

**Baker**

5/6/02-03536

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May 6, 2002

Commander  
Atlantic Division  
Naval Facilities Engineering Command  
1510 Gilbert Street (Building N-26)  
Norfolk, Virginia 23511-2699

Attn: Mr. Kirk Stevens, P.E.  
Code EV23-KAS

Re: Contract N62470-95-D-4818  
Navy CLEAN, District III  
Contract Task Order (CTO) 0219  
Response to Comments - Draft Remedial Investigation Report  
OU No. 19 Site 84, MCB Camp Lejeune

Dear Mr. Stevens:

Baker Environmental, Inc. (Baker) is pleased to submit one copy of the Response to Comments for the Draft Remedial Investigation (RI) for OU No. 19, Site 84. Comments were received from MCB Camp Lejeune, North Carolina Department of Environmental Resources (NCDENR) Groundwater and Superfund Sections, the United States Environmental Protection Agency (USEPA) Region IV, and the Naval Environmental Health Center (NEHC). Each comment and the corresponding response are provided in Attachment A. These comments will be addressed and incorporated into the Final RI.

Please review the attached responses and, upon making any changes you feel are necessary, distribute to the Partnering Team. For your convenience, an electronic copy was emailed to you for any edits you wish to make prior to your submittal.

Sincerely,

BAKER ENVIRONMENTAL, INC.



Jeffrey P. Tepsic, P.G.  
Project Manager

JPT/lp

cc: Ms. Beth Collier, LANTDIV, Code AQ115 (w/o attachment)  
Mr. Scott Bailey, CH2M Hill  
Mr. Chris Bozinni, P.E., CH2M Hill

**ATTACHMENT A  
RESPONSE TO COMMENTS ON  
SITE 84 DRAFT RI**

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**Response to Partnering Team Comments on  
DRAFT REMEDIAL INVESTIGATION REPORT  
Operable Unit 19, Site 84, MCB Camp Lejeune, North Carolina  
April 30, 2002**

Partnering Team comments are provided below followed by the response designated in **bold type**. Comments on the Draft Remedial Investigation Study have been provided by USEPA Region IV, the NEHC, the NCDENR Groundwater (Wilmington Regional Office) and Superfund Sections, LANTDIV, and MCB Camp Lejeune.

**EPA REVIEW COMMENTS (Received March 13, 2002)**

**OVERALL TECHNICAL COMMENTS**

This document was reviewed using EPA's Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA, October 1988, EPA/540/G-89/004" as well as Region 4 policy regarding the performance of human health and ecological risk assessments. While this report is a good synopsis of the work done to date, there are several areas where the work performed does not meet the requirements of current EPA policy and guidance. For example, the eight step ecological risk assessment process is followed selectively, the analytical data is not compared to 2x the mean background value and there is not delineation of groundwater contamination. It is understood that the groundwater contaminants identified are routinely found on the Base, however, they should be discussed in the proper sections of the text. Although active remediation would not be required, there would be a need to restrict groundwater use. Please see the following general and specific comments for details.

**RESPONSE:**

**The human health and ecological risk assessments will be revised to better meet the requirements of current EPA policy and guidance. The ecological risk assessment will be revised so that analytical data is compared to 2x the mean background values. Additional text will be inserted in appropriate sections of the report providing more discussion of contaminants identified in groundwater. Further, the report will recommend aquifer use restrictions and a monitoring program. A discussion of the impact to groundwater whether by site specific activities or naturally occurring elements, will be incorporated into the Final RI report, and carried through into the Final FS. Groundwater at the site will continue to be evaluated through a monitoring program. Inorganic exceedences will be compared to base background information, when that data becomes available. All other exceedences (e.g., pesticides, petroleum compounds) will be monitored and compared to Federal and State groundwater quality standards.**

## **I. GENERAL COMMENTS**

1. The report does meet the objective stated in the Executive Summary of evaluating whether the site's contamination has impacted the shallow water table aquifer. However, it does not meet one of the report's objectives and one of the most basic tenets of a Remedial Investigation; determining the extent of that contamination. While there appears to be downgradient horizontal delineation of groundwater contaminants, there is no vertical delineation of groundwater contaminants in this investigation. There were no constituent exceedences of Federal Primary MCLs, but there were exceedences of North Carolina standards, which should require vertical delineation. Additionally, there were pesticide detections in the most upgradient groundwater monitoring well (as seen in Figure 4-12), thereby calling into question the water quality coming onto the site. (It is noted that MW-19 is probably upgradient of MW-18. It was sampled and did only have one very minor pesticide detection. However, this additional data point is not included in the cross section, the potentiometric surface map or mentioned as a representation of a clean background well for Figure 4-12, Positive Detections of Organic Compounds in Groundwater.) Given the soil contamination at this site, the non-petroleum compounds detected in the groundwater and the seven public supply wells within a one mile radius, additional groundwater characterization should be performed.

### **RESPONSE:**

**A monitoring program will be included in the recommendations that will involve a minimum of four rounds of sampling for pesticides, BTEX and natural attenuation parameters. These results will be used to determine if concentrations are decreasing over time. In addition, an aquifer use restriction will be recommended in the Final RI report. The restriction would remain in place until all contaminants of concern have reached acceptable levels (i.e., below the NCWQS 2L Standards and/or Federal MCLs). For inorganics, a comparison of site data may be made to background levels once data are available. A base background study is currently ongoing, and will provide comparison data for inorganics detected in groundwater. Based upon the results of this comparison, metals may be removed as chemicals of potential concern if they are below agreed upon base background concentrations.**

2. In a similar vein, there is insufficient deeper characterization of the surficial aquifer. There is no understanding of the aquifer eight or ten feet below the top of the water table. There is no information, for example, as to the depth to the first aquitard or aquiclude, the direction and value of any vertical groundwater gradients or the potential for discharge of the groundwater to the adjacent surface water. Given the soil contamination at this site, the non-petroleum compounds detected in the groundwater and the seven public supply wells within a one mile radius, additional groundwater characterization should be performed.

**RESPONSE:**

Information regarding deeper hydrogeologic data is available from previous UST investigations and basewide hydrogeologic characterizations. This data will be added as appropriate to the Final RI document. Previous UST investigations have resulted in monitoring wells of up to 50 feet below ground surface. Data from the deeper monitoring wells and hydrogeologic studies will be incorporated into additional cross-sectional maps and potentiometric surface map(s) where appropriate.

In response to the comment regarding public water supply wells, there are actually five operating supply wells within a one-mile radius of Site 84, as opposed to the seven shown in the draft document. New information provided by the Base indicated that two of the public supply wells (616 and 645) are no longer in service. The public water wells are located one mile hydraulically upgradient of the site, making it unlikely they would be impacted by contaminants originating at Site 84. Figure 3-8 will be modified to reflect these changes. The inclusion of existing hydrogeologic data to define aquifer conditions at depth, the presence of the public supply wells upgradient of the site, and the inclusion of an aquifer use restriction will be sufficient in meeting the request of additional groundwater characterization at the site.

3. The report does not contain a quality assurance/quality control (QA/QC) report from the laboratory. Please include this evaluation of the QA/QC activities in the next revision of this report.

**RESPONSE:**

The narratives from the QA/QC laboratory report will be included in the Final version of the RI report, as an Appendix.

**II. SPECIFIC COMMENTS**

1. ES-9, Groundwater Bullet and No. 8

While there may be no planned use for the groundwater in this area, compounds are present that do present an unacceptable risk. Therefore, groundwater should be addressed in the Feasibility Study after the Team agrees that the aquifer and its contamination is sufficiently characterized.

**RESPONSE:**

During the March 28, 2002 conference call in which the draft RI/FS documents were discussed, the Partnering Team agreed that groundwater was sufficiently characterized (pending the inclusion of the data described in EPA General Comment number 2). The Final Feasibility Study will present an alternative that

includes a monitoring program with aquifer restrictions. In addition, BTEX, pesticides and metals in groundwater will be addressed in the Final Feasibility Study. Detected metals in groundwater may be excluded as chemicals of concern pending comparison of site data to concentrations of background metals to be identified in the base background study. Upon completion of the base background study and establishing values of background metals concentrations, it may become evident that the concentrations of metals found in this study are similar to those naturally occurring concentrations.

Petroleum contamination northeast of former Building 45 is present due to former USTs. This groundwater issue is discussed in the RI document, with contaminant boundaries presented. Remediation is being addressed under the UST program by the operation of the SVE/air sparging system. The system has been designed to remove petroleum contamination near former Building 45. In addition, new information was presented during the March 28, 2002 conference call describing how the planned removal action for soil and Building 45 foundation materials would also include excavation of soil in the area of the petroleum contamination.

2. Table 2-7. There are several discrepancies noted between the listing of the quality control samples in this table and the reporting of the analytical data for these samples in Appendix F. Seven trip blanks (TB) are listed in this table yet data for eight TBs are included in Appendix F. There is no data for TB 1 and TB 3 is reported twice, with different dates. Table 2-7 lists 12 equipment rinsate (ER) samples and data for 12 ER samples are reported in Appendix F. However, there is no data reported for ER 6 and data is reported for ER 13 although this sample is not listed in Table 2-7. Please correct these discrepancies in the next revision of this report.

**RESPONSE:**

**Table 2-7 and Appendix F will be corrected to accurately present the analytical results for the quality control samples.**

3. Table 4-8. The column width for this table appears to truncate the ends of some of the sample IDs making it difficult to readily ascertain just which sample the data is presented for. Please reformat the table to include the entire sample ID.

Additionally, the detection limits for the PCB analyses for sample IR84-DP45-03 seem high. Given the elevated values of PCBs detected in adjacent samples, this location should be given careful consideration during the upcoming Non-Time Critical Removal Action so as not to leave behind inappropriate amounts of PCBs.

**RESPONSE:**

**Table 4-8 will be reformatted to include the entire sample identification numbers. The area where sample IR84-DP45-03 detected elevated PCBs is local to former Building 45, and consistent with other data in this part of the site. This area is**

addressed in the Feasibility Study and the Non-Time Critical Removal Action. The removal action will include confirmatory sampling to ensure remediation endpoints are met at all locations across the site.

4. Figure 4-7. The text in the note presents conflicting information. Please revise as necessary.

**RESPONSE:**

The text in the note on Figure 4-7 will be revised as appropriate to reflect the proper colors for exceedences of Region IX PRG values and background values.

5. Figure 4-9. The PCB value of location DP18-02 appears significantly elevated. It is unclear if this area is planned to be included in the upcoming removal. However, PCBs should be further delineated in this area.

**RESPONSE:**

A significant portion of PCB contamination at Site 84 is local to former Building 45, however, other portions of the site exhibit concentrations above the applicable regulatory standards (i.e., TSCA) and guidance criteria (i.e, Region IX PRGs). For example, the lagoon has long been known to be a source of contamination. And there are other sampling locations across the site with high concentrations of PCBs; DP18-02 is one of these locations. Note that the highest detection observed to date is SB27-01 at 200,000  $\mu\text{g}/\text{kg}$ , a surface soil sample located in the mid-field area shown on Figure 4-3. Although the removal action is focused on removing the remaining portions of Building 45 and impacted soil in that area, all other areas of the site must be, and will be addressed. These areas are defined in the Feasibility Study along with the various remedial alternatives. Further, the removal action work plan contains provisions for confirmatory sampling to ensure that remedial goals are met. Additional text will be added to the Final RI to better explain this process.

6. Figure 4-13. Units on this figure are listed as  $\mu\text{g}/\text{L}$ . A check of the analytical data in Appendix F indicates that these analytical values should carry the units  $\text{mg}/\text{L}$ . Additionally, the line drawn from the sample description box for MW09-01C is drawn to the wrong sample location. Please correct this figure as appropriate. The Federal MCLs noted are secondary standards. This should be included in the notation.

**RESPONSE:**

Agreed. The units on Figure 4-13 will be changed to  $\text{mg}/\text{L}$ , and the line drawn from the sample description box for MW09-01C will be corrected to reference the correct sample location. The notes will be adjusted on the figure to discriminate between primary and secondary MCLs.

7. Page 8-2, Section 8.1

The section regarding groundwater lists several compounds as exceeding screening criteria. These compounds do not match the compounds listed in the Baseline Risk Assessment subsection on the next page which are described as posing unacceptable risk. Please revise the text to correctly indicate which compounds belong in which discussion and recognize that there are non-petroleum compounds in the groundwater which do pose an unacceptable risk.

**RESPONSE:**

**The text in Section 8.1 includes a discussion of compounds that exceed regulatory standards or screening criteria as well as a discussion of COPCs identified as part of the HHRA. Criteria used in the HHRA to select COPCs involves more factors than regulatory criteria. Although the majority of the constituents listed in Section 8.1 were retained as COPCs since they exceed the PRGs, there were additional constituents the were retained as COPCs because the HHRA identified them as risk drivers. Section 8.1 discusses compounds that exceeded regulatory standards while the HHRA discusses constituents requiring potential action that may be risk drivers under the scenarios considered. Additional text will be added to the section to further clarify this approach.**

8. Page 8-4, Section 8.2

This section does not include any reference to the groundwater contamination which appears to be not delineated and does contain compounds which do pose unacceptable risk. Please revise this section to address these concerns.

**RESPONSE:**

**The recommendations section will be expanded to included a further discussion on groundwater, especially as it relates to compounds that pose an unacceptable risk. In addition, revisions will be made to include long term monitoring and institutional controls, restricting groundwater use (aquifer use restrictions).**

9. Figure A-5. This figure indicates a couple of features which were not explained in the text of the report. The transformer room has a floor drain which appears to connect with a storm sewer. It is unclear where this storm sewer drained and whether this area was investigated. Second, this drawing indicates a deep well. The report does not include any information regarding this well, the source of its water or the uses of the water. Please provide any information available regarding this well, its past use and current status.

**RESPONSE:**

**Figures contained in Appendix A (including Figure A-5) are historical figures dating from the 1930's. They were discovered a short time prior to the submittal of the**

report. It is interesting to note that the drawings show floor drains, with some apparently connecting to storm sewers. Information on where these drains lead, or their current disposition is not known. The fact that this type of underground piping existed helps to explain the resulting soil contamination (especially near former Building 45). While we were not able to gain any more details on drains or wells than what is shown on the figures, we have included them so readers would have access to as much information as we were able to obtain.

10. Appendix F.

Please number the numerous pages of this appendix.

**RESPONSE:**

**Appendix F will be revised to include page numbers.**

**OVERALL RISK ASSESSMENT COMMENTS**

One major problem with the human health section of this document is that too much critical information is not presented or discussed fully in the text; rather, the information is presented in various tables. For example, normally the text presents an exposure equation and includes a discussion about the factors included in the equation and the assumptions associated with specific factors. In this document, very little information is provided in the text and it is difficult to correlate and/or interpret the information in the tables.

**RESPONSE:**

**It is agreed that discussion on exposure equations and exposure parameters should be included in the text. Therefore, information on how and why the exposure parameter and assumptions were derived/selected will be included in Section 6.3.5. However, the exposure equations will not be presented in text for this document. For this document, the exposure equations will be presented in Volume II, Appendix H of this report. In future baseline human health risk assessments performed for MCB Camp Lejeune, the exposure equations will be included.**

The Ecological Risk Assessment is very confusing in the way that it was presented. The title of Section 7.0 is "Screening Level Ecological Risk Assessment and Step 3A B Refinement". The section starts out with Step 1 B Problem Formulation (which is correct) but Step 2 B Exposure Estimate and Risk Calculation is not well defined. In fact, parts of Step 3A (such as assessment endpoint selection) are presented following Step 1. In addition, measurement endpoints are presented in Step 3A, however, they should not be selected until moving to Step 4. It is important that these steps be done in proper order to ensure that the regulatory agencies have approved/disapproved using a Scientific Management Decision Point (SMDP). The issue of performing the ERA correctly is especially crucial since the assessment endpoints selected in this document are not

complete nor always appropriate. Although the ERA was not done in the correct order, the review of the ERA was performed to determine if risk had been determined correctly.

**RESPONSE:**

**The text will be modified to more clearly differentiate Steps 1, 2, and 3A. Screening-level assessment endpoints and measurement endpoints as presented in the text were meant to represent preliminary endpoints, which are the final aspect of screening level problem formulation per USEPA Region IV Amended ERA Guidance (USEPA 2000). To remove any possibility for confusing preliminary endpoints with the assessment and measurement endpoints as selected in Steps 3b and 4, the terms "assessment endpoints," "measurement endpoints," and "risk hypotheses" will be removed from the text and the text will be further clarified as appropriate.**

The Ecological Risk Assessment (ERA) also did not stop at Step 3A, but went on through the entire Step 3, which is not appropriate. At the conclusion of the ERA, it was recommended that a remedial action be conducted that will address lagoon sediments and surface soils at Site 84. This recommendation is not appropriate for inclusion in this section. Based on the contaminants present at this site, the recommendation should be that the ecological risk assessment should proceed through the rest of Step 3, get appropriate SDMP approval, and then continue to Steps 4 through 7.

**RESPONSE:**

**The conclusion of the ERA will be modified to state that in the absence of a clean up action at the site, the ERA should go forward (to Steps 3B and beyond).**

**III. SPECIFIC HUMAN HEALTH COMMENTS**

1. Page 6-2, Section 6.1., Para 1. This paragraph discusses the general location of Site 84 and Northeast Creek. Is fishing possible in this creek? If so, then fish ingestion should be added as a potential source of risk.

**RESPONSE:**

**Information has recently been provided indicating that Northeast Creek is used for recreation, including boating and swimming. There is also a certain population present who fish and crab out of this creek. This discussion will be included in Section 6.3.1. Currently, fish tissue samples are not available. Therefore, a fish ingestion scenario will be evaluated qualitatively and addressed in the uncertainty section of the baseline human health risk assessment.**

2. Page 6-7, Section 6.2.3., Para 1. This paragraph presents a discussion about the Contract Required Quantitation Limits (CRQLs) and percent moisture. The methodology presented for correction of solid samples using an aqueous blank concentration is a departure from normal EPA RAGS methodology. Appropriate RAGS methodology is

presented earlier in this section and it is unclear why this additional correction is being used as no reference was provided to support its use. Therefore, only approved RAGS methodology should be used for determination of contaminant concentrations in blanks as stated in RAGS unless additional rationale is provided to support the use of the correction factors presented in this text.

**RESPONSE:**

**Agreed. The text discussing the correction of solid samples using an aqueous blank concentration will be removed from Section 6.3.2.**

3. Page 6-7, Section 6.2.3., Para 2. The text discusses the use of background samples collected from areas that are not influenced by site contamination. First, the source of the background data is not cited and it is unclear if this background data set has been approved by EPA for use in the risk assessment. Second, based on the text, it is unclear if the base-wide background values used were Base-wide average concentrations plus two standard deviations or 2x's the average background value, as found in EPA Region 4 guidance. If base wide average concentrations plus two standard deviations was used, then the background comparison screen must be re-done using 2x's the average background value. Third, the text references Tables 6-1A through 6-2B, as the location of the background soil data, however, no background soil data is presented on these tables. Therefore, the tables should be amended to include the appropriate background data.

**RESPONSE:**

**The source of background data is the Final Base Background Study (Baker, 2001), reviewed and approved by NC DENR and MCB Camp Lejeune. This document is referenced in the last sentence of paragraph 2. The text incorrectly states that base-wide average concentrations plus two standard deviations were used in the selection of COPCs for surface and subsurface soil. The text will be revised to state that the background comparison screen was done using two times the average base background concentrations. Also, the appropriate background soil data will be incorporated into Tables 6-1A through 6-2B.**

4. Page 6-15, Section 6.2.4., Para 6 (Surface Water). This paragraph presents the results of the analysis of surface water in the lagoon and Northeast Creek. The number of samples taken for surface water from the lagoon and Northeast Creek needs to be added to the text. Additionally, the text should address why inorganics were not sampled in surface water.

**RESPONSE:**

**Agreed. The number of surface water samples taken from the lagoon and Northeast Creek will be added to the text. Also, text will be added to this section stating that inorganics were not sampled because at the time these samples were collected,**

**organics, particularly PCBs, were the focus of that investigation. Inorganic analysis was not included in the scope of work.**

5. Page 6-16, Section 6.2.4., Para 1 (Sediment). This paragraph presents the results of the analysis of sediment in the lagoon and Northeast Creek. The number of samples taken for sediment from the lagoon and Northeast Creek needs to be added to the text. Additionally, the text should address why inorganics were not sampled in sediment.

**RESPONSE:**

**Agreed. The number of sediment samples taken from the lagoon and Northeast Creek will be added to the text. Also, text will be added to this section stating that inorganics were not sampled because at the time these samples were collected, organics, particularly PCBs, were the focus of that investigation. Inorganic analysis was not included in the scope of work.**

6. Page 6-18, Section 6.3.1., Para 2. The text states that the surface water sampled from the lagoon and Northeast Creek is not conducive to swimming. Additional text needs to be added to this section to support this statement, especially for the Creek, since it has been stated that the Northeast Creek is a large tributary to the New River. Based on this statement, it does appear that either swimming or wading should be considered for the Creek. The text should also address whether the Northeast Creek could be used by a receptor for fishing or crabbing. If there is a possibility that the Creek is used for fishing, this exposure scenario must be included in the risk assessment.

**RESPONSE:**

**Please see response to Specific Human Health Comment number 1.**

7. Page 6-22, Section 6.3.3., Para 3. Quantification of Exposure. This paragraph presents a brief discussion concerning methods used to quantify exposure. The reader is referred to Tables 6-6 through 6-12, as the location of the equations used to calculate the chronic daily intakes (CDIs) and dermally-absorbed doses (DADs). The text should first present the equation used for each exposure pathway followed by a discussion of factors selected, for example, the skin surface area. While the equations should be included with each table, a presentation of each equation used and the factors and assumptions used for that equation should be included in this section.

**RESPONSE:**

**Agreed. Information on how and why all exposure parameters and assumptions were derived/selected will be included in Section 6.3.5. However, the exposure equations will not be presented in text for this document. For this document, the exposure equations will be presented in Volume II, Appendix H of this report. Please note future baseline human health risk assessments performed for MCB Camp Lejeune will include the exposure equations.**

8. Page 6-25, Section 6.3.5., Exposure Input Parameters. This paragraph presents a brief discussion about the parameters used to quantify chemical uptakes. The reader is referred to Tables 6-6 through 6-12 as the location of parameters for each complete exposure pathway. It is not sufficient to provide a list for the parameters of concern in tables. For example, the text does not discuss the parameter selected using best professional judgment regarding the exposure duration of 4 years for the military base personnel (in the tables as 4 years B standard tour of duty). The text should include the justification for using 4 years and the source of this information.

Therefore, for each receptor in this section, the text needs to be expanded to include a discussion of the parameters of exposure associated with that receptor and parameters selected using best professional judgment and site-specific information.

**RESPONSE:**

**Please see response to Specific Human Health Comment number 8.**

9. Page 6-28, Section 6.5., Risk Characterization. This paragraph discusses the risk characterization process. However, the risk characterizations presented in this section, with regard to the before non-TCRA and after non-TCRA should be more fully discussed, especially with regard to sample sizes in each media from before and after the non-TCRA.

**RESPONSE:**

**Discussion regarding the before and after non-TCRA scenarios is provided in Sections 6.2.1 and 6.3.1. However, it is agreed that more information concerning sample sizes in each media from before and after the non-TCRA should be added to the text. Furthermore, this expanded discussion will also be included in Section 6.5.**

10. Page 6-33, Section 6.5.3.3., Para 6. It is stated that surface water and sediment did not contribute significantly to the total site risk or hazard levels. While this statement is true, this section is a presentation of the risk characterization, therefore, the actual values determined for the risk and hazard should be presented, followed by the statement currently in the text.

**RESPONSE:**

**Actual values determined for the risk and hazard from surface water and sediment are presented on Tables 6-16A through 6-17B. A sentence will be added to this section directing the reader to these tables.**

11. Section 6.6.3. Exposure Assessment. This section discusses the uncertainty associated with performing exposure assessments. The uncertainty associated with groundwater and the belief that no plume exists, should be added to this discussion.

**RESPONSE:**

**Agreed. Uncertainty associated with groundwater and the conclusion that no plume exists will be included in Section 6.6.3.**

**IV. Section 7.0 Ecological Health**

12. Page 7-2, Section 7.1.1., Para 2. This paragraph and following paragraphs present a very brief discussion concerning Site 84, Building 45 Area and surrounding areas. While Sections 3.2.7 through 3.2.9 are referenced for a detailed description of the environmental setting for the site, the sections associated with the Ecological Risk Assessment should provide more detail than currently present. At minimum, the size of the lagoon, length and depth of Northeast Creek associated with the site, and the site area, should be included in this section.

**RESPONSE:**

**The text will be expanded to provide more details of the environmental setting.**

13. Page 7-3, Section 7.1.1., Para 2. The paragraph discusses Northeast Creek. Are fish or other aquatic receptors present in the Creek? The text should be expanded to discuss habitat associated with the Creek and presence of aquatic receptors (i.e., benthic invertebrates, fish).

**RESPONSE:**

**The text will be expanded to include the requested information.**

14. Page 7-3, Section 7.1.2., Para 5. The text states that duplicate samples were removed from the data set for these risk evaluations. The text then goes on to discuss how duplicate samples were included in the risk assessment. The text appears to conflict with earlier text and the text should be clarified.

**RESPONSE:**

**The text will be clarified to explain how duplicate samples were treated for the risk assessment.**

15. Page 7-9, Section 7.1.7., Para 1. This paragraph presents a discussion of assessment and measurement endpoints. The assessment endpoint discussion needs to be expanded to specifically address the four criteria presented in the Process Document. The four assessment endpoint criteria that should be discussed are: contaminants present and their concentrations; mechanisms of toxicity of contaminants to different organisms; ecologically relevant and sensitive receptors; and potentially complete exposure pathways.

**RESPONSE:**

The text will be modified and the terms “assessment” and “measurement” endpoints will be removed from the text and replaced with “preliminary” endpoints to clarify that the endpoints selected are not equivalent to assessment and measurement endpoints that would be developed in Steps 3b and 4. (It is noted that the four assessment endpoint criteria that are mentioned in the Process Document for Step 3b are also included, in more general terms, in the Screening-Level Problem Formulation, which ends with the identification of “preliminary endpoints.”)

16. Page 7-9, Section 7.1.7., Para 3. Table 7-1 is referenced as summarizing the assessment endpoints, risk hypotheses, and measurement endpoints. However, measurement endpoints are not selected until Step 4 and not in Step 3A. Therefore, the measurement endpoints should be removed from this table.

**RESPONSE:**

Table 7-1 will be modified to present only preliminary endpoints relevant to Step 1 (which indicate the biological interpretation of the media screening).

17. Page 7-9, Section 7.1.7., Para 3. First, it is unclear if this text is actually part of Step 1. If it is, then the selection of assessment endpoints at this step should be very generic in nature and risk hypothesis should not be selected until Step 3. Secondly, the text states that population traits of interest (survival, growth, and reproduction) represent components of a health population. And if any of these three traits are affected, then the population will be adversely affected. While this statement is a true generalization and applicable for most assessment endpoints, this generalization of assessment endpoints fails to consider the four criteria used to select assessment endpoints. For example, PCBs are present at this site and an assessment endpoint should have been developed to specifically address its risk through food chain bioaccumulation to higher-trophic receptors. However, this was not done. The assessment endpoints for this site should be reviewed to ensure that they properly address the four criteria presented in the Process Document for selection of assessment endpoints.

**RESPONSE:**

The text will be clarified to indicate that preliminary endpoints, which are part of the screening-level problem formulation (Step 1) are presented. No risk hypotheses, “assessment,” or “measurement” endpoints will be mentioned in the text. Steps 2 – Screening-Level Preliminary Exposure Estimate and Risk Calculation, will only include a screening of media values against Region IV screening values. Step 3A will include an evaluation of food web exposures that will provide information regarding potential risks of upper trophic level receptors to bioaccumulative chemicals such as PCBs.

18. Page 7-11, Section 7.2. This section is entitled “Ecological Effects Evaluation”. Is this section Step 2? If so, then text should be added to the first paragraph stating this fact.

**RESPONSE:**

**The text will be clarified to indicate that the Ecological Effects Evaluation is the second part of Step 1.**

19. Page 7-21, Section 7.3.2., Para 1. It is stated that “maximum site concentrations were compared to the base background mean plus two standard deviations”. It is unclear why “plus two standard deviations” was used. EPA guidance states that 2X’s the mean should be used for background comparison purposes. This issue is even more confusing because in Tables 7-14a and 7-14b, it is stated that 2Xs the mean background was used. This issue needs to be resolved and only 2Xs the mean background value used.

**RESPONSE:**

**The text and tables will be corrected to reflect comparison to background concentrations that are two times the mean background concentration.**

20. Page 7-23, Section 7.3.4., Para 3. The text states that it is possible that estimates of potential risk to upper trophic levels for the less conservative risk evaluation would increase after the removal action because areas of highest contamination for a given compound were outside of the removal area. First, it is assumed that the removal action is being based on human health risk concerns, therefore, risk to ecological receptors might not change from before or after the action. Second, the risk evaluation should be examining both maximum and average exposures, so any issue about contaminants remaining after the action should be addressed in the risk assessment. It is unclear then, what is trying to be stated in this paragraph and the paragraph should be re-written to better state issues associated with food web exposure risks.

**RESPONSE:**

**The paragraph in question will be removed from the text.**

21. Page 7-23, Section 7.3.4., Para 4. The paragraph states that a list of upper trophic level receptors was selected during the Work Plan, however, the red-tailed hawk was added later because hawks were observed near the site and site habitat is suitable for this species. Why wasn’t the hawk initially selected in the Work Plan, based on site habitat? After failing to include the hawk, are there other species that were also missed? Was a site visit done by a biologist/ecologist to identify site habitat, site species, and potential site species? These issues are crucial to ensure that appropriate receptors are addressed.

**RESPONSE:**

The Work Plan provided a list of receptors that were “likely to be selected,” with the caveat that the “list will be adjusted, as appropriate, following the site visit” (by an ecologist). A site visit was conducted by an ecologist, which lead to the addition of the red-tailed hawk to the list of upper trophic level receptors to be evaluated.

22. Page 7-24, Section 7.3.4. Lists for Terrestrial and Aquatic/Wetland Species. Two lists are provided which include a variety of species for examination. This list should be expanded to include a discussion that presents the rationale for inclusion of each species, i.e., known to be present at site, not present at site but present at other near-by sites, habitat suitable for foraging, nesting, etc.

**RESPONSE:**

The list will be expanded as requested.

23. Page 7-31, Section 7.6. Conclusions. The text recommends that a remedial action be conducted that will address lagoon sediments and surface soils at Site 84. This recommendation is not appropriate for inclusion in this section. Based on the contaminants present at this site, the recommendation should be that the ecological risk assessment should proceed through the rest of Step 3 and then Steps 4 through 7.

**RESPONSE:**

The conclusion will be edited to state that in the absence of a clean-up action at the site, the ERA should proceed through the rest of Step 3 and forward.

**NEHC REVIEW COMMENTS (Received March 20, 2002)**

**GENERAL COMMENTS:**

1. The document entitled “Draft Remedial investigation Operable Unit No. 19, Site 84 - Building 45 Area MCB Camp Lejeune, North Carolina,” was provided to the Navy Environmental Health Center (NAVENVIRT-ILTHCEN) For review on 22 January 2002. The report was prepared by the Atlantic Division, Naval Facilities Engineering Command by CHM2 Hill and Baker Environmental Inc.

**RESPONSE:**

None required.

2. This is a well-written, readily understandable report. We appreciate the Format of the report both from a technical and communication perspective.

**RESPONSE:**

**Thank you.**

3. The findings indicated that a contaminant source zone is present below the water table. Our main concern is the potential for continued migration of the total petroleum hydrocarbon (TPH) groundwater Plumes through the semi-confining layer of the upper portion of the Castle Hayne Aquifer (e.g., safety and integrity of the water supply wells). We believe that it would be beneficial to use a groundwater model (that is, developed for Camp Lejeune) to predict whether Site 84 contaminants may be within the influence of the drinking water supply wells. We also believe that it may be necessary to assess whether a chlorinated hydrocarbon DNAPL also may be present.

**RESPONSE:**

**At present the project scope does not call for a groundwater model. However, impact to drinking water supply wells has been addressed by locating the positions of these wells relative to the site and taking into consideration the contaminant concentrations. The monitoring wells at the site have not indicated the presence of DNAPL. Based on the dissolved concentrations present, a DNAPL source would not be expected. A groundwater monitoring program will be recommended for this site. As part of the monitoring program wells will be gauged for the presence of both LNAPL and DNAPL.**

4. Because this site is anticipated to remain an industrial/commercial area, we believe that future residential scenarios, to include the child and adult exposure assumptions, are not valid at this time. It would be appropriate to readdress this issue in a risk assessment if future base conditions, although highly unlikely, change so that residential use is under consideration as a land reuse option (that is, Base closure). However, we feel that the text should discuss whether current residential housing (either on or off-Base) may potentially be impacted by Site 84-related chemicals.

**RESPONSE:**

**Comment noted. However, the future residential receptor scenario is typically included as part of a human health risk assessment conducted for Superfund sites. While it is often unlikely that these sites will be developed for residential use, this receptor scenario is presented as the worst-case scenario. Also, discussion will be added to the text concerning impact to current residential housing from Site 84-related comments.**

5. Heating oil No. 2 customarily contains the same total petroleum hydrocarbon (TPH) hydrocarbon range associated with diesel Fuel. We would like to point out that the detection of heating oil range hydrocarbons in certain soil samples does not necessarily indicate an unidentified new source.

**RESPONSE:**

**Agreed. Previous operations at Site 84 may have contributed multiple sources of soil contamination, including heating oil and/or diesel fuel.**

6. We believe that the "Introduction" and "Executive Summary" sections of this document should state upfront that the only portion of Building 45 remaining is the foundation. This is important clarification purposes because it means that potential vapor intrusion into Building 45 is not a relevant concern for this site.

**RESPONSE:**

**The text in the "Introduction" and "Executive Summary" will be clarified to state that the only portion of Building 45 remaining is the foundation.**

**REVIEW COMMENTS AND RECOMMENDATIONS:**

1. Page ES-3, "Nature and Extent of Contamination"  
Page ES-7, "Conclusions and Recommendations"  
Pages 6-3 and 6-4. Section 6.2.2, "Identification of Data Suitable For Use in a Quantitative Risk Assessment"

**Comments:**

a. Page ES-3 states Polychlorinated biphenyls (PCBs) were detected in subsurface soils, but generally at lower concentrations than in surface soils, where widespread PCB distribution was found.

b. Page ES-7 states that PCB concentrations are above screening criteria in the subsurface soils. Concentrations of semi-volatile organic compounds and pesticides decrease significantly with depth.

c. Page 6-3 states that, during this remedial investigation (RI) of Site 84, the following environmental media were sampled: surface soils (zero to one foot below ground service [bgs]), subsurface soils (one to fifteen feet bgs). Shallow groundwater, and surface water. Sediment samples were collected in October 1995 and March 1998. No additional sediment sampling is scheduled.

d. Page 6-3 further states that the surface and subsurface soils data were evaluated as a single data set. This data treatment method results in an averaging of the high and low results unless the two soil media have similar levels of chemical concentrations. Thus, because site-related chemicals were found generally at higher concentrations in surface soils than in subsurface soils (there may be some confusion throughout the text on this issue), the calculated potential risk from exposure to surface soils, or in some cases, subsurface soils, would be higher than for exposure to a combined dataset of surface and subsurface soils. By combining these data, the "worst case scenario" of exposure to the

higher concentrations of chemicals in specific soil media would result in a lower calculated human health risk estimate.

**Recommendations:**

a. Consider taking additional surface water (creek) and sediment samples to obtain more recent data for these potentially impacted media. We feel that more recent data is needed to obtain a more accurate picture of present conditions, taking into consideration potential fate and transport of site-related chemicals.

b. Also, calculate the risk from surface and subsurface soils separately to obtain a clearer picture of the actual potential risk from each soil media. Typically, residential population may have greater potential contact with surface soils and construction workers have more contact with subsurface soil.

**RESPONSE:**

The primary concern for Northeast Creek has been the potential impact from PCBs. The original Project Plans called for additional surface water and sediment sampling from the creek. However, the Partnering Team decided that previous data was sufficient and no further sampling is necessary at this time.

Risks from surface and subsurface soil were calculated separately in this baseline human health risk assessment. The surface soil data set included data obtained from samples collected from 0 to 12 inches below ground surface (bgs). The subsurface soil data set included data obtained from samples collected from 1 to 15 feet bgs. Furthermore, future residential receptors were evaluated for potential exposure to surface soil and construction worker receptor was evaluated for potential exposure to subsurface soil.

2. Page ES-4, "Nature and Extent of Contamination"

Page ES-7, "Conclusions and Recommendations"

Page 1-2, Section 1.2, "Objectives"

Page 6-4, Section 6.2.2, "Identification of Data Suitable for Use in a Quantitative Risk Assessment"

**Comments:**

a. ES-4 states that petroleum free product was detected in two groundwater wells associated with the underground storage tanks (USTs), located about 110-feet northeast of Building 45 foundation at Site 84. Benzene also was detected above the screening criteria, in addition to TPH as diesel and gasoline. (Gasoline may contain up to 4.9% benzene).

b. Page ES-7 states that free-phase petroleum, as well as a significant dissolved phase plume has been identified associated with Site 84 past Base operations.

c. Page 1-2 states that petroleum contamination was not addressed in the initial sampling plan because these contaminants typically are addressed under the UST Program. However, the sampling plan was adjusted during the field program to meet the additional objectives identified during the partnering team meetings.

d. Page 6-4 states that shallow groundwater currently is not used as a potable source at the site. However, there remains the possibility that this facility may close in the future. For this reason, groundwater exposure was conservatively evaluated for future residential receptors.

e. Potable water for current receptors (that is, military Base personnel and recreational users) is supplied from water supply wells set in the lower reaches of the Castle Hayne Aquifer (e.g., typically 200 to 300 feet below ground surface [bgs]). Thus, groundwater exposure to current receptors was not estimated for this investigation.

f. Page 2-6 states that the slug tests for "unconfined aquifers" were used to evaluate all slug test data.

#### **Recommendation:**

We are concerned about the potential for continued migration of the total petroleum hydrocarbon (TPH) groundwater plumes through the semi-confining layer of the upper portion of the Castle Hayne Aquifer (e.g., safety and integrity of the water supply wells). Because of this potential, we believe that the adequacy of the groundwater monitoring wells installed at Site 84 (e.g., number, location, and depth) should be readdressed. Include a list of the additional objectives identified during the partnering team meetings. Discuss whether the potential exists for a chlorinated hydrocarbon plume to also be present (e.g., 1,4-dichlorobenzene and vinyl chloride were detected). Discuss the appropriateness of dealing with the TPH contamination from past UST spills/leakage in this Remedial Investigation (RI).

#### **RESPONSE:**

**The field program was adjusted during the investigation stage to provide a clearer understanding of groundwater conditions at the site. As the site history and sampling data indicated that the contaminant of concern at Site 84 was PCBs in the shallow soils, the objectives of the Partnering Team focused on the impact to shallow groundwater.**

**The Final RI report will include additional information regarding the deeper geologic conditions at Site 84 by making use of existing UST wells. In addition site wide hydrogeologic information will be presented with emphasis on the area of Site 84. The objectives of the Partnering Team set during team meetings will be clarified in the Final report. In addition, further text will be added to explain the appropriateness of dealing with UST contamination in the RI.**

3. Page F3S-7, "Conclusions and Recommendations". One of the conclusions lists on Page ES-7 is that the Northeast Creek does not appear to have been impacted by past site operations. Contaminants were not detected in surface water or sediment samples in the Creek. We believe that these statements may be misleading, as they are not based on current data.

**Recommendation:**

Consider taking additional surface water and sediment samples. State when the date and location of the last surface water and sediment samples were taken.

**RESPONSE:**

The primary concern for Northeast Creek has been the potential impact from PCBs. The original Project Plans called for additional surface water and sediment sampling from the creek. However, it was decided by the Partnering Team that previous data was sufficient and no further sampling is necessary at this time. Additional text will be added to stating the date and location of the surface water and sediment samples.

4. Pages 1-5, 1-6, Section 1.5.3, "Site Assessment, Tank S-781, Midway Park." Page 1-5 discusses Tank S-781, which was located near the former Building 45. The text does not state the tank contents. Page 1-6 states that 1,4-dichlorobenzene and vinyl chloride exceeding North Carolina Water Quality Standards (NCWQS) were detected in a groundwater well during a groundwater investigation associated with Tank S-781. However, page 1-6 states that these chlorinated hydrocarbon detections are not believed to be associated with this tank. We believe that this statement requires further clarification as to the potential source(s) of these compounds (e.g., waste oil tanks).

**Recommendation:**

Discuss the potential sources for these chlorinated hydrocarbons.

**RESPONSE:**

Activities at Site 84 began more than 70 years ago. The site contains multiple sources of potential contamination including storage tanks, power plant operations, heavy equipment maintenance, etc. While historical information is available and previous site investigations provide some understanding of sources and contaminant types, it is difficult to enumerate each source and classify resulting impacts. However, text will be added to the final report describing this situation, further explaining potential sources for chlorinated hydrocarbons.

5. Page 1-6, Section 1.5.4, "Five Well Site Check and Resample One Existing Well" Page 1-6 discusses the groundwater investigation associated with the underground

storage tank (UST) 45-I (waste oil) located on the south side of the former Building 45. Groundwater flow measurements by two different contractors provided conflicting data as to the direction of groundwater flow in this area. This reversal in groundwater flow direction makes it more difficult to attribute the chemicals detected to an alternative/additional source other than the waste oil tank.

**Recommendation:**

Evaluate whether sufficient hydrogeological data exist to accurately determine the groundwater flow directions. Consider using groundwater modeling techniques to help determine the fate and transport potential of site-related chemicals.

**RESPONSE:**

**Shallow groundwater flow direction is accurately described in the existing report. Previous potentiometric surfaces were defined using a smaller number of sampling points. Groundwater modeling is not presently scoped for this site. Contaminant fate and transport will be described qualitatively.**

6. Page 1-12, Section 1.5.12, "Concrete Chip and Surface Water Sampling" Page 1-12 states that the above ground portions of Building 45 were removed in 1999, with the foundation left in place. This is an important point because the question of vapor intrusion into buildings becomes irrelevant. We suggest using the term "former Building 45" if just the foundation exists at this time.

**Recommendation:**

Consider using the term "former Building 45" to help clarify that the building no longer exists, except for the foundation.

**RESPONSE:**

**Portions of the Final report will be adjusted using the terms "former Building 45" to help clarify that the building no longer exists, except for the foundation. (Note: This portion of the building is scheduled for removal as part on the planned non-TCRA.)**

7. Table 1-1D, "Summary of Previous Investigation Results Operable Unit No. 19, Site 84/Building 45 Area" The Table 1-ID uses "ND" to indicate nondetects but does not give the actual numerical value. It is also important that the data summary tables contain the necessary information for efficient risk assessment and regulatory review.

**Recommendations:**

The text should list the actual numerical value of nondetects or include footnotes listing the sample quantitation limits at the bottom of the sample summary figure.

**RESPONSE:**

This table, (and a large portion of Section 1.0), present data collected during previous investigations. The data are presented as available, in many cases quantitation limits were not presented in previous reports.

8. Page 3-10, Section 3. I .8, "Ecological Characteristics" Figure 6-2. "Conceptual Site Model"

a. Page 3-9 states that a portion of the New River is classified as estuarine water suited for commercial shell fishing.

b. Page 3-10 states that a wide variety of freshwater and saltwater fish species are found in the small lakes, the New River estuary, numerous tributaries, creeks and part of the Intracoastal Waterway, which comprise the aquatic ecosystems found on Marine Corps Base (MCB) Camp Lejeune (e.g., freshwater fish in the streams and ponds include largemouth bass, redbreast sunfish, bluegill, chain pickerel, yellow perch, and catfish).

c. The food-chain pathway is not depicted in Figure 6-2. Consumption of fish/shell fish, etc. should be considered a potential pathway of concern in the human health risk assessment (HHRA). However, the ecological risk assessment does provide the following tables pertaining to the food web: Tables 7-IRa, 7-1gb, 7-19, 7-20a, 7-20b, and 7-21.

**Recommendations:**

Consider the consumption of Fish/shell fish, etc. a potential pathway of concern in the HHRA.

**RESPONSE:**

**Fish/shell fish consumption will be discussed as a potential exposure pathway in the uncertainties section.**

9. Figure 4-3, "PCB Analytical Results of Detections in Surface Soil"  
Page 6-2, Section 6.1, "Site Location and Characterization"

**Comments:**

a. Page 6-2 states that the transformers containing polychlorinated biphenyl (PCB) associated with Building 45 were located and removed from the wooded area east of the former electric substation. Additionally, about 20 additional transformers containing PCB were removed from the lagoon. Although other transformers may still be buried in the area according to Building 45 maintenance personnel, minor excavations in the area did not locate any additional transformers.

b. The text does not state whether ground penetrating radar (GPR) and/or other similar techniques were used to try and locate potential buried transformers.

**Recommendation:**

Discuss whether subsurface imaging techniques, such as (GPR, were used to detect potentially buried transformers.

**RESPONSE:**

**Subsurface geophysical techniques were not used to further investigate the possibility of buried transformers. Based on available site history, burial of wastes and/or transformers was not indicated.**

10. Page 4-8, Section 4.6, "Immunoassay Field Screening (PCBs) Results" Page 4-8 states that 60 samples were field tested using the EnSys immunoassay field test kits. These test kits provide results of PCB analysis in one of four concentration ranges, down to 1 part per million (ppm). The United States Environmental Protection Agency (U. S. EPA) Region 9 preliminary remediation goal (PRG) Tables lists 0.22 milligrams per kilogram (mg/kg) for PCBs as the preliminary remediation goal (PRG) for residential soil (with 1.0 mg/kg for industrial soil). This Region 9 residential soil screening value is lower than the Toxics Substance Control Act (TSCA) value of 1 ppm. This 1-ppm PCB value has been used previously as a PCB-cleanup policy at other Navy sites.

**Recommendation:**

Review the off-site laboratory results for consistency with the immunoassay field test results. If these results do not agree, discuss what corrective measures could be taken. Discuss the drawbacks associated with use of the immunoassay field test kits, to include detection limits potentially above regulatory screening levels, accuracy, etc.

**RESPONSE:**

**The immunoassay field tests were used as a screening tool to define PCB contamination. As PCB concentrations at Site 84 were known to exist over a relatively large area, using field test kits provided an efficient method of defining the soil contamination. Field test results were examined to determine which samples required further testing by the fixed based laboratory.**

11. Page 6-3, Section 6.2.1 - "Data Evaluation"

**Comments:**

a. Page 6-3 states that unreliable data were removed from the data set based on the U.S. EPA's established guidelines. The text does not state the percentage of data removed

from the data set. This information would be useful in evaluating the quality control/quality assurance (QA/QC) procedures followed and in understanding the strength of the data.

b. Page 6-3 provides the data treatment methods used for handling duplicate sample results. We think that it would be useful to quantify the variation in duplicate sample results. This variation may be related to the laboratory analysis, to the sampling procedure, or to the site-conditions (e.g. heterogeneous soil).

**Recommendation:**

State the percentage of data qualified as “unreliable” and removed from the data set. Quantify the variation in the duplicate sample results.

**RESPONSE:**

**It is estimated that less than 2% of the data was qualified as unreliable and removed from the data set. Quantification of the variation in the duplicate sample results will not be presented separately in Section 6.0. However, duplicate samples along with their associated environmental samples can be found in Appendix F.**

12. Page 6-4, Section 6.2.2, “Identification of Data Suitable for Use in a Quantitative Risk Assessment”

Page 6-18, Section 6.3.1, “Potential Human Receptors”

**Comments:**

a. The text states on Page 6-4 that due to the possibility that upon closure of Marine Corp Base (MCB) Camp Lejeune residential housing or industrial/commercial buildings could be constructed and shallow groundwater could be used for potable purposes the groundwater exposure was conservatively evaluated for future residential receptors.

b. The text states on Page 6-18 that “MCB Camp Lejeune operates as a Marine Corps Base. It is assumed that long-term plans for the facility are the same as the present plans, with land use also generally the same as at present.” The statements on Pages 6-4 and 6-18 seem to contradict themselves.

**Recommendations:**

If the land use at MCB Camp Lejeune is staying the same for the foreseeable future, the recreational land use scenario should be used at this site.

**RESPONSE:**

**While it is very unlikely that the facility-use of MCB Camp Lejeune will change in the future, exposure scenarios such as future residents are evaluated to present a**

**conservative approach in the baseline risk assessment. Current adult and adolescent recreational user receptors were evaluated for potential exposure to surface soil, surface water, and sediment at Site 84.**

13. Page 6-4, Section 6.2.3, "Criteria for Selecting Chemicals of Potential Concern"

**Comments:**

- a. The text states on Page 6-4 that "Generally, a comparison to naturally-occurring levels applies only to inorganic analytes because the majority of organic chemicals are not naturally occurring."
- b. Reference (a) states that both naturally occurring and anthropogenic chemicals that are present at levels below background should be eliminated from consideration in the risk assessment.

**Recommendation:**

The background survey should contain both naturally occurring (e. g., metals) and anthropogenic chemicals (e.g., PAHs). The Navy policy for conducting a background evaluation is located on the Navy Risk Assessment Web Site. You may access the web site by going to <http://www.nehc.med.navy.mil/ep/index.htm> and clicking on "Navy Guidance for Conducting Human Health Risk Assessment" located at the bottom of the page. The Navy Policy link is located on the left side of the guidance home page.

**RESPONSE:**

**Guidance on the use of background data in a human health risk assessment was obtained from USEPA Region IV Bulletins: Supplemental Guidance to RAGS (USEPA, 1995).**

14. Pages 6-6 and 6-7, Section 6.2.3, "Criteria for Selecting Chemicals of Potential Concern"

**Comments:**

- a. Page 6-6 lists the "common laboratory contaminants" found in blanks. This list includes acetone, 2-butanone, methylene chloride, toluene, and phthalate esters. Because various petroleum-related products contain toluene (e.g. benzene, toluene, ethyl benzene, and xylene [BTEX]) and TPH free product has been located on-site, we question whether the blank may have been contaminated with toluene from contact with site-related material.
- b. Page 6-7 discusses assessing contaminant levels in "solid" samples. We understand that soil samples are classified as solid samples. It is not clear whether the text may also

be referring to analysis of free petroleum product which also technically are classified as solids.

**Recommendations:**

- a. Consider if the blank may have been contaminated with toluene from site-related material (e.g., TPH).
- b. Discuss the source of the "solid" samples mentioned in the report.

**RESPONSE:**

**The discussion on page 6-6 referencing contamination in an associated blank was a general discussion and not directed to a particular blank sample result. The text discussing solid sample results on page 6-7 will be removed from this section.**

15. Page 6-23, Section 6.3.4. "Data Analysis"

**Comments:**

- a. The text states on Page 6-23 that "In those instances where the distribution tests were unable to definitively determine the type of distribution (i.e., the results indicated "no" to both normal and lognormal distributions, or "yes" to both normal and lognormal distributions), the data set was assumed to be lognormally distributed, or per (USEPA Region IV risk assessment guidance (USEPA, 1995a)."
- b. An EPA Deputy Administrator memorandum dated 26 February 1992 entitled "Guidance of Risk Characterization for Risk Managers and Risk Assessors" indicates that a single number used to represent the health risk to an individual or population may hamper the risk manager's ability to make an informed decision. Additionally, risk estimates should present both the upper bound reasonable maximum exposure (RME) and average ease, or central tendency (CT).
- c. Although the geometric mean is a convenient term for describing central tendencies of lognormal distribution, it is not considered an appropriate basis for estimating the concentration term used in exposure assessments. Unlike the arithmetic mean, the geometric mean of a set of sampling results bears no logical connection to the cumulative intake that would result from the long-term contact with site contaminants. The geometric mean may differ appreciably from, and be much lower than, the arithmetic mean.

**Recommendations:**

- a. Provide quantitative risk estimates for the arithmetic or geometric mean and the upper 95 percent confidence limit of that mean.

b. Do not compare data representing a geometric mean with data representing an arithmetic mean.

**RESPONSE:**

**USEPA guidance on determining exposure concentrations found in the documents, Calculating the Concentration Term (USEPA, 1992) and USEPA Region IV Bulletins: Supplemental Guidance to RAGS (USEPA, 1995) was followed in this baseline human health risk assessment. Data representing a geometric mean was not compared with data representing an arithmetic mean.**

16. Pages 3-3, 3-4, Section 3.1.4, "Subsurface Geology"

Pages 3-R, 3-9, "Surface Water Hydrology"

Table 3-6, "Summary of Potable Water Supply Wells Within a One-Mile Radius"

a. Page 3-3 states that the Castle Hayne confining unit at MCB Camp Lejeune can be described as a group of less permeable beds at the top of the Castle Hayne aquifer that have been partly eroded. Page 3-4 states that "This confining unit may only be partly effective in retarding the vertical movement of groundwater between the surficial and Castle Hanye aquifers." The Beaufort confining unit overlies the Beaufort aquifer. Although the deeper unit is slightly thicker and not known to be discontinuous, it also is likely to be only partly effective in retarding the vertical exchange of groundwater between the Beaufort and Castle Hayne aquifers.

b. Table 3-6 states that there are six "active" potable water supply wells and nine "inactive" potable wells within a one-mile radius of Site 84.

**Recommendation:**

Please see Comment and Recommendation Number 2 above.

**RESPONSE:**

**As noted above the Final RI report will include additional information regarding the deeper geologic conditions at Site 84 by making use of existing UST wells and base wide hydrogeologic information.**

**NCDENR REVIEW COMMENTS - Division of Water Quality – Groundwater Section, Wilmington Regional Office (Received March 19, 2002)**

Draft Remedial Investigation comments:

1. Most of the compounds observed in soils at the site have not impacted groundwater to the extent that they have caused groundwater violations. Existing groundwater contamination at the site seems to be related to fuel releases which are to be addressed by

an existing remedial system. The small quantity of pesticides and lack of PCBs in groundwater is to be expected due to low solubility of these compounds. The low level of pesticides observed at many of the sample locations throughout the site are characteristics of what would be expected from pesticide applications at those locations in the past. The available information does not indicate a need for additional groundwater remediation beyond that which is currently operative at the site.

**RESPONSE:**

**We agree. However, based upon the Partnering Teams desire to be protective of groundwater, a monitoring program will be implemented. This will be discussed in the recommendations section and will include at least four rounds of sampling. The data will be used to examine any changes of groundwater conditions over time. In addition, aquifer use restrictions will be recommended in the final document.**

2. The Groundwater Section is not aware of the current TSCA requirements for PCB clean-up in soils, but groundwater data suggests the archlor has not impacted groundwater. If guidance is needed, it is suggested that the EPA Region 3 Risk Base Framework, which was developed into a draft document for the Groundwater Section in 1996, but not yet adopted, may be applied.

**RESPONSE:**

**Thank you, comment noted.**

3. There may be some concern of vertical delineation of groundwater at the site, however, information available concerning 1992 well nests may be sufficient to determine the vertical extent of contamination.

**RESPONSE:**

**To provide more description of hydrogeologic conditions at depth and a thorough understanding of the vertical delineation of groundwater conditions, existing information, including site specific data from deep wells discussed in the UST report (1992) will be included in the Final RI report.**

**NCDENR REVIEW COMENTS - Division of Waste Management - Superfund Section (Received March 21, 2002)**

1. The groundwater at this site contains contaminants at levels greater than the State groundwater standards (15A NCAC 2L). The groundwater contamination must be addressed before the cleanup is complete.

**RESPONSE:**

As stated above (in the response to NCDENR groundwater section review comment #1), a monitoring program will be recommended to evaluate groundwater conditions through time. In addition, aquifer use restrictions will also be recommended. Restrictions on aquifer usage will remain in effect until state groundwater standards are attained.

2. Section 4.4 State and Federal Criteria and Standards. The NC Hazardous Waste Section Soil Screening Levels (SSLs) for protection of groundwater should be included in this discussion of screening levels. The contaminants in soils should be screened against SSLs when they are present in groundwater above the State standards.

**RESPONSE:**

NC Hazardous Waste Section Soil Screening Levels (SSLs) for the protection of groundwater will be included in the Final report.

3. Section 8.2. Recommendations. While the non-TCRA action may remove contaminants other than PCBs, the non-TCRA action does not formally address these compounds. An objective of the non-TCRA removal is to identify and remove PCB contaminated soils surrounding Building 45. The other contaminants identified in the soils must be addressed before the cleanup is complete.

**RESPONSE:**

SVOCs and pesticide constituents in soil are commingled with PCB contamination. As such, excavation of PCB impacted soil also will remove other contaminants. It has been recommended by the Partnering Team that confirmatory sampling include PCBs, SVOCs, and pesticides. In addition, the Final Feasibility Study will address these constituents as part of the remedial action alternatives. The existing SVE/air sparging operated by J.A. Jones is designed to remove related petroleum contaminants at the site.

4. David Lilley is reviewing the Risk Assessments and will submit comments later.

**RESPONSE:**

Comment noted.

5. Comments from the Wilmington Regional Office are attached.

**RESPONSE:**

Comment noted.

**NCDENR HUMAN HEALTH RISK ASSESSMENT REVIEW  
COMENTS - Division of Waste Management - Superfund Section  
(Received April 9, 2002)**

1. Page 6-6, first full paragraph, and Appendix I, Table 1A: Are the surface water bodies at this site intermittent? If not, then the analysis of this pathway will probably not be necessary. See Supplemental Guidance to RAGS: Region IV Bulletins, Human Health Risk Assessment (April 25, 2001) at web address <http://www.epa.gov/region4/waste/ots/healthbul.htm>. Under Exposure Assessment, there is a line that reads: "Sediments in an intermittent stream should be considered as surface soil for the portion of the year the stream is without water. In most cases it is unnecessary to evaluate human exposures to sediments covered by surface water". The cited reference says nothing about using the soil screening values for sediment if the site could be used for residential purposes. If there is a reason for including this scenario (such as large, accessible muddy areas where there is not sufficient water to wash mud from skin after wading), include this scenario. Otherwise, analysis of this scenario can be deleted.

**RESPONSE:**

**Information has recently been provided indicating that Northeast Creek is used for recreation, including boating and swimming. The lagoon, while accessible, is not conducive to recreation. It is recognized that evaluation of the sediment exposure pathway may not be necessary given that the sediments of Northeast Creek are covered by surface water. However, it will not be deleted because the calculations have been completed and do not contribute unacceptable risk to any receptor evaluated for this exposure pathway.**

2. Page 6-7, Background: According to Region IV's Supplemental Guidance to RAGS: "For naturally occurring inorganics and radionuclides, compare the on-site maximum detected concentration to 2 times the average site-specific background concentration. Eliminate the chemical as a COPC if it is less than 2 times the background level." Please correct.

**RESPONSE:**

**The text incorrectly states that base-wide average concentrations plus two standard deviations were used in the selection of COPCs for surface and subsurface soil. The text will be revised to state that the background comparison screen was done using two times the average base background concentrations. Chemicals were eliminated as COPCs if they were less than this corresponding background concentration.**

3. Section 6, Tables: The benefit of reproducing most of the information contained in the RAGS Part D tables but changing the format and placing it in this section is unclear to the reader. Please delete these tables if they add nothing to the report. The RAGS Part D

tables, which are an integral part of the Human Health Risk Assessment, need to be presented in the body of the document rather than in an appendix. Please correct.

**RESPONSE:**

The tables in Section 6.0 were provided to aid the reader in evaluating the human health risk assessment and to condense the information provided in the RAGS Part D tables into a format that could be included in Volume I with the remainder of the report. Therefore, these tables will not be deleted.

4. Appendix I: Chemicals cannot be deleted from consideration just because they were not detected. The guidance contained within RAGS Volume I, Part A, section 5.3 must be followed in evaluating the quantitation limits. It is recommended that this comparison take place in the RAGS Part D tables 2.x; the results should be presented and discussed in the uncertainty section.

**RESPONSE:**

Comment noted. Possible uncertainties associated with not evaluating the quantitation limits will be addressed in the uncertainties section of this baseline human health risk assessment. In future baseline human health risk assessments performed for MCB Camp Lejeune, evaluation of quantitation limits will be addressed in an earlier subsection (i.e., data evaluation).

5. Appendix I, Tables 2-2A and 2-2B: The subsurface soil should be screened against the industrial PRGs, not the residential PRGs (Region IV's Supplemental Guidance to RAGS). Please correct.

**RESPONSE:**

Comment noted. However, the residential PRGs will not be replaced with the industrial PRGs for this document. Although it is recognized that screening of subsurface soil data with residential PRGs is not recommended by Region 4 guidance, the current use of residential PRGs is more conservative, and therefore, will not underestimate potential risks. In future baseline human health risk assessments performed for MCB Camp Lejeune, subsurface soil data will be screened against industrial PRGs.

6. Appendix I, Tables 2.x: In the "Screening Toxicity Value" column, please define "S".

**RESPONSE:**

In Tables 2.x, "S" indicates "soil saturation." This definition will be provided in the appropriate tables.

7. Appendix I: In some tables, the footnotes in the tables do not match the footnotes. Please correct.

**RESPONSE:**

**The footnotes tables in Appendix I will be reviewed and corrected as necessary.**

8. A spot check of the screening toxicity values in Appendix I, Tables 2.x revealed the following:

- Table 2.3: The noncarcinogenic PRG for chloroform (with an HI = 0.1) of 6.3E-02  $\mu\text{g/l}$  should be used instead of the carcinogenic screening value of 1.6E-01  $\mu\text{g/l}$ . Please correct.

**RESPONSE:**

**The PRG for chloroform will be corrected to be 0.063  $\mu\text{g/L}$ .**

- Table 2.3: The PRG for cadmium (with an HI = 0.1) should be 1.8  $\mu\text{g/l}$ , not 1.8E-03  $\mu\text{g/l}$  as listed. Please correct.

**RESPONSE:**

**The PRG for cadmium will be corrected to be 1.8  $\mu\text{g/L}$ .**

- Table 2.3: The PRG for cobalt (with an HI = 0.1) should be 2.2E+02  $\mu\text{g/l}$ , not 2.2E-01  $\mu\text{g/l}$  as listed. Please correct.

**RESPONSE:**

**The PRG for cobalt will be corrected to 220  $\mu\text{g/L}$ .**

Please double check all screening toxicity values and contaminant concentration units before resubmitting.

**RESPONSE:**

**The screening values and contaminant concentration units will be double checked and revised as necessary.**

9. On page 6-9, it is claimed that both the NC WQSs for groundwater and the Federal Groundwater Standards were used as ARARs in this risk assessment. In appendix I, Table 2.3, a spot check revealed that the MCLs only were used as ARARs. Please add the NC WQSs for groundwater to this table as an ARAR.

**RESPONSE:**

**The NC WQS will be added for groundwater to Table 2.3 as an ARAR.**

10. Page 6-6 and Appendix I, Table 2.4: The surface water concentrations should also be compared to the North Carolina Surface Water Quality Standards. Please correct.

**RESPONSE:**

**The surface water concentrations will also be compared to the North Carolina Surface Water Quality Standards.**

11. Appendix I, Tables 5.1 and 6.1: Please cite references for the “Oral to Dermal Adjustment Factor” on these tables.

**RESPONSE:**

**The references for the “Oral to Dermal Adjustment Factors” presented on Tables 5.1 and 6.1 will be cited on these tables. Specific references can also be found on the table of oral absorption efficiencies in Appendix H.**

12. Appendix I, groundwater tables 4.x: Please explain why the ET for the inhalation route is 0 for adults.

**RESPONSE:**

**This is a significant figures error. The ET for the inhalation route is 0.25 hours/day for adults. The formatting error on this table will be corrected.**

13. Appendix I, Table 1: This table lists current recreational users, but Tables 7.x list the recreational users as “future”. Please make consistent.

**RESPONSE:**

**Table 1 is correct in listing current recreational users. Tables 7.x will be corrected to state current instead of future.**

14. Appendix I, Tables 4.x, dermal sections: The Region 4 guidance should be used for the Absorption Factors (ABSs) instead of the Region III guidance. Region IV guidance states: “Where chemical-specific information is not available, dermal absorption factors of 1.0% for organics and 0.1% for inorganics should be used as defaults in determining the uptake associated with dermal exposure to contaminated soils (this includes the soil matrix effect). Please correct.

**RESPONSE:**

Updated ABS values taken from the most recent Exposure Factors Handbook (USEPA, 1997) were used. Tables 4.x will be reviewed and the ABSs will be revised to the Region 4 default values if no chemical-specific information is available.

15. Appendix I, Table 5.1: Define "Other" in the "Sources of RfD: Target Organ" column.

**RESPONSE:**

The word "other" appears in the table in error. Table 5.1 will be revised to change the word "Other" to IRIS.

16. Page 6-18, last full paragraph: It is claimed that the lagoon and Northeast Creek are not conducive to swimming. Please explain why.

**RESPONSE:**

Information has recently been provided indicating that Northeast Creek is used for recreation, including boating and swimming. There is also a certain population present who fish and crab out of this creek. This discussion will be included in Section 6.3.1.

17. Page 6-19, third paragraph: According to Region IV guidance, Exposure to VOCs During Showering: "It should be assumed that showering exposure is equivalent to exposure from ingestion of two liters of contaminated water per day based on the recommendation of The Risk Assessment Forum (RAF, p. 1-2). This method includes exposures via inhalation and dermal routes and is applied to adolescents and adults."

**RESPONSE:**

Comment noted. However, the methodology used in this risk assessment (i.e., Foster and Chrostowski Shower Model) will not be changed. A quick comparison of the two methods indicates the shower model is more conservative, and therefore, risks are not being underestimated. In future baseline human health risk assessments performed for MCB Camp Lejeune, the methodology provided in Region 4 guidance will be utilized.

18. Section 6.7: Due to the above comments, it is not possible to agree or disagree with the summary at this point.

**RESPONSE:**

Comment noted.

**NCDENR ECOLOGICAL RISK ASSESSMENT REVIEW COMENTS  
- Division of Waste Management - Superfund Section (Received April  
26, 2002**

1. Figure 1: It is unclear to the reader why aquatic invertebrates can be exposed to creek and wetland surface water via ingestion, but not lagoon surface water via ingestion. Please explain.

**RESPONSE:**

**Aquatic invertebrates can be exposed to both creek and lagoon surface water via ingestion. This will be corrected on the figure.**

2. Figure 1: It is unclear to the reader why fish, amphibians, and birds can be exposed to creek and wetland sediment via ingestion and direct contact, but can only be exposed to lagoon sediments via ingestion (not direct contact). Please explain.

**RESPONSE:**

**The receptors listed can be exposed to both creek and lagoon sediment via ingestion and direct contact. This will be corrected on the figure.**

3. Figure 1: It is unclear to the reader why terrestrial reptiles, birds, and mammals can be exposed to lagoon surface water via ingestion, but not creek and wetland surface water via ingestion. Please explain.

**RESPONSE:**

**Ingestion of surface water from Northeast Creek by terrestrial receptors is not considered a complete exposure pathway because the salinity of the creek (22.3 parts per thousand) exceeds the approximate toxic threshold for wildlife receptors (15 ppt, Humphreys 1988); therefore, the creek would not provide an acceptable drinking water source for terrestrial receptors.**

4. Table 7-2: A spot check revealed the following:

- Region 4 provides a freshwater screening value of 1,350 µg/l for 1,2-dichloroethene (trans). Please add.
- The Region 4 soil screening value for tetrachloroethene is 10 µg/kg, not 100 µg/kg as listed. Please correct.

Please double check all screening values before resubmitting.

**RESPONSE:**

**All screening values will be re-checked and corrected as appropriate.**

1. Tables 7.3 – 7.8: According to Lynn Wellman, (US EPA Ecological Risk Assessor-March 18, 2002 phone conversation) nondetected chemicals that either 1) have no screening values, or 2)  $DL > SV$  must be retained as COPCs. They may be considered for elimination at Step 3 if there are lines of evidence to suggest the COPC does not exist at the site. Please correct.

**RESPONSE:**

**The tables and text will be adjusted as indicated.**

2. Page 7-21, Section 7.3.2, first paragraph: According to Ted Simon, (US EPA Risk Assessor-March 26, 2002 phone conversation) for naturally occurring inorganics, the on-site maximum detected concentration should be compared to 2 times the average site-specific background concentration, not 2 times the background plus 2 standard deviations. Please correct.

**RESPONSE:**

**The text and tables will be corrected to reflect comparison to background concentrations that are two times the mean background value.**

3. Page 7-23, first paragraph, and Appendix K, Section K.3, second paragraph: The cited reference (USEPA, 2000) does not identify “important bioaccumulative compounds” as claimed. Please cite the source of this information.

**RESPONSE:**

**Table 4-2 of the cited document (United States Environmental Protection Agency (USEPA). 2000. Bioaccumulation Testing and Interpretation for the Purpose of Sediment Quality Assessment, Status and Needs. Office of Water and Office of Solid Waste, Washington, D.C. EPA-823-R-00-001.) provides this information. This reference was missing from the reference list for Section 7, and will be added. This reference was provided in Appendix K.**

4. Appendix K, Page K-3: Please include mammalian carnivores as an assessment endpoint for the terrestrial habitat.

**RESPONSE:**

**The shrew, which is evaluated in the risk assessment, is an insectivore (a type of carnivore). The red fox (mammalian carnivore, diet of small mammals) will be added as an additional assessment endpoint for the terrestrial habitat.**

5. Appendix K, Page K-3: According to the Wildlife Exposure Factors Handbook, the mink is a carnivore. Please correct.

**RESPONSE:**

**The text will be corrected to classify the mink as a carnivore.**

6. Appendix K, Page K-3: Please include mammalian piscivores as an assessment endpoint for the aquatic habitat.

**RESPONSE:**

**The mink is evaluated as a mammalian piscivore in this assessment (mink's diet is 89% fish/frogs). It is noted that a piscivore is a type of carnivore.**

7. Appendix K, Table K-6, water ingestion rate, American Robin: According to this table and the cited reference:

$$IR = \frac{0.14 \text{ g water}}{\text{g robin-day}} \times \frac{1 \text{ L}}{1000 \text{ g}} \times \frac{63.5 \text{ g robin}}{1} = 0.0089 \text{ L/day}$$

The ingestion rate listed in Table K-6 is 0.01442 L/day. By spot checking using the same procedure and the cited reference, I calculated the water ingestion rate for the Great Blue Heron to be 0.095 L/day, Table K-6 lists this as 0.1125 L/day. I also calculated the water ingestion rate for the raccoon to be 0.344 L/day, Table K-6 lists this as 0.6806 L/day. Checking the same receptors using the same procedure on Table K-12, I was able to reproduce the numbers in this table. Please correct Table K-6 before resubmitting.

**RESPONSE:**

**In the most conservative exposure scenario (Table K-6), exposure parameters are chosen to provide the most conservative estimate (i.e., highest value) of dietary intakes. Therefore, in the dietary intake equation, body weights are assumed to be a minimum (63.5g robin), and water and food ingestion rates are assumed to be maximum estimates for a given species. To estimate Maximum water ingestion rates, the equation noted in the comment is calculated using a Maximum estimate of body weight. For the robin this value is 103 grams (USEPA 1993). (0.14 g/day\* 1L/1000g \* 103g = 0.01442 L/day). In the more realistic exposure scenario (Table K-12), water and food ingestion rates are calculated using mean body weights, which are the same as body weights that are used in the dietary intake equation (i.e. the body weights presented in Table K-12). Therefore, the tables are correct as presented.**

8. Appendix K, Table K-6: The Eastern Screech-Owl does not appear in the cited reference. Please correct.

**RESPONSE:**

Section 3 of the cited reference (**Wildlife Exposure Factors Handbook, USEPA 1993**) addresses allometric equations. These equations were used to calculate water and food ingestion rates for the Eastern Screech-Owl. No changes will be made to the table.

9. A spot check of Appendix K, Tables K-7 and K-8 revealed the following:

- Table K-8: The LOAEL and NOAEL information for chromium could not be found in the cited reference. A LOAEL value of 13.14 mg/kg/d was found in the cited study, an a NOAEL value of 3.28 mg/kg/d was found in another study. Please justify these numbers or correct.

**RESPONSE:**

Page A-29 of the cited reference (**Toxicological Benchmarks for Wildlife, 1996 Revision. Sample et al. 1996**) provides NOAELs and LOAELs for chromium for the black duck of 1 mg/kg/d and 5 mg/kg/d, respectively, as indicated on Table K-7. Page A-27 of the cited reference provides the study used for the mammalian NOAEL and LOAEL for chromium. Upon review of the study, and based upon the fact that the endpoint was mortality and not reproduction, it is agreed that it is appropriate to apply an uncertainty factor of 0.1 to the LOAEL reported in the study reference (13.14 mg/kg/day). The table will be adjusted and model will be re-run with a mammalian LOAEL of 13.14 mg/kg/d and NOAEL of 1.314 mg/kg/day for chromium.

- Tables K-7 and K-8: For contaminants with multiple LOAELs and NOAELs in these tables, how was it determined which value would be used?

**RESPONSE:**

The values used were dependent upon the ecological receptor being evaluated. NOAEL and LOAEL estimates from the test organism most closely related to the receptor (e.g., same Order or Family) were preferentially used to evaluate potential risks to that receptor. When selecting NOAELs and LOAELs from the cited reference, test endpoints were examined such that the NOAEL or LOAEL based upon the more sensitive endpoint (e.g., reproduction rather than mortality) was used. Values that were measured directly were preferred over values that were estimated from less sensitive test endpoints.

- Table K-8: The LOAEL and NOAEL values for mercury (mink study) should be 0.025 mg/kg/d and 0.015 mg/kg/d, respectively.

Please double check all the values in these two tables before resubmitting.

**RESPONSE:**

Because the endpoint of the study used to develop the mercury NOAELs and LOAELs for mink was mortality or weight loss, it is agreed that it is appropriate to apply an uncertainty factor of 0.1 to the reported values. The table will be adjusted and model will be re-run with a LOAEL of 0.025 mg/kg/d and NOAEL of 0.01 mg/kg/day for mercury. The remaining values in Tables K-7 and K-8 will be double-checked before resubmitting.

10. Page K-9, Section K.3.4, second line: Typo: change “does” to “dose”.

**RESPONSE:**

The correction will be made.

11. Appendix K, Table K-9: Please include a description of the model used to derive the BAF and include a sample calculation for PCBs.

**RESPONSE:**

The risk assessor did not calculate BAF values, but rather used the values reported in the references cited on Table K-9. The general approach to derive BAF values for earthworms is presented in the text on pages K-5 and K-6. The reader is referred to the individual references cited on table K-9 to obtain details regarding calculation of BAFs for individual chemicals.

12. Page K-6: Please provide a sample calculation for the determination of BAFs for the small mammals mentioned.

**RESPONSE:**

The risk assessor did not calculate BAF values for small mammals, but rather used the values reported in the references cited on Table K-10. The reader is referred to the individual references cited on table K-10 to obtain details regarding calculation of BAFs for individual chemicals.

13. Page K-7, Aquatic Invertebrates and Fish: Without a more detailed analysis of AVS, TOC, sediment grain size, and trophic levels (especially for the fish) the use of BAFs and BCFs will not yield useable results. Please correct.

**RESPONSE:**

The use of literature based BAFs and BCFs to estimate contaminant concentrations in aquatic invertebrates and fish is appropriate for use in a screening-level ecological risk assessment in the absence of site-specific information. The lack of detailed information regarding site-specific sediment conditions including AVS,

**TOC, sediment grain size, etc., which can influence bioavailability, does introduce uncertainty into the risk assessment, which may result in an over or under-estimation of potential site risks. A discussion of these uncertainties will be added to Appendix A.**

14. Page K-10, Section K.4: The overuse of the words “less conservative” in this section leaves the reader with the impression that the purpose of this section is to use different values simply because they are less conservative. The purpose of this section should be to replace the conservative default values with values more representative of actual site conditions. Please modify the wording to be consistent with this purpose.

**RESPONSE:**

**The text will be modified as requested.**

15. Page 7-31 Section 7.6: A remedial action is normally not recommended following a Screening Level Ecological Risk Assessment. It is recommended that the ecological risk assessment continue through the remainder of the eight step process.

**RESPONSE:**

**The text will be revised to indicate that in the absence of a remedial action, the risk assessment should continue through the eight-step process.**

**LANTDIV REVIEW COMMENTS (Received March 18, 2002)**

1. pg. ES-4-In the fourth paragraph it states that “groundwater contamination...is limited...with no apparent plume.” In the fifth paragraph I states that there is a “dissolved-phase groundwater plume”. Which is correct?

**RESPONSE:**

**Impact to groundwater is primarily related to former USTs located northeast of former Building 45. A dissolved phase BTEX plume has been defined and is being addressed under the UST program. Other site groundwater contamination related to past practices at former Building 45, the lagoon area, and the mid-field area is minimal. This information is contained in the existing text, however the text will be re-written for clarity.**

2. pg. ES-5, 2nd complete paragraph, 1st sentence-Please define the acronym ILCR.

**RESPONSE:**

**Incremental Lifetime Cancer Risk will be defined in the executive summary.**

3. pg. ES-5, 5th complete paragraph, 1st sentence-Please define the acronym HI.

**RESPONSE:**

**Hazard Index will be defined.**

4. pg. ES-6, 2nd complete paragraph, 1st complete sentence-Please define acronym MCPA.

**RESPONSE:**

**MCPA (2-Methyl-4-chlorophenoxyacetic acid) will be defined in the Executive Summary.**

5. pg. 1-1, Section 1.2, 1st sentence-Missing a verb. It appears to be a string of prepositional phrases.

**RESPONSE:**

**Agreed. This sentence will be revised to be grammatically correct.**

6. pg. 1-9, Section 1.5.8, 1st complete paragraph, 2nd sentence-Please define acronym RRR.

**RESPONSE:**

**The acronym RRR (Relative Risk Ranking) will be defined in Section 1.0.**

7. pg1-12, Section 1.5.13, 1st paragraph, last sentence-Even though the petroleum contamination is being handled by the UST program why hasn't "the extent of contamination and related treatment" already been incorporated into the IR program work?

**RESPONSE:**

**The UST program is handled under separate funding by the Navy, however, a better explanation of how it is being handled and how it relates to activities being undertaken for the IR program will be incorporated into the Final RI report.**

8. pg. 1-13, Section 1.5.13, 2nd paragraph, 3rd sentence-Please change "existing" to "existence"

**RESPONSE:**

**This change will be made in the Final RI report.**

9. -Same as above-This isn't actually a sentence; it is a long phrase with no subject or verb.

**RESPONSE:**

**The sentence will be revised.**

10. Figure 1-2-Please identify the symbol that looks like a couple of blades of grass in the key.

**RESPONSE:**

**This is the symbol for a wetland area. It will be added to the legend on Figure 1-2.**

11. pg. 2-1. Section 2.0, 1st paragraph, last sentence-Where are the changes noted regarding the Final Project Plans for CTO-0219?

**RESPONSE:**

**The changes noted in the report refer to changes made during the field program. The changes were implemented during the field investigation to respond to objectives set by the Partnering Team. These included expanding the investigation for additional analyses, characterizing former UST basins, detailing the location and disposition of the drain line, adding additional borings/monitoring wells to further characterize groundwater. This is described in Section 4.0, page 4-1. Additional text will be included in Section 2.0 of the Final RI report to clarify these issues.**

12. pg. 2-7, Section 2.4, 1st paragraph, third sentence-"The location horizontal"-missing a comma?

**RESPONSE:**

**Agreed. The sentence will be revised to include a comma.**

13. Figure 3-4-What does the symbol of a red box with a red dot inside mean (MW-15)?

**RESPONSE:**

**This symbol represents a monitoring well from a previous investigation.**

14. Figure 3-4-Increase font size of "drainage inlet"

**RESPONSE:**

**Figure 3-4 will be revised with "drainage outlet" written with an increased font.**

## **MCB CAMP LEJEUNE – EMD REVIEW COMMENTS (Received March 20, 2002)**

COMMENTS: I am echoing comments already made by the regulators in that the groundwater at this site has not been fully reported on. There is limited information on groundwater contamination in the RI. There is no information on a confining layer or any deep groundwater sampling or results. There is no mention of groundwater contamination in the risk assessment or a discussion on a LUCIP for future groundwater usage. These reports need to go into greater detail on the groundwater contamination at the site and how we plan on accounting for it if it should remain on site after we are through with our remedial activities. This should include a discussion on the UST related petroleum contamination and how we plan on accounting for that and the metal and pesticides. Also there seems to be some downplaying of the usages of NE Creek. The creek is used for recreation to include boating and swimming. There is a certain population present who fish and crab out of this creek. Information on the level of substinent fishermen is not available but should be accounted for.

### **RESPONSE:**

Text will be added to the Final RI to indicate that Northeast Creek is used for fishing and recreational purposes. There have not been any detections of PCBs in excess of screening criteria on the surface water or sediment samples previously collected at Northeast Creek. Therefore, no pathway has been identified for PCBs to fish tissue. As stated in previous comment responses in this document, the issue of deeper groundwater characterization will be discussed in the Final RI by incorporating existing data from UST site investigations. Also, aquifer restrictions will be included as part of the recommended actions for Site 84. A monitoring program also will be recommended to examine detections of BTEX and pesticides over time. The petroleum related contamination is being addressed by the SVE/air sparging system and planned removal action for the Building 45 foundation and surrounding soils.