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CERTIFIED MAIL RETURN RECEIPT REQUESTED

Waste Management Division
United States Environmental Protection Agency,
Region IV
Attn: Ms. Michelle Glenn
345 Courtland Street, N.E.
Atlanta, Georgia 30365

Re: MCB Camp Lejeune; Responses to EPA Region IV Comments on the Baseline Risk Assessment Section, Draft Final RI Report for Operable Unit No. 3 (Site 48)

Dear Ms. Glenn:

We have received the EPA Region IV comments (facsmile transmission dated June 9, 1993) to the subject draft final document. The Navy/Marine Corps responses to these comments are enclosed.

Any questions concerning these responses should be directed to Ms. Linda Berry at (804) 322-4793.

Sincerely,

L. A. BOUCHER, P.E.
Head
Installation Restoration Section
(South)
Environmental Programs Branch
Environmental Quality Division
By direction of the Commander

Encl:
Response to EPA Region IV Comments on Baseline Risk Assessment Section of the Draft Final RI Report Operable Unit 3 (Site 48) via facsimile 6/9/93

Copy to:
NC DEHNR (Mr. Peter Burger)
MCB Camp Lejeune (Mr. Neal Paul)

Blind copy to:
1823 (LGB)(2 copies w/encls), 18S, LGBDoc:BRA/RI/3

Attachment A
Response to Comments Submitted by the
US Environmental Protection Agency, Region IV
on the Draft Remedial Investigation Report
for Operable Unit No. 3 (Site 48)
Marine Corps Base, Camp Lejeune, North Carolina

Response to Human Health Risk Assessment

1. A comparison to trip blanks, field blanks, equipment rinsate blanks and laboratory blanks was conducted to determine the source of the common laboratory contaminants methylene chloride, acetone and the phthalate esters. These chemicals were detected in a number of blanks associated with field sampling activities. These data are presented in Appendix L Quality Assurance/Quality Control Summary. Ten times the maximum amount of detected in any blank was applied to those chemicals considered by USEPA to be common laboratory contaminants. This discussion is presented in Section 4.0 Nature and Extent of Contamination. As a result, acetone, methylene chloride and bis(2-ethylhexyl)phthalate were not retained as Chemicals of Potential Concern (COPCs). This will be clarified in section 6.2.1 text.

2. Background data cannot be solely used in the selection of inorganic COPCs without considering the complexities of the site geology, site history and the chemistry of the inorganic in question. Nor should exposure based values such as a Drinking Water Equivalency Level (DWEL) be used instead of potentially applicable or relevant and appropriate state or Federal criteria in the selection process. DWELs are not promulgated standards. The criteria presented in Table 6-1 are State and Federal promulgated standards that consider human health, but also the technical achievability of remediating groundwater and are, therefore, more pertinent to the selection of COCs for the baseline risk assessment. In this case, the State of North Carolina Water Quality Standard for groundwater is more conservative than the exposure based DWEL and is more protective of human health. Comparing groundwater concentrations to promulgated enforceable Federal and State of North Carolina groundwater criteria (which could be considered applicable, relevant and appropriate criteria) is more appropriate than a comparison to non-enforceable DWEL values derived by assuming some level of potential human exposure. Background data, site history, regional geology, industrial uses of manganese, regional geology, manganese chemistry and study area mineralogy were evaluated in conjunction with State of North Carolina and Federal groundwater criteria (Table 6-1) before selecting chemicals as COPCs. This approach is consistent with USEPAs selection criteria presented in Section 5 of the Risk Assessment Guidance for Superfund, Human Health Evaluation Manual. Part A (RAGS, 1989).

Background data for manganese were presented in Section 4.0 of the Remedial Investigation Report. Background concentration of manganese ranging from 50 to 120 ug/L were detected in potable

supply wells located throughout Marine Corps Base Camp Lejeune. Potable wells are situated in the Castle Haynes aquifer, which underlies the surficial aquifer. These data need not be reiterated in Table 6-1. Two Site 48 wells installed in the surficial aquifer (GW-2, GW-3) contained concentrations of total and dissolved manganese which exceeded Castle Haynes background data. These exceedances were confirmed by a second round of groundwater sampling and analysis conducted in March of 1993. Manganese detected in groundwater is likely due to the regional geology and mineral composition of the study area. The potential for significant manganese containing mineral deposits does exist in the Atlantic costal plain of the U.S..

The principal industrial use of manganese is for the production of steel and aluminum beverage cans. Minor uses of manganese include water purification (with potassium permanganate), as a soil conditioner, as battery oxide for dry cells and for coloring bricks and ceramics. These uses for manganese are not consistent with known Site 48 history. Furthermore, manganese was not detected at high concentrations in Site 48 soil or sediment samples. The presence of elevated manganese in soils or sediments would provide an indication of its historical use and/or disposal at Site 48. This was not the case, therefore, manganese was not retained as a COC for further evaluation in the baseline risk assessment.

Furthermore, comparative techniques such as the two times rule require professional judgement in their application. It is not a test for determining statistical significance. The two times rule is based on the accuracy criteria for CLP analytical methods which are, in general, plus or minus 50 percent (Federal Register Vol. 49, No.209. October 26, 1984). Although, the two times rule is a good rule of thumb for comparison to background, it cannot be used exclusively for the selection of inorganic COPCs for the aforementioned reasons.

3. The two times rule is not a test for determining significance. It is a rule of thumb approach based on the general accuracy data for CLP methods. This method cannot be used exclusively in the selection of COPCs. Furthermore, Table 6-2 does present base specific background concentrations of inorganic chemicals. Site specific background data in conjunction with literature background data, site history and regional geology were considered in the selection of COPCs. Nondetect results are presented in Appendix G Data and Frequency Summary. Inclusion of nondetect results in Table 6-1 would be cumbersome because of the number of samples involved. Nondetect results will not, therefore, be included in table 6-2.

4. In the first paragraph of Section 6 of the RI report it is stated that the ecological assessment will be conducted under separate cover. Therefore, no action will be taken on this comment.

5. Text will be corrected to indicate adolescent age is between 7-16 and not 6-15. No other action is required for this comment. Revision of these ages in the text does not impact the outcome of the risk assessment.

6. The text will be edited to "incidental" replacing "accidental". Additional action on this comment is not required. This correction does not impact the outcome of the risk assessment.

7. The text will be corrected to indicate 2,190 days for the exposure duration for a child. The exposure duration, 3,285 days, was not used in the estimation of risk. Consequently, no additional action is required.

8. Wording in the assumption will be corrected to "Contaminant concentration is surface soil", there is no additional action required for this comment.

9. The adult skin surface area 3210 cm2 will be used instead of 2000 cm2 for the estimation of risks from dermal contact with soil. Human health risks to adult base personnel and future adult residents have been estimated using this revised surface area.

10. The text will be revised to read that children and adults may potentially be exposed to COCs. This revision does not impact the risk assessment.

11. Acenaphthene was the only contaminant which was used to estimate the potential exposure from dermal contact with groundwater. A permeability constant value for this compound is not published in the USEPA's guidance document (Dermal Exposure Assessment: Principles and Application, January 1992). Consequently, a default permeability constant published in USEPA's Risk Assessment Guidance was used. Using the default value of 1E-3 does not change noncarcinogenic risk from naphthalene. Therefore, no action is required on this comment.

12. Based on USEPA's guidance document Dermal Exposure Assessment: Principles and Application, January 1992, an exposure frequency of 7 days/year is recommended. However, because further investigation is recommended, and the assessor should make professional judgements based on their own knowledge of site-specific conditions, it was determined that with this site being in a southern climatic region that 4 times the recommended frequency would be a conservative judgement.

13. The provisional toxicity values for trichloroethylene (TCE) have not been promulgated. These values are not listed in the latest version of The Health Effects Assessment Summary Tables (HEAST) or on the Integrated Risk Information System (IRIS). Therefore, the values presented in the comments will not be used to evaluate human health risks from TCE until they have been promulgated.

14. The text will be revised to "less than" as opposed to "greater than". No additional action is required.

15. The Reference Dose for 4,4'-DDT used to estimate risk from soil ingestion will be corrected.

16. Significant uncertainty is associated with modification of the oral Reference Dose (RfD) or Carcinogenic Potency Factor (CPF)to determine an absorbed dose. RfDs and CPFs are usually expressed as administered dose. Use of administered dose toxicity values is appropriate when evaluating similar routes of exposure. However, when evaluating dermal exposure to a chemical, an absorbed dose is derived by the risk assessor. Technically, it is not appropriate to evaluate potential health effects associated with an absorbed dose using a toxicity value generated form an administered dose. Modifying the RfD or CPF (derived from an administered dose) by some arbitrary oral absorption factor does not produce a better or more accurate toxicity index for evaluating potential dermal exposure.

USEPA promulgated absorption values are not currently available because of the uncertainty in the available absorption data. For example, absorption value for a given chemical differ for different animal species and the media by which the chemical is administered (i.e. rat vs guinea pig vs mouse; corn oil vs food vs neat). Furthermore, available default absorption values cannot account for the variability of absorption between test animals and humans, nor can they account for absorption differences in individual diets or individuals of different ages, weights, race or socio-economic status. Until more appropriate dose-response factors are derived or promulgated absorption factors are published by USEPA, absorbed dose RfDs or CPFs cannot be derived and used in place of promulgated USEPA administered dose RfDs and CPFs. The uncertainty of using the current USEPA promulgated administered dose RfDs and CPFs will, however, be highlighted in the uncertainty section of the baseline risk assessment.

17. The handwritten example sheet for dermal contact with groundwater will be correct to show 1L/1000cm3. The spreadsheet generated for this scenario does not require correction.

18. The concentration (0.002 mg/L) of acenaphthene will be used to estimate potential risks from dermal contact with groundwater.

19. The dermal absorption values for the pesticides will be corrected to 0.05 and 0.01 for metals.

Linda, These are "heads up" only. They may change. Michelle

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In fact, since the human health risk assessment contained in the draft RI previously was totally qualitative, it was necessary to review the current document (chapter) in its totality and resulted in a significant number of comments.

Comments BRA

1. Page 6-5, Section 6.2.1. Detected contaminants in groundwater cannot be written off as "common.....laboratory contaminants" unless valid comparison is made to laboratory blanks. EPA Risk Assessment Guidance for Superfund (RAGS, 1989), Section 5.5, states that "if the blank contains the sample results should be considered positive only if the concentrations in the sample exceed ten times the maximum amount detected in any blank." Methylene chloride and phthalate esters are considered by EPA to be common laboratory contaminants. For chemicals which are not considered by EPA to be common laboratory contaminants, the guidance reads that one should "consider the sample results as positive only if the concentration of the chemical in the site sample exceeds five times the maximum amount detected in any blank."

2. Page 6-5, Section 6.2.1; Table 6-1. Manganese should not be eliminated from being a chemical of potential concern unless site area background data are provided. Based on the current water RfD for manganese of 0.005 mg/kg-d, the Drinking Water Equivalency Level (DWEL) is 200 ppb. The maximum reported manganese site concentration is 585 ppb. Chemicals which have verified toxicity values should be

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eliminated from further consideration in the BRA only if the site concentration are not significantly greater than area background rather than by comparison with MCLs. Since sufficient numbers of background samples to perform meaningful statistical analyses are rarely obtained, two times the average background concentration should be compared to the maximum site concentration to determine significance. Table 6-1 should include site area background data for inorganic chemicals so that comparisons with the site data can be readily made.

3. Page 6-7, Section 6.2.2; Table 6-2 (pg 6-8). The "two times rule" (see previous comment) should be used before eliminating chemicals from further consideration based on similarity to background. Table 6-2 should include site area background data for inorganic chemicals so that comparisons with the site data can be readily made. Chemical analytical results reported as "ND" should give the detection limit achieved for that chemical.

4. Page 6-10, Section 6.2.3; Tables 6-5, 6-6. Mercury levels shown in Tables 6-5, 6-6 exceed the Ambient Water Quality Criteria (AWQC) for saltwater aquatic life but not the Federal AWQC for human health exposure. The mercury level detected should have been dealt with in the ecological assessment performed for this site area. It would be appropriate to have an explanation to this effect at this point in the human health BRA.

5. Page 6-23, Section 6.3.4. The age range for the adolescent should be 7-16 years old. The values given for exposure duration and body weight are appropriate.

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6. Pages 6-23, 6-24, Section 6.3.4.1; Table 6-11. The term "Accidental Ingestion" should be reworded to read "Incidental Ingestion"; rather than from an "accident", the estimated exposure occurs from ordinary activity. For onsite residents (future scenario), adults should be assumed to incidentally ingest 100 mg/day and children (age 1-6 year old) should be assumed to ingest 200 mg/day (USEPA "Standard Default Exposure Factors", 1991). Table 6-11 fails to list the exposure parameters for the potential adolescent exposure discussed in the text.

7. Page 6-25, Section 6.3.4.1. The noncarcinogenic Averaging Time for the child exposure (ED = 6 yrs) is 2190 days. Table 6-11 list the correct value for this parameter.

8. Page 6-25, Section 6.3.4.2. The title of this section is "Dermal Contact with Surface Soil", but one of the assumptions listed for the CDI equation in this section is written as "Contaminant concentration in **subsurface** soil" [bold added for emphasis].

9. Page 6-27, Section 6.3.4.2. The assumed skin surface area (SA) is stated to be 2000 cm^2 for a worker's hands head, and arms. EPA Exposure Factors Handbook (March 1990) (EFH) - more current than the reference stated in this document (Superfund Exposure Assessment Manual, 1988) - lists the SA for the total arms and hands (not head) of an adult male as being 3120 cm^2. An SA of 2000 cm^2 would correspond to the forearms and hands only.

10. Page 6-30, Section 6.3.4.4. Under **Future On-Site Residents**, the text states that "Children could contact

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COCs...". What about the adult in this scenario?

11. Page 6-32, Section 6.3.4.4. The default dermal aqueous permeability constant (PC) of 8E-4 cm/hr in RAGS is superseded by the recent EPA guidance (Dermal Exposure Assessment: Principles and Application, January 1992), which lists PC values for many inorganics (table 5-3), organics (table 5-7), as well as a default (water) PC value of 1E-3 cm/hr.

12. Page 6-34, Section 6.3.4.5. What is the justification for the exposure frequency value of 28 days/year for the adolescent at the New River, i.e. what would prevent more frequent exposure?

13. Table 6-18, Page 6-43; Page 6-55. Provisional toxicity values from EPA- Environmental Criteria and Assessment Office should be used for Trichloroethene as follows:

RfD = 6.0E-3 mg/kg-day
oral CSF = 1.1E-2 $(mg/kg\text{-}day)^{-1}$
inhalation CSF = 6.0E-3 $(mg/kg\text{-}day)^{-1}$

The reference for the RfD for mercury is HEAST rather than IRIS.
Units for the toxicity values should be clearly shown on the table.

14. Page 6-53, Section 6.6.2. The statement, "However, risk estimates for potential human exposure via groundwater ingestion estimated a risk of greater than 10E-4." , does not agree with the results of the risk assessment, and should be edited appropriately.

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15. Appendix P - CDI (intake), risk and hazard tables.

    Ingestion of soil tables. The Reference Dose (RfD) used for 4,4'-DDT is incorrect. It should be 5E-4 mg/kg-dy.

16. Appendix P. All assessment of risks, hazards from dermal exposure (soil, groundwater, sediment). Oral Slope Factors and RfDs (based on administered dose) should be adjusted for oral absorption before being used to estimate risks and hazards from dermal exposure (determined as an absorbed dose). Appendix A in the EPA RAGS document should be consulted for explanation on this adjustment. If the needed chemical-specific oral absorption values cannot be located, contact the this office for chemical class default values.

17. Appendix P. The CDI and resultant noncarcinogenic risk from dermal contact with groundwater are incorrect by three orders of magnitude. On the handwritten sheet (example) for this scenario, the conversion factor is written as "1 L/cm^3" (It should be "1 L/1000 cm^3"). This would account for the 1000-fold error in the CDI and risk values.

18. Appendix P. In the table for dermal exposure to groundwater by future child resident, the concentration of acenaphthene is shown as 0.0006 mg/L; elsewhere in this report, it is shown as 0.002 mg/L. Address this discrepancy.

19. Appendix P. In the tables for adolescent dermal contact with sediment, a dermal absorption value of 1 (100%) is used for mercury and for 4,4'-DDT/DDE/DDD. Elsewhere in this report, the values used and referenced are 0.05 (5%) for

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semivolatiles and 0.01 (1%) for metals.