subsurface HHCPC were identified at Site 15. The text of this section and the Executive Summary should be amended in order to avoid unnecessary confusion.

Response: The text will be revised to indicate that no HHCPCs were identified for subsurface soil.

31. **Figure 7-2, Page 7-6**. Figure 7-2 shows the contaminant pathway model for Site 15 ecological receptors. Shading of the boxes indicates exposure pathways that are quantitatively evaluated for receptors in Site 15. Nonshaded boxes indicate insignificant exposure pathways. The soil-to-food-to-ingestion pathway for terrestrial invertebrates is not shaded meaning it is not considered to be a significant exposure pathway. This is somewhat misleading because the soil-to-food-to-ingestion pathway is a significant route of exposure. However, since the majority of food for terrestrial invertebrates comes from soil, exposure via soil ingestion and food ingestion can be lumped into one exposure route. Soil ingestion and food ingestion should both be shaded and a note should be provided about them being essentially one pathway and that they will be analyzed as such.

Response: The box for terrestrial invertebrate soil-to-food-to-ingestion pathway will be shaded in Figure 7-2. The following footnote will be added to the table; The ingestion exposure routes for terrestrial invertebrates include the ingestion of soil and food items containing chemicals accumulated from Site 15 surface soil.

32. **Section 7.2.3, Pages 7-7 and 7-8**. This section presents the hypotheses developed to gauge risks associated with exposure to surface soil. Hypothesis number 4 on page 7-8 discusses ECPC in groundwater. The first sentence of the fifth paragraph on page 7-7 should be changed to, "Four hypotheses were developed to gauge potential risks associated with exposure to Site 15 surface soil *and groundwater*."

Response: The second paragraph in Section 7.2.3 will replaced with the following: *"Four questions were developed to gauge potential risks associated with exposure to Site 15 surface soil and groundwater. These questions are designed for multiple species and trophic levels and represent both individual and community dynamics. Questions for the Site 15 ERA include the following:"*

33. **Table 7-1, Page 7-8**. Table 7-1 shows the endpoints selected for the ecological risk assessment. In Section 7.2.3, the assessment endpoints are defined as representing the ecological component to be protected. However, in Table 7-1 the assessment endpoints for terrestrial plants and terrestrial invertebrates are stated as being a reduction in the biomass of terrestrial plants used as forage material and a reduction in the abundance of earthworms used as forage material, respectively. Reductions in forage material are not ecological components to be protected. The assessment endpoints in Table 7-1 are not consistent with the definition of an assessment endpoint provided in section 7.2.3. This inconsistency should be corrected.

Response: The receptors for the first two assessment endpoints in Table 7-1 will be changed from terrestrial plants and invertebrates to wildlife species. Therefore, a reduction in forage material is an ecological component to be protected, as a reduction in

forage material would have a direct effect on the receptors of concern (i.e. wildlife species).

34. **Table 7-2, Page 7-13**. Table 7-2 provides information on the selection of ECPCs such as detected concentrations and screening values. It is reported in Table 7-2 that the ecological screening value for zinc is not available. However, when referencing Beyer (1990), a screening value of 200 mg/kg was found. This value should be use in Table 7-2.

Response: The screening value of 200 mg/kg will be added to Table 7-2, and the ERA will be revised accordingly.

35. **Section 7.4.1, Page 7-18**. The second paragraph on page 7-18 involves groundwater EPCs. It is explained that a 10-fold attenuation factor is applied to the RME concentration in order to derive a realistic exposure concentration for groundwater constituents in the surface water of Clear Creek. It is unclear as to how the "10-fold attenuation factor" was derived. This needs to be clarified.

Response: The 10-fold attenuation factor is a conservative estimate of the attenuation that occurs between groundwater and surface water exposure.

36. **Section 7.4.2, Page 7-18**. Several sections in chapter 7 (e.g. Section 7.4.2 and Section 7.3) refer the reader to information in the General Information Report (GIR) prepared by ABB-ES in 1998. Information such as PDE calculation methodologies and background investigation data are only available in the GIR and are not provided in this report. It would be helpful for pertinent information to be provided in an appendix to this report.

Response: The background data are provided in the NAS Whiting Field GIR and will not be added to the RI report. The GIR was created to reduce the presentation of redundant information in the RI reports and contains a large amount of technical information that would be unwieldy to append to each RI report.

37. **Table 7-4, Page 7-19**. This table provides the equations used to calculate the potential dietary exposures for wildlife receptors. The variable "TN" is given three different definitions in Table 7-3. They are as follows, 1) the tissue concentration in food item N, 2) the secondary prey item concentration, and 3) the primary prey item concentration. Clarification (e.g., T_p for primary prey item tissue concentration and T_s for secondary prey item tissue concentration) in Table 7-3 would be beneficial.

Response: The variable T_N will be modified so that T_{N1} refers to the tissue concentraion of the primary prey item, T_{N2} refers to the tissue concentration of the secondary prey item, and T_N refers to the tissue concentration of either the primary or secondary prey item.

The rationale provided in the ERA for not calculating bird tissue concentrations is the lack of avian bioaccumulation factors (BAFs). Since contaminant concentrations in birds as a secondary prey items were not calculated, it should be stated in section 7.4 how PDEs for the red fox and red-tailed hawk were calculated without the avian BAFs.

Response: The text in section will not be revised however an uncertainty will be added in Section 7.7 to address this issue. The following uncertainty will be added to section 7.7. The PDEs for the red fox and red-tailed hawk assume no exposure from small birds as prey items due to a lack of avian BAFs. Birds make-up a small portion of the red fox and red-tailed hawk diet, and for this evaluation it is assumed that small birds would not provide a source of contaminant exposure. In addition, the risks predicted (i.e. the HQs and HIs) for the red fox and red-tailed hawk were so low that it is unlikely that including avian BAFs (if they were available) would alter the findings of the ERA.

38. **Section 7.4.2, Pages 7-18 and 7-20**. The second bullet in Section 7.4.2 provides a discussion of the short-tailed shrew as a wildlife receptor. The home range of the short-tailed shrew is not provided in this discussion although the home ranges for other ecological receptors are provided in this section. The home range of the short-tailed shrew should be provided in the first bullet.

The second bullet on page 7-20 provides a discussion of the red-tailed hawk as a wildlife receptor. The home range of the red-tailed hawk is not provided in this discussion, although the home ranges for other ecological receptors are provided in this section. The home range of the red-tailed hawk should be provided in the fourth bullet.

Response: The home range for the short-tailed shrew will be included as suggested. The first sentence in this paragraph will be revised as follows; ".... , and brush, and has a home range of approximately 1 acre".

The home range for the red-tailed hawk will be included as suggested. The first sentence of this paragraph will be revised as follows; "... on small mammals, and has a home range of approximately 800 acres".

39. **Table 7-6, Page 7-21**. This table describes the exposure parameters for representative wildlife species used as receptors in this remedial investigation. Many of the parameters are cited from the *Wildlife Exposure Factors Handbook* (USEPA, 1993); however, it is not consistently stated whether an average of the exposure parameter is calculated or if a certain study was selected. For example, it is not explained in Table 7-5 how the values in the column titled, "Assumed Diet for Terrestrial Exposure Assessment (% of diet)," were derived. The dietary composition data for the deer mouse (surrogate for the cotton mouse) provided in the handbook are seasonal percentages with invertebrates comprising as much as 63% of the deer mouse's diet, but Table 7-6 states that invertebrates make up

10% of the deer mouse's diet. It should be clarified in Table 7-6 how the values in the dietary composition column were derived from the data provided in the handbook.

The food ingestion rate (FIR) for the red-tailed hawk was calculated using the bird equation based on body weight from the *Wildlife Exposure Factors Handbook* (USEPA, 1993). An FIR of 0.133 kg/day for the red-tailed hawk is presented in table 7-6; however, when calculated using the EPA bird equation and the body weight provided in Table 7-6, an FIR of 0.059 kg/day results. This calculation should be reevaluated and checked for accuracy.

In Table 7-6 it is stated that the body weight of the red-tailed hawk is 1.02 kg with a footnote of [I]. However, footnote [I] refers to the bird food ingestion equation, not to the derivation of body weight. The footnote for the red-tailed hawk body weight should be changed to indicate the source of the body weight value.

Response: The dietary composition data in Table 7-6 were derived based on average exposure parameters cited in the *Wildlife Exposure Factors Handbook* (USEPA, 1993). The table footnotes will be revised to clarify this distinction.

The food ingestion rates were re-calculated for the eastern meadowlark and red-tailed hawk. The FIR for the eastern meadowlark is correct. However, the FIR for the red-tailed hawk was calculated incorrectly, the correct FIR for the red-tailed hawk should be 0.059 kg/day. The ERA will be revised as required.

The footnote will be changed to [h], as the body weight for the red-tailed hawk, used in this evaluation was presented in Terres 1980.

40. **Section 7.6.4, Page 7-32**. In this section, it was concluded that it is unlikely that the predicted levels of zinc in the groundwater will have an adverse effect on aquatic receptors in Clear Creek. This was concluded in spite of the fact that the predicted groundwater exposure concentrations of zinc (27 µg/L) exceed the AQUIRE value of 17 µg/L. The reasoning behind this conclusion is that a review of additional AQUIRE data for zinc indicated that the predicted 27 µg/L exposure concentration would not result in adverse effects to the majority of the aquatic receptors in Clear Creek. Although this conclusion is believed to be accurate, the reasoning behind this conclusion should be further discussed in this section.

Response: The text will be modified to include more details on the reasoning behind the conclusion of no adverse effect to aquatic receptors from exposure to zinc. The following text will be added to this section: The AQUIRE data on zinc was reviewed for toxicity information on specific receptors that would most likely inhabit Clear Creek. The results of this review indicated that exposure to concentrations of zinc at 27 ug/L would not pose a risk to these aquatic receptors.

41. **Section 9.1, Page 9-1**. The text states that three volatile organic compounds (VOCs), seven semi-volatile organic compounds (SVOCs), and one pesticide compound were detected in Site 15 surface soil samples. However, these constituents are actually found in subsurface soil samples. The text of this section and the Executive Summary should be corrected accordingly.

Response: The text of section 9.1 and the Executive Summary will be corrected to refer to subsurface soil samples.

42. **Table H-1**. This table presents bioaccumulation factors (BAFs) for terrestrial invertebrates, terrestrial plants, mammals, and birds.

It is not possible to confirm the mammal BAFs for semivolatiles using the cited Travis and Arms equation for biotransfer factors with conversion to BAFs. The average ingestion rate used for this calculation in the ERA was not provided. Provide more information on the calculation of the mammal BAFs and re-confirm the calculated mammal BAFs.

Table F-1 provides a plant BAF of 6.7E-03 for bis(2-ethylhexyl)phthalate, Di-n-butylphthalate, and butylbenzylphthalate. However, when recalculated using the equation in footnote [d], a plant BAF of 8.7E-03 was obtained for bis(2-ethylhexyl)phthalate, 7.6E-03 for Di-n-butylphthalate, and 1.1E-02 for butylbenzylphthalate. Please review these calculations and address the discrepancies.

Response: The average ingestion rate for lactating and non-lactating cows is 12 kg feed/day (dry weight). As noted in footnote [e] in Table H-1, this value was converted to a wet weight prior to calculation of a BAF. This ingestion rate for lactating and non-lactating cows will be included in footnote [e], in Table H-1. The mammal BAFs for Di-n-butylphthalate, and bis(2-ethylhexyl)phthalate, calculated using this equation are 2.4E-01 and 1.9E-01, respectively. The BAF for Di-n-butylphthalate will be used as a surrogate for butylbenzylphthalate, as a BAF was not calculated for this analyte because it has a log Kow value of <5.

The calculations were reviewed and the USEPA reviewer is correct in stating that the plant BAF for bis(2-ethylhexyl)phthalate and Di-n-butylphthalate should be 7.6E-03 and 8.7E-03, respectively. However, the BAF for Di-n-butylphthalate will be used as a surrogate for butylbenzylphthalate, as a BAF was not calculated for this analyte because it has a log Kow value of <5.

43. **Table H-2**. Table H-2 presents ingestion toxicity information. The Lowest Observed Adverse Effect Level (LOAEL) column heading should not be under the lethal reference toxicity value (RTV) heading. The LOAEL should be presented only with sublethal

RTVs. The column headings need to be verified to ensure that they reflect the data in the column and be revised as necessary.

Response: LOAEL values for mortality are available (i.e., mortality in 6% of the population); therefore, it is appropriate to list these values under the "lethal RTV" heading. As described in Section 7.5.1 of the ERA, data used to select lethal RTVs includes NOAEL and LOAEL data, as well as well as LD 50 values from literature.

44. **Table H-3**. Table H-3 presents the RTVs selected for the ERA while Table H-2 presents ingestion toxicity data for wildlife.

For zinc, an LD50 derived lethal RTV of 502 mg/kg/BW/day was used in Table H-3 and a LOAEL derived sublethal RTV of 20 mg/kg/BW/day was used in Table H-3. However a lower lethal RTV of 3.9 mg/kg/BW/day and a lower sublethal RTV of 16 mg/kg/BW/day are both available as listed in Table H-2. The lowest possible RTVs should be used in Table H-3. Please review this calculation and address this discrepancy.

Response: The lethal and sublethal RTVs presented in Table H-3 were used as the selected RTVs because the effects measured in the laboratory tests were more closely related to the chosen assessment endpoints. The alternatives listed in Table H-2 (i.e., lethal RTV of 390mg/kg/BW-day and sublethal RTV of 160 mg/kg/BW-day) are consistent with the selected RTVs, and are based on effects that are not as closely related to the chosen assessment endpoints as the selected RTVs. In addition, the RTV values identified in the reviewers comment are not consistent with the RTVs listed in Table H-2.

EDITORIAL COMMENTS

45. **Section 7.5, Page 7-25**. The first sentence on page 7-25 mentions Site 18 when it is believed that Site 15 is being referred to. This discrepancy should be addressed.

Response: The first sentence on page 7-25 will be corrected to refer to site 15.