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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4

SAM NUNN ATLANTA FEDERAL CENTER

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ATLANTA, GEORGIA 30303

March 11, 2002

4WD-FFB

Mr. Kirk Stevens

Department of the Navy - Atlantic Division

Naval Facilities Engineering Command

Code 1823

Norfolk, Virginia 23511-6287

SUBJ: MCB Camp Lejeune

Draft Remedial Investigation

Operable Unit No. 19, Site 84

Dear Mr. Stevens:

The Environmental Protection Agency (EPA) has completed its review of the above subject document. Comments are enclosed. If there are any questions, I can be reached at (404) 562-8538.

Sincerely,

A handwritten signature in cursive script, appearing to read "Gena D. Townsend".

Gena D. Townsend

Senior Project Manager

cc: Dave Lown, NCDEHNR

Rick Raines, MCB Camp Lejeune

**United States Environmental Protection Agency (EPA)  
Comments on the Remedial Investigation Report  
Operable Unit No. 19, Site No. 84 - Building 45 Area  
Marine Corps Base, Camp Lejeune, North Carolina  
Dated January 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.

**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.
  
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.

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.

### 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.
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 rinseate (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.
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

4. **Figure 4-7.** The text in the note presents conflicting information. Please revise as necessary.
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.
6. **Figure 4-13.** Units on this figure are listed as ug/L. A check of the analytical data in Appendix F indicates that these analytical values should carry the units mg/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.
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.

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.
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.
10. **Appendix F.** Please number the numerous pages of this appendix.

## 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.

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 – Refinement". The section starts out with Step 1 – Problem Formulation (which is correct) but Step 2 – 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.

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.

## 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.
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.
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.
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.
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.
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.

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.
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 – 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.
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.
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.
11. Page 6-39, 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.

## 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.
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).
  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.
  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.
  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.
  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.
  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.
  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 2X's the mean background was used. This issue needs to be resolved and only 2X's the mean background value used.

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.
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.
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.
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.