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LETTER REGARDING U S NAVY RESPONSE TO U S EPA REGION IV COMMENTS ON THE
DRAFT REMEDIAL INVESTIGATION FOR SITE 73 MCB CAMP LEJEUNE NC
3/25/1997
U S NAVY

Response to Comments
Submitted by USEPA Region IV to the
Draft Remedial Investigation Report for
Site 73 (Operable Unit No. 9)
MCB, Camp Lejeune, North Carolina
Comment Letter Submitted by Ms. Gena D. Townsend
Received by Baker Environmental, Inc., 3/25/97

General Comments

1. Baker disagrees with the comment and contends that Figure 2-2 is correct. The water level on this diagram is below the top of the screen elevation. The reviewer likely did not note that the diagram is not to scale (hence the NTS designation at the bottom of the diagram). All of the shallow wells installed during the investigation were constructed with their screens intersecting the water table. Specific details regarding well construction are included in Section 2 text and tables.
2. Isoconcentration maps will be added to the final version of the RI report as per this comment.
3. Tables 4-2 and 4-3 were compiled to show how site background data compares to base background concentrations. The comparison shows that inorganics detected in the site background samples are within the range of base background results, albeit on the lower end of the range.

The soils at the site were compared to the base background concentrations because these concentration ranges were established from samples collected throughout MCB Camp Lejeune and not the result of a single sample. The single sample may tend to be biased low or high (compared to base background) causing the site to appear more or less contaminated than it really is. A comparison to a large number of background samples provides a broader baseline to which samples can be compared.

4. Analytical results for background soil samples have been divided into surface and subsurface results for comparison purposes. Soil samples used to determine background levels of inorganics in soils across the base were collected from various locations, various soil types and depths below ground surface to provide an average level for the base. Therefore, to compare soils at a given depth is not advantageous since this may exclude a large portion of the base that may have samples collected at different depths than those selected for comparison. Once a portion of the base has been excluded, then the remaining results can not be considered representative of levels throughout the base.
5. Site-specific background groundwater, sediment and surface water samples were not obtained at Site 73 because of the availability of other data sources. These sources are identified in Section 4.2.2. The text will be revised to include this rationale.
6. COPC screening for different media sampled at the site is conducted in the human health and ecological risk assessment sections of the report. Federal MCLs and NC DEHNR standards were used to indicate which samples collected at the site were in excess of these criteria and would likely be considered contaminated by either the EPA or NC DEHNR. A discussion will be included to clarify this point.
7. The text was modified in lieu of this comment. It now states, "These concentrations are not considered to be related to laboratory

~~contamination, however, they did not exceed USEPA Region III Soil Screening Levels for Protection of Groundwater.".~~ Since these compounds did not exceed the soil screening levels they were not discussed in Section 8 as were all other compounds that did not exceed the selected criteria.

8. Baker believes that the horizontal extent of contamination has been sufficiently defined by the lack of positive detections exceeding the NC DEHNR groundwater standards or the federal MCLs in samples collected from the outermost wells positioned on the fringes of the site. In some cases, the wells are placed hundreds of feet apart, but the placements of these wells were based on discussions with the EPA upon conclusion of the first phase of work conducted at the site. The locations were concurred upon by LANTDIV, MCB Camp Lejeune, EPA Region IV and Baker personnel during a conference call conducted on August 25, 1995. Inside the site boundaries, various plumes have been defined vertically and horizontally as indicated in Sections 4 and 8.

Specific Comments

1. In response to the comment, Figures 1-16 and 1-17 have been modified to show the location of Building A-3.
2. The boundaries of Site 73 are not depicted on Figure 1-2 because the entire area shown is the site. The site is surrounded on three sides by wooded areas and on the remaining side by Courthouse Bay. The site is described in detail in Section 1.3. Because there are no adjoining facilities, Baker opted not to identify an arbitrary boundary. Rather, the boundaries of the site are ultimately defined as the extent of the study area which is marked by various sample point locations depicted in subsequent figures.
3. Figure 1-15 was originally created by Richard Catlin and Associates in 1993 for a UST study conducted at Site 73. It has been included in this report as a historical reference. As such Baker feels it would be inappropriate to modify it. As per the comment, the notes at the bottom left corner of the figure does indicate the contour interval.
4. A topographical map will be added in the final version of the RI. Additionally, references to the figure will be added in Section 3.1.
5. The typographical error has been corrected as per the comment.
6. The definition of "SR" will be included in the table for the final version of the RI.
7. Text has been added to Section 3.2 describing surface water flow at the site.
8. The text has been modified as per the comment.
9. The text has been modified to reflect the correct results reported in Table 4-5.
10. Section 5.5 of the Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A) found on page 5-16, states "...if the blank contains detectable levels of common laboratory contaminants, then the sample results should be considered as positive results only if the concentrations in the sample exceed ten times the maximum amount detected in any blank." Given this statement, the conclusion is valid.
11. Additional text has been added to the report which further supports the premise that methylene chloride and toluene detections are laboratory related.

12. Several VOCs were detected in high concentrations in the fish and crab tissues samples. These contaminants are not expected to be related to contamination at the site for the following reasons. The concentrations of the VOCs in the surface water and sediment samples were very low and were detected infrequently. In addition, VOCs typically do not bioconcentrate in fish and crab tissues as noted in their relatively low bioconcentration factors (acetone = 0.69; methylene chloride = 3.75; toluene = 10.7). Therefore, it is more likely that the VOCs were introduced in the laboratory although the exact procedure cannot be determined.
13. The statement indicating possible origin of the low concentrations of contaminants in trip blanks has been modified to include the possibility of contaminants introduced during sample shipping.
14. The only contaminant that was attributed to the chlorination of water in the detection of chloroform, not chlorinated organics. Other chlorinated organics (e.g., dibromochloromethane and bromodichloromethane) are suspected to exist within the potable water supply system. These particular contaminants were detected in samples collected from the potable water source used for decontamination of heavy equipment. Therefore, it is reasonable to deduce that the contaminants were not site related, but rather are attributable to the potable water system at the site.
15. The soils were evaluated as a single media without phases in Section 4 and the Human Health Risk Assessment. Whereas, the groundwater was evaluated in phases. Therefore, the table reflects the evaluation process. If needed, the results of the blanks are separated by phase in Appendix R of the report.
16. Table 4-4 is not intended for selection of COPCs. This table is used to compare data obtained at the site with published criteria. Non risk-based criteria was used to help evaluate the severity of the contamination observed on site. The soil screening levels for the protection of groundwater is not risk based and, in lieu of similar standards provided by Region IV, is a good guide for soil contamination. Risk-based criteria is included in the baseline risk assessment in Section 6.
17. The title of Figure 4-8 has been changed from Detected Volatiles in the Lower Portion of the Surficial Aquifer to Detected Organics in the Lower Portion of the Surficial Aquifer and the semivolatile results have been added.
18. Section 4 does discuss the detection of semivolatile compounds in sample 73-AC2-MW07-00 and soil boring 73-MW15B and refers to the appropriate table for analytical results. In addition, Table 4-4 provides a summary of soil contamination observed in samples collected at the site. Section 4 does not state that high concentrations of SVOCs were detected in these samples but the reference to the tables and the results depicted there should provide the reader enough information to deduce this on their own. Section 8 is a Summary and Conclusions section, and as part of the summary, Baker elected to state the obvious in case the reader elected to not read Section 4 in its entirety. However, there is no discrepancy.

Response to Comments
Submitted by North Carolina DEHNR to the
Draft Remedial Investigation Report for
Site 73 (Operable Unit No. 9)
MCB, Camp Lejeune, North Carolina
Comment Letter Submitted by Mr. David J. Lown
Received by Baker Environmental, Inc., 8/14/97

General Comments

1. The Soil Screening Levels contained in the Draft North Carolina Risk Analysis Framework will be used for comparison criteria unless Region II soil screening levels are more stringent. The North Carolina document was issued about the same time as the submission of Draft Site 73 RI report. Since the document was draft and not a guidance document at the time of the submission of the RI report, Baker chose not to include the comparison criteria from the Framework because the disclaimer had stated that the document was not to be referenced or used in any submissions to the state regulatory agencies.
2. It is agreed that justification should be considered before dismissing sampling results as laboratory contamination. However, if a contaminant is detected at very low levels (at or just above the detection limit) throughout the site and the compound is a common laboratory contaminant or had been detected in one of the blanks collected during the investigation, then the contaminant is suspected to be non-site related due to the uncertainty of its origin and the consistent detections at relatively the same levels.
3. The stratigraphy of the site will be better defined including the discussion of the paleo-channel. The conceptual model of the site be refined as per the comment.

Specific Comments

4. Building A-3, and other major landmarks will be depicted on Figures 1-16, 1-17 and 1-18 in the final RI report.
5. Some slight differences in description do exist between the cross-sections. However, this is due to the generalization of the soil descriptions for the purpose of the cross-section. For instance, if a particular soil type was described as a sand with some silt and in

~~another boring the same soil had trace silt but contained trace to little clay, the description would be stated as such: sand with trace to some silt and trace to little clay. Hence, by generalizing the soil descriptions this way it is possible that the soil observed at a particular depth in a boring may be described slightly different in two different cross-sections.~~

The Castle Hayne semi-confining unit not being the same unit on both of the cross-section was the result of an error that was missed during internal review. A drafting error resulted in the mis-identification of the boundary between the surficial aquifer and the semi-confining unit of the Castle Hayne aquifer.

6. Agreed. References to the Belgrade and River Bend formations will be included on the cross-sections. The reason for the identification of the Castle Hayne semi-confining unit is to correlate the site with the regional geology and to show that the unit does exist at the site, even if it is not confining any downward migration of groundwater at this particular site. The clay unit is not regional or even base-wide. Rather, it is observed in some areas of the base but appears to be localized (just as indicated in Cardinell, et al. 1993, Hydrogeologic Framework of U.S. Marine Corps Base at Camp Lejeune, North Carolina).
7. The soil description for the upper 35 feet of soil boring 73-DW12 was not included on the boring log for this well boring in error. The boring log will be modified to include the soil description. Additionally, the paleo-channel will be included on maps and cross-sections in the report.
8. A reference section will be added to this section.
9. Please refer to general comment number 2.
10. Please refer to general comment number 1.
11. This error will be corrected in text.
12. Bis(2-ethylhexyl)phthalate is used in plasticizing a variety of polymeric materials such as natural rubber, synthetic rubber cellulose acetate butyrate, nitrocellulose, polystyrene and polyvinyl chloride resins. The gloves and various plastic products used in laboratories have a potential to contribute to detections of this compound. In addition, the half life of this compound in water is approximately two to three weeks following a period of acclimation. This is additional evidence that the contamination of the samples is not site-related. A discussion will be added to text to better clarify the fact that this compound is not site-related.
13. The data sets will be combined at the request of NC DEHNR. However, the implication may be that contamination observed in the lower-most portion of the surficial aquifer is actually in the upper-most portion of the Castle Hayne indicating that the drinking water aquifer is more contaminated than originally stated in the draft report.
14. Reasoning set forth in this comment for the occurrence of elevated Fe and Mn will be added to text. Evaluation of these compounds will be discussed and additional maps be added if necessary.
15. The groundwater to surface water model (G3CTM) will be used in the Feasibility Study to evaluate if contamination observed in the groundwater may impact surface waters at the site. A couple of paragraphs have been added to Section 5.2.6 detailing the model and its input into the Feasibility Study.

Response to Comments

Submitted by the North Carolina DEHNR, Division of Solid Waste Management to
the , Draft Remedial Investigation Report for
Site 65 (Operable Unit No. 9)
Marine Corps Base Camp Lejeune, North Carolina
Comment Letter Submitted by Mr. Patrick Watters
Comments Received by Baker Environmental, Inc., 2/28/96

1. The differences between the two maps specified in this comment are noticeable. The map provided in the work plan for the site was constructed from the CADD drawing provided by LANTDIV of MCB Camp Lejeune. The drawing included in the report was surveyed during the remedial investigation. Typically there are some differences between these drawings. The LANTDIV drawing is typically incorrect with regard to scale and positioning of structures and roads because the individual sites are part of a very large drawing of the entire base and as the portion of the map where the site resides is enlarged to a scale which is presentable for a report some of the scaling is distorted. In addition, the LANTDIV drawing was provided at the beginning of the contract (1989) and is somewhat outdated with respect with changes that may have occurred at the site. These maps are typically only used during work plan preparation when an up-to-date map is often not available.
2. The burn area is not accurately depicted on the figures. The area where burning was suspected to have occurred is the southeastern portion of the area denoted as the burn area. The remainder of the area was cleared of trees and inaccurately combined with the actual burn area. The figure has been modified to provide better clarity. The soil samples that were collected in the burn area during this investigation were collected along the downgradient side of the area. The monitoring well located on the eastern side of the cleared area was installed during a previous investigation. Soil and groundwater results from this well did not indicate that contamination existed in the area of the burn area, therefore additional wells were not installed during the RI. Had contamination been detected in samples from the well, additional soil and groundwater samples would have been proposed for this area of the site.

Baker included sampling the ponds east of Site 65 in the OU 9 Work Plan in an effort to have surface water samples obtained from the nearest surface water bodies. Baker was aware of two ponds from our preinvestigation site visit. Four ponds, however, are depicted on available USGS maps so we decided to include them. When the Baker investigation team mobilized to the field it was apparent these more southerly located ponds no longer existed. The identification of two disposal areas referred to in the comment was not an objective of this investigation. Based on our knowledge of the site, Baker is unaware of any reference to unfound disposal areas. If Baker's Work Plan implied that two disposal areas might exist to the reviewer, it was unintentional.

3. A map will be added to the text illustrating the locations of the sites from which the samples were collected. These samples were not intended to be considered background levels, rather they were intended to provide a range of concentrations typical of MCB Camp Lejeune. Likewise, a study was conducted at the White Oak River Basin to determine a range of inorganic concentrations typical of surface waters outside the boundaries of the base. Additional, text has been added to the report to clarify these points.
4. Several VOCs were detected at high concentrations in the fish and crab tissue samples. These contaminants are not expected to be related to contamination at the site for the following reasons. The concentrations

of the VOCs in the surface water and sediment samples were very low and were detected infrequently. In addition, VOCs typically do not bioconcentrate in fish and crab tissues as noted by their relatively low bioconcentration factors (acetone = 0.69; methylene chloride = 3.75; and toluene = 10.7). Therefore, it is more likely that the VOCs were introduced in the laboratory although the exact procedure cannot be determined.

5. Steps have been taken to eliminate the detection of acetone as a result of inadequate drying time for field equipment. The spoons are allowed to dry thoroughly prior to use. The reference to cross-contamination in the laboratory was suggested as a possible reason for the detection of acetone. However, upon review of the data validator's report, it is apparent that the source of the acetone is most likely the result of not allowing adequate drying time for field equipment which as earlier stated has been remedied.

6. Page 6-6, Section 6.2.1.7.

The basis for using two times the average site specific background as a cut-off for inorganics considered to be essential nutrients is the following USEPA Region IV guidance document: USEPA. 1995. United States Environmental Protection Agency.

Supplemental Guidance to RAGS: Region IV Bulletins, EPA Region IV. November 1995. This document will be cited in the appropriate text, Table 6-14 and Section 6.8 (References).

Response to Comments
Submitted by USEPA Region IV to the
Draft Remedial Investigation Report for
Site 65 (Operable Unit No. 9)
Marine Corps Base, Camp Lejeune, North Carolina
Comments Submitted by Ms Gena D. Townsend
Comments Received by Baker Environmental, Inc., 3/19/96

General Comments

1. The figures (1-3 through 1-6) will have text added denoting the locations of site landmarks and specific historic details illustrated by the photograph. Additionally, the text will be modified to better identify past and present landmarks in the final version of the RI.
2. The regional hydrogeology section (Section 3.4.1), which proceeds the site specific hydrogeology section, clearly states that the surficial aquifer receives recharge by rainfall and discharges to local streams and through the semi-confining unit into the underlying Castle Hayne aquifer. Recharge to the Castle Hayne aquifer at MCB Camp Lejeune is primarily received from the surficial aquifer with discharge to the New River and its major tributaries.
3. Base background levels do apply to groundwater as well as soils. The Draft report Evaluation of Metals in Groundwater discussed on page 4-4, Section 4.2.2.2 compiled a number of base-specific background samples as part of a study to evaluate levels of inorganic elements in groundwater at the base. Therefore, the statement is correct and does not need modified.

Specific Comments

1. The misspelling has been corrected.
2. The misspellings have been corrected.
3. Additional text has been added to Section 4.2.2.1 (discussion of naturally-occurring inorganic elements in soils) which explains that the results of the background samples collected at the site have been incorporated into the base background database and explaining this is the reason for comparison to base background ranges and not site specific. The tables mentioned in the comment provide a comparison of results received from Site 65 background samples to the base background range illustrating whether the results fall within or outside the range established for the base.
4. The error in the table has been corrected.

Risk Assessment Comments

1. Ecologically-based sediment screening values were used in the selection of sediment COPCs, as a conservative measure in the Draft report, in the absence of available human health sediment criteria. However, Baker agrees with the comment and will use the most recent Region III risk-based soil COC concentrations, protective of residential exposures, to screen detected sediment concentrations. This is likely to result in the selection of a lesser number of sediment COPCs than was done in the Draft report.
2. The title of the cited reference will be changed to the following: USEPA. 1993. United States Environmental Protection Agency. Draft Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure. November 1993.
3. Baker concurs with this comment and will use the most recent Region III COC screening value protective of fish tissue consumption (0.014 mg/kg) and the oral RfD (0.0001 mg/kg/day) established for methylmercury in all applicable text, tables and spreadsheets. However, it should be noted that this comment may be more applicable to Table 6-9, rather than Table 6-10, as was cited in the comment.
4. Baker will change the child inhalation rate from 10 m³/day to 15 m³/day in Table 6-14, as well as in all other applicable text, tables and spreadsheets. It should be noted that this change is not expected to result in unacceptable risks to child receptors.
5. Values of 0.023 mg/kg/day and 0.00008 mg/kg/day will be used to represent the most recent oral RfDs established for manganese and thallium (carbonate, chloride and sulfate salts), respectively; and, 6.1 mg/kg/day (not 3.1 mg/kg/day) will be used as the most recent inhalation RfD available for benzo(a)pyrene.

Response to Comments

**Submitted by the United States Environmental Protection Agency, Region IV on the
Human Health Risk Assessment of the
Draft Remedial Investigation Report for
Site 73 (Operable Unit No. 9)
MCB, Camp Lejeune, North Carolina
Comment Letter Submitted by Ms. Gena Townsend
Received by Baker Environmental, Inc., 3/12/97**

I. General Comments

1. Agreed. The text will be revised to include ecological risk assessments.
2. Prevalence is cited as a COPC screening tool in RAGS. Section 5.9.3, page 5-22 states that a compound or constituent can be eliminated as a COPC if it is detected infrequently, or at a frequency of detection of five percent or less. Therefore, in data sets of sample size greater than or equal to 20, the limit of five percent frequency of detection may apply. The sample sizes for the Site 73 environmental data sets in which prevalence was used as a screening tool were greater than 20. However, positive detections will be re-examined to see if reinclusion based on toxicity is warranted.
3. Agreed. A common set of footnotes will be used for all COPC tables.
4. Agreed. Central tendency (CT) calculations will be presented for those receptors that showed unacceptable risk.
5. Section 4.0 and 6.0 tables will be re-examined for discrepancies. However, it should be noted that the tables in Section 4.0 were divided by aquifer and then further subdivided by portions of the aquifer (i.e., uppermost portion of the surficial aquifer, lower surficial aquifer, uppermost portion of the Castle Hayne aquifer, etc.). The groundwater COPC selection tables were not divided in this manner. Therefore, the ranges of concentrations may not be comparable. For example, the concentration range for trichloroethene over the entire aquifer in Table 6-6 (Phase I) is 1.4 to 110 $\mu\text{g/L}$ while in Table 4-5 (Phase I), it is 1.4 to 24 $\mu\text{g/L}$ within the uppermost portion of the surficial aquifer.
6. The unit-specific Problem Formulation actually includes Sections 7.3, 7.4, 7.5, 7.6 and 7.7. This will be clarified in the ERA.
7. The Region IV Supplemental Guidance to RAGS: Region IV Bulletins, Ecological Risk Assessment, 1995 indicates that the maximum groundwater concentrations should be compared to the surface water screening values as a conservative scenario. However, this conservative scenario is not necessary at this site for the following reasons: 1) surface water samples were collected along the shore; 2) the surface water samples were collected in the area where groundwater is expected to enter the surface water; and 3) the groundwater plume has reached the water. Therefore, the more realistic scenario of the exposure point at the surface water pathway will be considered and the groundwater will not be compared to surface water screening values.

8. ~~Section 7.3.1.1 presents the procedures that were used for selecting the COPCs. It does not include analytical data used to select the COPCs. Section 7.3.2.4 and Table 7-4 presents the rationale for retaining a contaminant as a COPC in the fish tissue samples including if the contaminant was detected in the surface water or sediment. Tables 7-2 and 7-3 present the surface water and sediment analytical results. No fish tissue screening values have been established to evaluate potential impacts to fish.~~
9. Mr. Lynn Wellman from USEPA Region IV confirmed that he does not endorse use of the ORNL Screening Benchmarks for soil (particularly for plants) or the Region III BTAG values. Mr. Wellman said that although the toxicity studies in ORNL are useful, he does not agree with the approach ORNL used to develop the screening levels. He prefers the Dutch soil numbers as a screening tool. Therefore, the Dutch numbers will be used first. They will be supplemented with other toxicity numbers when no Dutch numbers are available.
10. The definition of the assessment endpoint in Section 7.5 will be changed to "Assessment endpoints are explicit expressions of the actual environmental values that are to be protected."
11. The definition of the measurement endpoint in Section 7.5 will be changed to "Measurement endpoints are measurable responses to a stressor that are related to the valued characteristics chosen as the assessment endpoints."
12. It is our understanding that the amount of "reduction of receptor population that would have to occur before an ecological effect is determined to occur" is a measurement endpoint, not an assessment endpoint. In addition, there is little agreement on what percentage a receptor population would have to be reduced in order to have an "ecological effect," since variations in populations occur naturally. However, the assessment endpoints will be changed as follows to be a little more specific.
- The protection of terrestrial herbivore and carnivore mammals from ingesting plants, soil surface water, fish, and/or small mammals that contain site-related contaminants.
 - The protection of terrestrial herbivore avian species from ingesting plants, soil, and surface water that contain site-related contaminants.
 - The protection of terrestrial plants and invertebrates from direct exposure to site-related contaminants in the soil.
13. The measurement endpoints will remain the same since the overall meaning of the assessment endpoints did not change.
14. The word feasible will be removed from the third bullet in Section 7.6.
15. All of the contaminants with an HQ that exceeds unity already are discussed in the ERA. We feel that the additional information relating to the significance of the risk gives the reader, often the risk managers, an idea of which contaminants are posing the most significant ecological risks. Therefore, this information will be retained in the ERA.

II. Specific Comments

1. Section 6.2.2, page 6-3, paragraph 0, sentence 2.

The text will be revised to explain in greater detail the rationale for combining the VOC data from the second phase sampling with the first phase metals, SVOCs, and pesticide/PCB data to estimate the risk for the second phase sampling. The rationale is as follows: The groundwater investigation for Site 73 was separated into two phases. The first round of sampling was to evaluate the nature and extent of groundwater contamination at Site 73. Based on these results, it was determined that a second round of sampling was necessary to delineate the VOC contamination. The first round of samples was analyzed for TCL organics and TAL metals. The second round of samples was analyzed for VOCs only. It should be noted that the data points were not the same for the two phases. Sampling points for Phase II were chosen based on VOC concentrations detected in monitoring wells (i.e., certain wells were resampled in second phase). Furthermore, additional wells were installed and sampled during Phase II. Therefore, two separate risk scenarios exist. Phase I data presents a more conservative estimate of risk, while Phase II data presents a more plausible estimate of the risk from exposure to groundwater at Site 73. It was felt that combining the Phase I metals, SVOCs, and pesticide/PCB data with the Phase II VOC data would provide a more complete picture of the risk estimate.

2. Section 6.2.3.4, page 6-4, paragraph 3, sentence 3.

RAGS, page 5-16, section 5-5, second paragraph states that if it is not possible to associate equipment rinsates, field blanks, and/or trip blanks with specific environmental samples, then it is acceptable to compare the blank data with results from the entire sample data set. In the case of the Site 73 analytical data set, the blanks may not have been associated with their specific lot due to the fact that the sample delivery groups (SDGs) may have been broken up at the laboratory.

3. Section 6.2.3.4, page 6-6, paragraph 7.

The MCLs were not used as screening criteria for the baseline risk assessment. Paragraph 5, sentence 3 states that the federal and state criteria and standards used for "qualitative evaluation of contaminants." The text will be revised to more clearly state that state and federal criteria and standards are not used in selecting COPCs, but are included for qualitative comparison purposes only.

4. Section 6.2.4, page 6-7, paragraph 6, sentence 2.

Agreed. The text will be revised to reflect the change from "Region III COC" to "Region III RBC."

5. Section 6.2.4, page 6-8, paragraph 2, sentence 1.

Agreed. The phrase "a comparison" will be inserted into the sentence.

6. Table 6-4.

Agreed. Benzo(a)pyrene and benzo(a)anthracene will be included as COPCs due to their toxicity

~~and the history of site activities. The text, tables, and risk calculations will be revised accordingly.~~

7. Table 6-6.

The COPC selection will remain as presented in Table 6-6. Please refer to responses to general comment number two and specific comment number two.

8. Table 6-6.

MCLs were not used as screening criteria for the risk assessment. Please refer to the response to specific comment number three.

9. Table 6-6.

Agreed. Table 6-6 and all other effected tables will be revised to include the Region III RBC value for thallium carbonate/chloride/sulfate.

10. Table 6-9.

Agreed. The ER-L sediment criteria will be removed from Table 6-9 since ER-L values are intended for use in ecological risk assessments. However, it should be noted that ER-L criteria were not used to screen COPCs, but were used for qualitative comparison purposes only.

11. Table 6-9.

There are new toxicity criteria for Aroclor-1260 in the most recent RBC Table (March 17, 1997). The maximum concentration of Aroclor-1260 detected in Site 73 surface soil was less than the new residential soil RBC. Therefore, Aroclor-1260 will not be selected as a COPC.

12. Tables 6-10 and 6-11.

Agreed. Acetone will be removed as a COPC for fish and crab tissue. The appropriate text, tables, and risk calculations will be revised accordingly.

13. Section 6.3.3, page 6-16.

Agreed. The text will be revised to include the formula for the lognormal 95 percent UCL.

14. Section 6.3.3, page 6-16, paragraph 6, sentence 1.

Agreed. The risk assessment will be revised to include two sets of risk calculations for groundwater: risks will be estimated using the maximum well concentration and again using the lognormal 95 percent UCLs. The aforementioned risks estimated from exposure to groundwater will be presented as maximum and plausible, respectively.

15. Section 6.3.3, page 6-17, paragraph 0, sentence 1.

Agreed. The text will be rewritten to more clearly explain the use of the lognormal 95 percent

16. Section 6.3.4.5, page 6-23, paragraph 4.

Agreed. The Kp value will be changed to the PC value in the dermal exposure CDI equations for groundwater and surface water.

17. Section 6.3.4.7, page 6-25, paragraph 3, sentence 1.

The IR for military personnel will remain 0.05 L/hr. The IR of 0.05 L/hr is cited in RAGS as a default value for ingestion of surface water while swimming. This value is more conservative than the Region IV recommended value of 0.01 L/hr for adults. The estimated risks to military personnel from surface water ingestion were not outside acceptable levels when using the more conservative IR value. Therefore, these risks will not be recalculated. However, an IR of 0.01 L/hr for adults will be considered in the future.

18. Section 6.3.4.7, page 6-25, paragraph 2, sentence 3.

Agreed. The text will be revised to more clearly explain that exposure to surface water via swimming is unlikely due to the murky nature of the water. However, surface water exposure via wading is possible.

19. Section 6.5.1.5, page 6-35, paragraph 2.

Text will be added to this section stating that only VOCs were sampled during Phase II and these VOC results were combined with the SVOC, pesticide/PCB, and metals results from Phase I. Please refer to specific comment number one for further explanation of the rationale for the estimation of risk for each phase.

20. Section 6.5.1.6, page 6-35.

The increase in groundwater risk from Phase I to Phase II is discussed in the text (refer to page 6-40, paragraph 6). However, this discussion will be revised to include differences in analytical methods used as a possible reason for the increase.

21. Section 6.6.3, page 6-37, paragraph 3, sentence 3.

Agreed. The assumption regarding the particulate emission factor (PEF) in which no vegetative cover was assumed was made to maintain a conservative approach. This assumption may not be realistic, however, and will be re-examined.

22. Section 6.6.3, page 6-37, paragraph 4, sentence 3.

Agreed. The sentence will be removed, and the paragraph will be revised.

23. Section 6.6.3, page 6-37, paragraph 5.

Agreed. The paragraph will be revised to include a discussion on the hydraulic connection between

the shallow and deep aquifers at Site 73.

24. Section 6.7.1, page 6-39, paragraph 4.

Agreed. The text will be revised to reflect that arsenic is naturally occurring in marine animals and arsenic was not a COPC for any of the environmental media at the site investigation. Therefore, it is unlikely that the arsenic present in the fish and crab is site related, and it will be eliminated as a COPC.

25. Section 6.7.2, page 6-40, paragraph 2, sentences 2 and 3.

Agreed. The text will be revised to include target organ analysis.

26. Section 7.5.1, page 7-10, paragraph 1.

The first assessment endpoint will be changed to "differences (compared to background) in the structure (i.e., density, diversity) of benthic macroinvertebrate communities attributable to site-related contaminants." The second assessment endpoint in the ERA will be changed to "the protection of benthic macroinvertebrates and fish due to exposure of site-related contaminants in the surface water and sediment."

27. Section 7.8.5, page 7-19, paragraph 6, sentence 1.

The indicator species were selected to represent either species that occur at the site, or to represent similar species (in trophic level and feeding habits) that occur at the site (i.e., the rabbit was selected to represent a small mammal herbivore). The indicator species were selected because of available exposure data (i.e., ingestion rates, home range) for these species. The specific type of species that each of the indicator species represents will be discussed further in the ERA.

28. Section 7.8.5.2, page 7-20, paragraph 1.

The small mammal in the CDI model is a meadow vole. This is presented as such in Table 7-18. However, a sentence will be added to the text to provide clarification.

29. Section 7.10.1, page 7-25, paragraph 4, sentence 4.

The landscaped areas are considered mowed grass, shrubs, etc. This will be further clarified in the text.

30. Section 7.1.2.1, page 7-29, paragraph 3, sentence 3.

The term "significantly impact" was based on visual field observations (i.e., no dead fish or fish with external abnormalities were observed). However, since there is a lack of fish tissue screening levels, non-visual impacts (i.e., reduced growth) were not evaluated in this screening level ERA. Additional field and/or laboratory studies would need to be conducted to evaluate more subtle impacts to fish. Text will be added to state this. The fifth paragraph in the section indicates that the contaminants in the surface water and sediment have a low potential to impact the aquatic receptors. This is based on their low HQ values as discussed in Sections 7.91 and 7.92. The

discussion in Section 7.12.1 is just a summary of the information presented in previous sections.

31. Section 7.1.2.2, page 7-30, paragraph 1, sentence 4.

This sentence will be reworded as follows. "The flora did not appear to be adversely impacted based on visual observations during the site investigations (i.e., stressed vegetation). However, the flora may be impacted in ways that are not visually apparent (i.e., reduced growth)."

32. Table 7-18.

The parameter exposure sources are included in Table 7-18. The food ingestion rates are based on the percentage of food sources that the animal ingests in the second row (i.e., 100 percent vegetation) and, therefore, are not referenced.

33. Section 8.1.1.3, page 8-3, bullets 1 and 2.

Section 4.4.3 discusses the rationale for making the statement contained in Section 8.1.1.3. Section 8 is the summary and conclusions section of the report and by definition provides a synopsis of the various statements and evaluations presented throughout the prior sections of the report.

34. Appendix AB.

The references for the parameter exposure sources in Appendix AB are presented in Table 7-18.

Response to Comments
Submitted by the NCDEHNR on the
Human Health Risk Assessment of the
Draft Remedial Investigation Report for
Site 73 (Operable Unit No. 9)
MCB, Camp Lejeune, North Carolina
Comment Letter Submitted by Mr. David Lilley
Received by Baker Environmental, Inc., 8/14/97

1. The north Carolina Water Quality Standards for cis-1,2-dichloroethene and trans-1,2-dichloroethene were taken from the North Carolina Department of Environment, health, and Natural Resources Division of Environmental management, Groundwater Section, document 15A NCAC 2L, pages 19 through 24, dated 10/25/94.
2. Agreed. The NCWQS for acenaphthene will be changed to reflect the correct value of 0.08 $\mu\text{g/L}$.
3. Bis(2-ethylhexyl)phthalate will not be selected as a COPC due to blank contamination. The associated blank was taken during the Phase I sampling. This can be verified in the QA/QC Frequency of Detection Summaries found in Appendix R. However, the table will be rearranged to make the distinction between the Phases more clear to the reader.
4. The MCL of 1,300 $\mu\text{g/L}$ for copper was found in the USEPA Drinking Water Regulations and health Advisories, Office of Water, EPA 822-B-96-002, October, 1996.
5. The ER-L sediment screening values were included in Table 6-9 for qualitative comparison purposes only. According to the Region IV Supplemental Guidance to RAGS, Human Health Risk Assessment Bulletin No. 5, Region III residential soil RBCs are to be used to screen sediment concentrations in the COPC selection process. Based on this, the ER-L sediment screening values were removed from Table 6-9. Therefore, 4,4'-DDE, bis(2-ethylhexyl)phthalate, copper, and nickel will not be added to the list of COPCs.
6. Please refer to response to comment number five.
7. Agreed. The value will be changed in all appropriate tables to reflect the correct Region III residential soil RBC of 180 $\mu\text{g/L}$ for manganese.
8. The NCWQS for the compounds and analytes listed in Table 6-8 will be revised. Zinc was previously retained as a COPC.
9. Agreed. Table 6-12 will be revised to reflect that chloroform was not selected as a COPC and 1,2-dichloroethane was.
10. The reasoning for using a factor of 0.1 for the fraction of fish/crab tissue ingested is stated in Section 6.3.1 of the RI Report. Most of the fishing done in Courthouse Bay is of a commercial nature. Based on professional opinion, it was conservatively assumed that the adult and child receptor received ten percent of the fish and crab in their diet from Courthouse Bay.

11. Agreed. The toxicity data for 1,2-dichloroethane will be included in Table 6-18.
12. The RFDi for benzene was taken from the RBC Table dated May 6, 1997. The source of this value is the EPA National Center for Environmental Assessment (NCEA), and it is a provisional value. The RFDi will continue to be used as a conservative measure but Table 6-18 will be revised to reference its source as EPA-NCEA and its provisional status.
13. The RFDi for barium was taken from the RBC Table dated May 6, 1997. The source of this value is HEAST, and it is an alternate value. The RFDi will continue to be used as a conservative measure but Table 6-18 will be revised to reference its source as HEAST and its alternate status.
14. The RFDi for cadmium was taken from the RBC Table dated May 6, 1997. This value was footnoted in the Table as being withdrawn from IRIS or HEAST. The RFDi for cadmium will be removed from Table 6-18.
15. The risk assessment will be revised to include two sets of risk calculations for groundwater: risks will be estimated using the maximum well concentration and again using the lognormal 95 percent UCL. The aforementioned risks estimated from exposure to groundwater will be presented as maximum and plausible, respectively.

Response to Comments
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Baseline Ecological Risk Assessment of the
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Comment Letter Submitted by Mr. David Lilley
Received by Baker Environmental, Inc., 8/14/97

1. Ms. Diane Reed was contacted to obtain the origin of the North Carolina Water Quality Standards (NCWQS) referenced in this comment. The NCWQS for the following chemicals are human health numbers: toluene, chloroform, antimony, and manganese. Since these NCWQS are included on Table 6-8 of the RI in the Human Health risk assessment, they will not be repeated on Table 7-2. However, the values for toluene and chloroform will be changed to 37 and 815 ug/L based on the ecological values in the Supplemental Guidance to RAGS, Ecological Screening Values, Bulletin No. 2. In addition, the values for acetone and barium were calculated by Ms. Reed utilizing the methodology described in 15A NCAC2B (North Carolina Water Quality Standards). Therefore, these numbers will be incorporated into Table 7-2.
2. Table 7-3 will be changed to incorporate the values for chromium and copper from the Supplemental Guidance to RAGS, Ecological Screening Values, Bulletin No. 2. The value for nickel will not be changed in Table 7-3 since the value in the above-referenced document is incorrect.
3. The concentration range for toluene in the fillet samples will be changed to 520J to 580J.
4. The concentration range for barium in the crab samples will be changed to 0.054J to 0.094J.
5. The references on Table 7-6 will be checked and changed as necessary.
6. The reference cited in Table 7-6 for the Superfund Public Health Manual (SPHEM) is correct. Mr. David Lilly and Mr. Lynn Wellman (Region IV USEPA) agreed that the physical/chemical table referenced in SPHEM can be used in the risk assessment.
7. The latest update from SCDM will be obtained from the internet and will be used to update Table 7-6.
8. The text on page 7-7 will be changed to read 2,4-dinitrophenol.
9. The inconsistency between page 7-8 and Tables 7-4/7-5 will be corrected.
10. The inconsistencies between page 7-16 and Table 7-2 will be corrected.
11. The inconsistencies between Sections 7.8.3.1 and 7.8.3.2 and Tables 7-4/7-5 will be corrected.
12. Table 7-19 only presents the COPCs with Quotient Indices that exceed "1". A sentence will be added to the text to clarify this.
13. Table 7-21 only presents the COPCs with Quotient indices that exceed "1". A sentence will be added to the text to clarify this.