



DEPARTMENT OF THE NAVY  
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16 APR 1996

From: Commanding Officer, Navy Environmental Health Center  
To: Commanding Officer, Atlantic Division, Naval Facilities  
Engineering Command, ATTN: Lance Laughmiller, 1510 Gilbert  
Street, Norfolk, VA 23511-2699

Subj: MEDICAL REVIEW OF INSTALLATION RESTORATION PROGRAM  
DOCUMENTS FOR MARINE CORPS BASE, CAMP LEJEUNE, NC

Ref: (a) Baker Environmental, Inc. transmittal ltr of 15 Feb 96

Encl: (1) Medical review of "Draft Remedial Investigation/  
Feasibility Study Project Plans Operable Unit No. 16  
(Sites 89 and 93)"

(2) Medical/Health Comments Survey

1. Per reference (a), we have completed a medical review of the "Draft Remedial Investigation/Feasibility Study Project Plans Operable Unit No. 16 (Sites 89 and 93)." The attached comments are included for your information as enclosure (1).

2. Please complete and return enclosure (2). Your comments are needed to continually improve our services to you.

3. Our points of contact for this review are Mr. Kenneth G. Astley and Mr. David McConaughy, Health Risk Assessment Department, Environmental Programs Directorate. If you would like to discuss this medical review or if you desire further technical assistance, call (804) 363-5541 or (804) 363-5557, DSN prefix 864.

*W. E. Luttrell*  
W. E. LUTTRELL  
By direction

**MEDICAL REVIEW OF DRAFT REMEDIAL INVESTIGATION/FEASIBILITY  
STUDY PROJECT PLANS OPERABLE UNIT NO. 16 (SITES 89 AND 93)  
MCB CAMP LEJEUNE, NORTH CAROLINA**

- Ref: (a) Supplemental Region IV Risk Assessment Guidance, U.S. EPA Region IV memo, dtd March 26, 1991
- (b) Technical Assistance Document for Complying with the TC Rule and Implementing the Toxicity Characteristic Leaching Procedure (TCLP), May 1994 (EPA-902-B-94-001)
- (c) Risk Assessment Guidance for Superfund, Vol I, Part A: Human Health Evaluation Manual, Dec 1989 (EPA 540/1-89/002)
- (d) Agency for Toxic Substances and Disease Registry, Public Health Assessment Guidance Manual, 1994

**General Comments:**

1. The draft document entitled "Draft Remedial Investigation/Feasibility Study Project Plans Operable Unit No. 16 (Sites 89 and 93) MCB Camp Lejeune, North Carolina" was provided to the Navy Environmental Health Center for review in February 1996. The draft Remedial Investigation/Feasibility Study Project Plans was prepared for the Atlantic Division, Naval Facilities Engineering Command by Baker Environmental, Inc.

**Review Comments and Recommendations:**

1. Page 2-12, Section 2.2.5.3, "Surface Water Investigation"  
Table 2-6, "Previous Surface Water Analytical Results"

Comment: The text states on page 2-12 that 1,2-Dichloroethene (total) and Trichloroethene were detected at maximum concentrations of 150 micrograms per liter (ug/L) and 66 ug/L, respectively. However, this information was not reflected in the summary presented in table 2-6.

Recommendation: The discrepancy between the text on page 2-12 and table 2-6 should be corrected.

2. Table 2-3, "Previous Soil Investigation Analytical Results Operable Unit No. 16 (Site 89) CTO 0344 MCB Camp Lejeune, North Carolina"

Comment: Analytical sampling results for several analytes are listed as "below detection limit" (BDL). There was no reference as to what the detection limit(s) were, or if the detection limit(s) were below the Applicable or Relevant and Appropriate Requirements (ARARs). This information should be made available before eliminating analytes as chemicals of concern.

**Recommendation:** List the detection limits in the table's footnotes and state in the "investigation results" whether or not sampling results reported as "below the detection limit" were also below chemical specific ARARs.

3. Page 4-2, Section 4.3.1, "Operable Unit No.16 (Site 89)-STC-868"

**Comment:** The text states on page 4-2 that surface soil samples will be collected from just below the "groundwater surface". The statement is confusing and should be clarified in the text.

**Recommendation:** Clarify at what depth the surface soil samples will be taken.

4. Page 4-5, Section 4.3.2, "Operable Unit No. 16 (Site 93)-TC-942"

**Comment:** The text states on page 4-5 that "Additionally, a groundwater sample from each well will be collected for total dissolved solids/total suspended solids (TSS/TDS)." We assume that "total dissolved" represents both filtered and unfiltered groundwater samples. The text does not state which samples will be used for assessing human health risk.

a. Reference (a) states that "unfiltered groundwater data should be used to determine the exposure point concentration."

b. We recommend using both types of samples in the health risk assessment. Although the regional EPA guidance requires use of unfiltered sample results in the quantitative health risk assessment (HRA), if risk estimates for both filtered and unfiltered samples are developed, both values can be discussed in the HRA. Since some heavy metals absorb strongly to soil/sediment particles, the difference between the resultant risk estimates from filtered and unfiltered sampling results can be large. Providing comparison values can therefore be very useful in demonstrating that the risk estimates from unfiltered groundwater samples is overly conservative.

**Recommendations:**

a. Specifically state that unfiltered groundwater will be collected and used to determine the exposure point concentration, for the HRA calculations.

b. Develop risk estimates for both filtered and unfiltered ground water samples, and discuss both values in the HRA.

5. Page 4-10, Section 4.6.1.4, "Exposure Assessment"

**Comment:** This section discusses potential exposure scenarios. The surface water scenario lists both dermal contact and ingestion of surface water as potential pathways. Potential receptors listed are current military personnel and current and future residents. We feel that the

scenarios may be too conservative, depending upon the exposure factors used. Most of the surface water described in the text is not considered a potential potable source by the North Carolina Water Quality Standards. Therefore, we feel that **incidental** ingestion and dermal contact to surface water during recreational activities is more appropriate.

Recommendations: Adjust the preliminary surface water scenarios to illustrate real-time (present and future) pathways.

6. Page 4-11, Section 4.6.1.6, "Risk Characterization"

Comment: Groundwater is identified as an exposure media for future residential scenario. We agree with this finding. However, in the past, Baker Environmental, Inc. has combined the analytical results from different aquifers into one data set. We do not agree with this practice. Quantitative risk estimates should be quantified separately for each aquifer.

Recommendation: State in the final work plan that quantitative risk estimates will be calculated for each aquifer of concern.

7. Page 4-11, Section 4.6.1.6, "Risk Characterization"

Comment: The text states on page 4-11 that "Quantitative risk estimates based on the reasonable maximum exposure to the site contaminants will be calculated based on available information." Quantitative risk estimates based on the average exposure to site contaminants was not addressed in the text. An EPA Deputy Administrator memorandum dated 26 February 1992 entitled "Guidance of Risk Characterization for Risk Managers and Risk Assessors" indicates that a single number used to represent the health risk to an individual or population may hamper the risk manager's ability to make an informed risk decision. Additionally, risk estimates should present both the upper bound reasonable maximum exposure (RME) and average case.

Recommendation: Provide quantitative risk estimates for the average as well as the RME case.

8. Table 4-2, "Preliminary Remediation Goals"  
Table 2-3, "Previous Soil Investigation Analytical Results"

Comment: Tetrachloroethene is the only soil contaminant of concern listed in Table 4-2. However, table 2-3 lists that oil and grease was detected at the 1,400,000 micrograms per kilogram level in previous soil investigation analytical results. Justification for eliminating oil and grease from the list of contaminants of concern in Table 4-2 is not presented in the text.

Recommendation: Provide adequate justification for not including oil and grease in Table 4-2.

9. Table 2-3, "Previous Soil Investigation Analytical Results"

Comment: The Table states that Toxicity Characteristic Leaching Procedure (TCLP) analysis was conducted for "solvents, volatiles, semivolatiles, pesticides, and inorganics. Reference (b) states that the TCLP model assesses risk to groundwater when potentially hazardous TC waste is co-disposed with garbage into sanitary landfills; TCLP simulates worst case management of hazardous waste in a landfill and TCLP conditions rarely reflect actual site conditions.

Recommendation: We do not endorse the use of the TCLP model to assess potential risk from site-related contamination from the various sampled media pertinent to a human health risk assessment (HHRA). Media samples should be analyzed and validated for the full suite of Contract Laboratory Procedure (CLP) constituents using Level D quality control procedures.

10. Figure 4-2, "Existing & Proposed Groundwater, Surface Water & Sediment Sampling Locations, Site 89"

Figure 4-4, "Existing and Proposed Groundwater Sampling Locations, Site 93"

Comment: In our review of the well locations in Figures 4-2 and 4-4 we could not determine whether or not groundwater up-gradient to the sites will be adequately addressed. EPA recommends a ratio of one up gradient well established for each three down gradient wells to adequately characterize background concentrations. Also, the depths (shallow, intermediate, or deep) of the existing wells should be listed on the figures.

Recommendation: Clearly state both in the text, and in the Figures, that the groundwater up gradient to the sites will be adequately characterized. Relocate proposed groundwater sampling locations if necessary. Since reference (c) does direct that surface soil samples should be collected at the "shallowest depth practical" to accurately reflect potential surface soil exposure pathways.