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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4

ATLANTA FEDERAL CENTER
100 ALABAMA STREET, S.W.
ATLANTA, GEORGIA 30303-3104

March 12, 1997

4WD-FFB

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Ms. Katherine Landman
Department of the Navy - Atlantic Division
Naval Facilities Engineering Command
Code 1823
Norfolk, Virginia 23511-6287

SUBJ: MCB Camp Lejeune
Draft Remedial Investigation
Risk Assessment
Operable Unit No. 9 - Site 73

Dear Ms. Landman:

The Environmental Protection Agency has completed its review of the above subject document. Comments are enclosed.

If you have any questions or comments, please call me at (404) 562-8538

Sincerely,

A handwritten signature in black ink, appearing to read "Gena D. Townsend".

Gena D. Townsend
Senior Project Manager

Enclosure

cc: David Lown, NCDEHNR
Neal Paul, MCB Camp Lejeune

1.0 GENERAL COMMENTS

1. Section 1.5, Page 1-7, Paragraph 1, Bullet 3 states that the presence or absence of site-related contaminants in the surface and subsurface soil in order to conduct a human health risk assessment is one of the specific data needs for this document. However, the text does not include ecological health risk assessments in addition to human health risk assessments. The text should be revised accordingly.
2. Section 6.2.3, Pages 6-3 through 6-7 present the criteria for selection of COPCs and includes prevalence as a criteria for selection of COPCs. However, the Region 4 guidance does not include prevalence of frequency of detection as a criteria for selection of COPCs (EPA, 1995). In addition, persistence and mobility are not usually used as criteria for COPC selection except when considering leaching from soils into groundwater. The COPC selection process should be revised to eliminate frequency of detection as selection criteria. If there are no high hits of the contaminant then the frequency of detection method can be used.
3. Tables 6-2 through 6-11 present the COPC selection process. However, some of the footnotes are confusing for the selection criteria. For example, Footnote "A" in Table 6-2 means "< residential screening value", but in Table 6-3 means "> residential screening value". A common set of footnotes should be used for all these tables.
4. Section 6.6 discusses sources of uncertainty. However, this section does not address the Central Tendency (CT) analysis which is required by EPA for the uncertainty section. The CT analysis should be included accordingly.
5. Tables 6-6 and 6-7 present selections of organics and metal COPCs in groundwater (Phases I and II). However, after comparing with the Summary of Groundwater Contamination presented in Table 4-5 (Section 4), there are a number of discrepancies regarding concentrations of some VOCs. For example, the concentration range for vinyl chloride in Table 6-6 (Phase I) is 1.4 to 110 ug/L, but it is 1.8 to 23 ug/L in Table 4-5 (Phase I). The discrepancies should be resolved.
6. Section 7.2, Page 7-2, Paragraph 2 provides the generic EPA definition of the problem formation used in this ERA. However, a unit-specific problem formulation is not discussed. Therefore, the text should be revised to discuss the unit-specific problem formation.

7. Section 7.3, Page 7-2, Paragraph 5 states that contaminants in groundwater were not evaluated in this ERA. However, EPA guidance states that contaminated groundwater must be considered if groundwater discharge to sediments or seeps occurs (EPA, 1995). For example, Section 8.1.1.2 states that groundwater begins to recharge Courthouse Bay. Therefore, since groundwater may be impacting Courthouse Bay, the potential for ecological risk must be considered. The text should be revised to address the issue of contaminated groundwater and its potential ecological risks.
8. Section 7.3.1.1, Page 7-3, Paragraph 2, Sentence 4 states that contaminants detected in the tissue samples are not detected in any of the surface water or sediment samples so they are not retained as COPCs. The text does not include a discussion of the levels of the various contaminants detected in the tissue samples and whether these levels exceed screening level values. The text should be revised to address this issue accordingly.
9. Section 7.3.1.4, Pages 7-3 and 7-4, Paragraphs 1 and 2 indicate that screening values were obtained from Oak Ridge National Laboratory (ORNL). However, the Region 4 guidance states that preliminary screening values for contaminants which lack Region 4 Waste Management Division Ecological Screening Values should be proposed and submitted to OHA for approval. As of December 1996, ORNL values have not been approved for use by the Region 4 (personal communication with Len Wellman, Dec. 1996). Therefore, the use of ORNL surface soil screening values is inappropriate in this document, and the text should be revised to delete the use of these values.
10. Section 7.5, Page 7-9, Paragraph 5 provides a definition of assessment endpoints which states that assessment endpoints are environmental characteristics, which, if they are found to be significantly affected, may indicate a need for remediation (e.g., decrease in sports/fisheries). However, this definition is not consistent with the definition of an assessment endpoint as stated in EPA guidance (EPA, 1994). Therefore, the text should be revised to utilize the EPA definition of an assessment endpoint.
11. Section 7.5, Page 7-9, Paragraph 6 provides a definition of a measurement endpoint. However, the definition of the measurement endpoint is inconsistent with the definition in EPA guidance which states that a measurement endpoint is a measurable ecological characteristic that is related to the

environmental value chosen as the assessment endpoint. The text should be revised to follow the definition by EPA.

12. Section 7.5.2, Page 7-12, Paragraph 1, Sentence 1 lists the assessment endpoint selected for terrestrial receptors. However, the selected terrestrial assessment endpoint is too vague and inappropriate. For example, the text should state what reduction of a receptor population would have to occur before an ecological effect is determined to occur. Specific guidance concerning the selection of assessment endpoints can be found in the EPA Process document (EPA, 1994). Therefore, the text should be revised to include a more terrestrial assessment endpoint.
13. Section 7.5.2, Page 7-12, Paragraph 1, Sentence 2 states that measurement endpoints for the terrestrial ERA include exceedances of contaminant specific soil effect screening values and contaminant specific effect doses. However, due to the incorrect assessment endpoint selected for terrestrial receptors, these measurement endpoints are inappropriate. Therefore, the text should be revised to include a discussion of measurement endpoints selected which is related to the environmental value chosen as the terrestrial assessment endpoint.
14. Section 7.6, Page 7-12, Paragraph 3, Bullet 3 includes one element of a complete exposure pathway which is a feasible receptor exposure route. However, the exposure route should in fact be potentially present, not feasible, because the use of the term feasible implies a risk management decision and not a risk analysis decision. The text should be revised to delete the term feasible from this bullet.
15. Section 7.9, Page 7-22, Paragraph 1 provides the rationale used in this ERA to determine the issue of significant risk based on Menzie. However, this information may be used by risk managers, it is inappropriate for inclusion in this ERA. Therefore, this paragraph and its associated bullets should be deleted from this document. In addition, all text in the ERA utilizing Menzie's significance criteria should be revised to discuss risk based values on the risk calculated and contaminant specific HQs which exceed unity.
16. Section 8.1.1.4, Page 8-3, Paragraph 1, Bullet 1 states that VOCs detected in fish and crab samples were restricted to common laboratory contaminants and are suspected to be the result of sample preparation. However, if the VOCs were not detected in laboratory blanks, then the statement in this bullet is not supported and VOCs should remain as possible contaminants of concern. The text should be revised to

address the presence or absence of the VOCs in laboratory blanks.

17. Section 8.1.1.4, Page 8-3, Paragraph 1, Bullet 2 states that pesticides detected in fillet samples may be related to widespread control activities and not from site operations or disposal practices. However, the text does not include a discussion specifically dealing with the issue of how contaminants present at this unit (which may be due to Camp Lejeune wide operations yet not unit specific) will be dealt with, perhaps in a site wide ecological risk assessment. The text should be revised to include the discussion.
18. Section 8.1.1.4, Page 8-4, Paragraph 0, Bullet 1 states that metals detected in fish and crab samples may be related to base-wide or regional influences and not from site operations. However, the text does not discuss how contaminants present at this unit (which may be due to Camp Lejeune wide operations) will be dealt with, perhaps in a site wide ecological risk assessment or other such document.
19. Section 8.1.3.1, Page 8-5, Paragraph 0, Bullet 2 states that several contaminants were detected above background studies, but these contaminants do not appear to be significantly impacting the fish community. However, the term "significantly impacting" is unclear and should be revised for clarity. The text should indicate the significant impact to the fish community, such as the population reduction by percentage.
20. Section 8.2, Page 8-5, Paragraph 3, Bullet 1, Sentence 4 states that no surface or subsurface contamination appears to present a significant human health or ecological risk. However, based on the information presented in the ERA of this document and the information provided in Section 8.1.3, it appears that this statement is misleading. The information from the ERA states that there is ecological risk present at the site to both aquatic and terrestrial ecosystems.

2.0 SPECIFIC COMMENTS

1. Section 6.2.2, Page 6-3, Paragraph 0, Sentence 2.

This sentence states that VOC data from the second phase of sampling were combined with the first phase metals, SVOCs and pesticide/PCB data to estimate the risk for the second phase sampling. However, this approach leads to the impression that two complete sets of samples were taken and that the risks had not changed over time when the summary results are presented separate from the risk assessment. It is suggested that the risk results for the Phase II sampling be presented separately. If the VOC concentrations or risks have significantly changed with time, a statistical comparison should be made of only the VOC concentrations. This risk assessment should be revised to reflect this comment.

2. Section 6.2.3.4, Page 6-4, Paragraph 3, Sentence 3.

This sentence states that the maximum blank concentration for a given sample medium will be used to eliminate COPCs for the entire data set for that medium. However, this approach ignores that blank contamination can vary widely from one blank to another. Typically, the blank correction is made at the time of data validation on a sampling lot by lot basis and each blank is associated with the appropriate samples. The data should be re-evaluated on a lot by lot basis to make the blank comparisons.

3. Section 6.2.3.10, Page 6-6, Paragraph 7.

This paragraph discusses the use of MCLs as a screening criteria. However, MCLs are not to be used as a screening criteria for baseline risk assessments. The text should be revised accordingly.

4. Section 6.2.4, Page 6-7, Paragraph 6, Sentence 2.

This sentence uses the term "Region III COC". However, the more appropriate term is "Region III RBC". The use of the acronym COC should be replaced with RBC in all text and tables when referring to screening criteria.

5. Section 6.2.4, Page 6-8, Paragraph 2, Sentence 1.

This sentence has the phrase "the selection of COPCs for each environmental medium based on the maximum detected

concentration..." It is suggested that the words "a comparison" be inserted between "based on" and "the maximum".

6. Table 6-4.

This table indicates that benzo(a)pyrene is not selected as a COPC because the frequency of detection is less than 5 %. However, since the frequency of detection is not an acceptable criteria, benzo(a)pyrene should be selected as a COPC. In addition, benzo(a)anthracene should also be selected as a COPC because its concentration is at the RBC, and PAHs tend to be found together. This is particularly important since waste oils were released at this site. The text should be revised accordingly.

7. Table 6-6.

Table 6-6 presents COPC selection. However, the following compounds should have been, but were not selected as COPCs: chloroform, bis(2-ethylhexyl)phthalate, antimony, beryllium, cadmium, nickel, silver, and thallium. Chloroform and bis(2-ethylhexyl)phthalate were not selected because of errors in blank correction. The remainder were not selected because of frequency of detection. The table should be revised accordingly.

8. Table 6-6.

The table shows MCLs as one of the criteria for COPC selection. However, since MCLs should not be used as a criterion, the MCL columns should be deleted from the table.

9. Table 6-6.

The table shows that there is not an established Region 3 tap water value for thallium. However, there are Region 3 tap water RBC values for several thallium compounds including thallium sulfate. The RBC value for thallium sulfate is 2.9 ug/L and could be used in this table. The table should be corrected accordingly.

10. Table 6-9.

The table presents the ER-L sediment criteria. However, this criteria which is intended to be used for ecological risk assessments may not be applicable to human health risk assessments. Therefore, this table should be revised to remove this criterion.

11. Table 6-9.

The table shows that Aroclor 1260 was not selected because the frequency of detection was less than 5%. However, since the frequency of detection should not be used, Aroclor should be selected as a COPC. The table should be revised accordingly.

12. Tables 6-10 and 6-11.

The tables show that acetone present in the tissues of the fish and crabs was selected as a COPC. However, since acetone is a normal metabolic component of mammalian tissues, the acetone detected in these tissues is likely a normal metabolic component and may not be related to the site activities. The text may need to remove acetone as a COPC.

13. Section 6.3.3, Page 6-16.

This section discusses the quantification of exposure. However, the formula which is used for calculating the normal or log-normal UCL is not presented. The omission of the formula should be corrected.

14. Section 6.3.3, Page 6-16, Paragraph 6, Sentence 1.

The text states that groundwater data from all wells will be used. However, the Region 4 guidance states that the average concentration of the wells from the most highly contaminated area of the groundwater plume should be used (EPA, 1995). Therefore, the groundwater concentrations used in the risk assessment should be adjusted accordingly.

15. Section 6.3.3, Page 6-17, Paragraph 0, Sentence 1.

The text states that the true mean may be higher than the maximum value because the 95 % UCL is greater than the maximum. However, the text does not consider the distributional assumption. For example, if a log-normal distributional assumption was assumed and the distribution was actually normal, then it is likely that the 95 percent would be greater than the maximum. This paragraph should be re-written accordingly.

16. Section 6.3.4.5, Page 6-23, Paragraph 4.

This paragraph presents the equation for CDI. However, this formula for the exposure to groundwater is incorrect for

organic chemicals. The PC values used in the risk spreadsheets is the Kp value from the EPA dermal guidance (see equations 5.20 and 5.21 on page 5-51 in EPA, 1992). The text should be revised accordingly. This comment also applies to Section 6.3.4.7, Surface Water Dermal Exposure.

17. Section 6.3.4.7, Page 6-25, Paragraph 3, Sentence 1.

The text states that the IR for military personnel is 0.05 L/hr. However, the Region 4 recommends an IR of 0.01 L/hr for adults (EPA, 1995). This discrepancy should be resolved.

18. Section 6.3.4.7, Page 6-25, Paragraph 2, Sentence 3.

The text states that exposure to surface water is considered unlikely due to the murky nature of the surface water. This statement is repeated in several succeeding paragraphs. However, it is not clear how the murky water prevents surface water exposure, especially since murky water is not likely to impede military activities. The text regarding the murky water issue should be clarified accordingly.

19. Section 6.5.1.5, Page 6-35, Paragraph 2.

The text discusses the results of the Phase II groundwater sampling. However, the fact that only VOCs were sampled during this phase is omitted from this discussion and the discussion leads to the impression that all TCL components were sampled. The two phases of sampling should not be combined for risk estimation purposes.

20. Section 6.5.1.6, Page 6-35.

This section discusses the risk from future residential adult exposure. It is noted that the groundwater risk due to VOCs from the Phase II sampling was higher than the Phase I sampling because of increases in vinyl chloride and trichloroethene concentrations. However, this increase is not discussed in the risk assessment. The text should be revised to present the discussion so that the differences between the sampling can be highlighted. In addition, the performance of a non-parametric test such as the Wilcoxon rank sum test (Gilbert, 1987) to test for significant differences would be helpful.

21. Section 6.6.3, Page 6-37, Paragraph 3, Sentence 3.

The text states that it was assumed that the entire area was not covered with vegetation. However, this assumption is unrealistic as the area was described to have vegetative

cover and there are multiple buildings and paved surfaces on the site. This assumption should be re-examined and revised if necessary.

22. Section 6.6.3, Page 6-37, Paragraph 4, Sentence 3.

The text states that groundwater taken from monitoring wells cannot be representative of potable groundwater. However, the text overstates the case as the purpose of installing monitoring wells is to arrive at an estimation of exposure from drinking groundwater from the tap. This sentence should be removed, and the paragraph should be revised.

23. Section 6.6.3, Page 6-37, Paragraph 5.

The text discusses the use of shallow groundwater for residential use. However, the text does not mention that the shallow water table and deeper aquifers are hydraulically connected, because future groundwater exposure to contaminants in the deeper groundwater could be as a result of migration from the shallow aquifer. This paragraph should be revised to include a discussion on the hydraulic connection.

24. Section 6.7.1, Page 6-39, Paragraph 4.

The text discusses the elevated risk results due to the presence of arsenic in fish and crab tissues. However, arsenic is not a COPC for any of the environmental media at the site in the investigation. In addition, arsenic is naturally present in marine animals (ATSDR, 1989). Therefore, it is unlikely that the arsenic present in the fish and crabs is site related. The text should be revised accordingly.

25. Section 6.7.2, Page 6-40, Paragraph 2, Sentences 2 and 3.

These two sentences state that since the individual media HI values were below one, and that it is unlikely that adverse systemic effects would result from exposure to groundwater. However, this conclusion is not entirely correct. The individual media exposure and doses can be additive, but it depends on the metabolism of the individual contaminant. The text does not discuss the breakdown of non-carcinogenic effects on the individual target organs. Such a breakdown is discussed in RAGS and in the Region 4 guidance (EPA, 1995). This paragraph should be revised to discuss the impact on individual target organs.

26. Section 7.5.1, Page 7-10, Paragraph 1.

The text provides a definition of the assessment endpoint selected for the aquatic receptors of this ERA. However, the aquatic assessment endpoint selected is too vague and inappropriate. For example, the text should specify the amount of difference in site communities versus background communities that must occur to determine if an effect is present. Specific guidance concerning the selection of assessment endpoints can be found in the EPA guidance (EPA, 1994). The text should be revised to include a more specific aquatic assessment endpoint.

27. Section 7.8.5, Page 7-19, Paragraph 6, Sentence 1.

The text provides a list of indicator species used in this analysis. However, the text does not discuss exactly what is meant by the term indicator species. The text should include the discussion accordingly.

28. Section 7.8.5.2, Page 7-20, Paragraph 1.

The text states that estimated CDI doses of the bobwhite quail, cottontail rabbit, white tailed deer and small mammal were determined. However, it is unclear what the difference is between a cottontail rabbit and small mammal since a rabbit would appear to qualify as a small mammal. The text should be revised to address this issue accordingly.

29. Section 7.10.1, Page 7-25, Paragraph 4, Sentence 4.

The text states that the majority of soil samples were collected from landscape areas. However, the text does not include a discussion of exactly what is meant by landscape areas. The text should be revised to include the discussion accordingly.

30. Section 7.1.2.1, Page 7-290, Paragraph 3, Sentence 3.

The text states that contaminants do not appear to be significantly impacting the fish community. However, it is unclear if the use of this term is based on the risk management criteria. If the term is being used based on the risk management criteria, the text should be revised to discuss what is meant by the term "significantly impact". In addition, the text should be revised to include specific information (such as calculated HQ values) concerning aquatic risk to the fish community.

31. Section 7.1.2.2, Page 7-30, Paragraph 1, Sentence 4.

The text states that the flora community did not appear to be adversely impacted during the site investigation. However, this statement tends to minimize the issue that several inorganics exceeded plant benchmark values. Therefore, this sentence should be deleted from the text.

32. Table 7-18.

Table 7-18 provides a list of exposure parameters for the chronic daily intake (CDI) model. However, the parameter sources were not included in the table. The table should be revised to include references for all parameters used in the CDI model.

33. Section 8.1.1.3, Page 8-3, Paragraph 0, Bullets 1 and 2.

The text states that contamination present in surface water/sediment was due to either high amount of boat traffic or the result of erosion and possible aerial pesticide application, and not from spills or disposal events. However, the text does not discuss the rationale used to make the decisions that the contaminants in these media are not related to site-specific activities. The text should be revised to include the discussion.

34. Appendix AB.

Appendix AB lists the equations and values (i.e., ingestion rate, home range) used to calculate exposure for the red fox, bobwhite quail, eastern cottontail rabbit, white-tailed deer, and raccoon. However, the source of this information is not cited. The tables should be revised to provide a list of the references from which the values used in these tables were obtained.