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DEPARTMENT OF THE NAVY
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From: Commanding Officer, Navy Environmental Health Center
To: Commanding Officer, Atlantic Division, Naval Facilities Engineering Command, ATTN: Katherine Landman, 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 9 Oct 95

Encl: (1) Medical review of "Draft Remedial Investigation Report Operable Unit No. 11 (Site 80), Marine Corps Base, Camp Lejeune, North Carolina"
(2) Medical/Health Comments Survey

1. Per reference (a), we have completed a medical review of the "Draft Remedial Investigation Report Operable Unit No. 11 (Site 80), Marine Corps Base, Camp Lejeune, North Carolina." 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. The points of contact for this review are Ms. Katharine Kurtz or Mr. David McConaughy, Health Risk Assessment Department, Environmental Programs. If you would like to discuss this medical review or if you desire further technical assistance, please call them at (804) 363-5553 or (804) 363-5557. DSN prefix is 864.

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

MEDICAL REVIEW OF DRAFT REMEDIAL INVESTIGATION REPORT
OPERABLE UNIT NO. 11 (SITE 80)
MARINE CORPS BASE CAMP LEJEUNE, NORTH CAROLINA

Ref: (a) Risk Assessment Guidance for Superfund, Volume 1, Part A: Human Health Evaluation Manual, December 1989 (EPA 540/1-89/002)
(b) Public Health Assessment Guidance Manual, Agency for Toxic Substances and Disease Registry, 1994
(c) Sampling and Chemical Analysis Quality Assurance Requirements for the Navy Installation Restoration Program, June 1988 (NEESA 20.2-047B)

General Comments:

The draft document entitled "Draft Remedial Investigation Report Operable Unit No. 11 (Site 80), Marine Corps Base, Camp Lejeune, North Carolina," dated 9 October 1995 was provided to the Navy Environmental Health Center (NAVENVIRHLTHCEN) for review on 12 October 1995. The report was prepared for LANTNAVFACENGCOM by Baker Environmental, Inc. Our comments and recommendations are provided below.

Review Comments and Recommendations:

1. Page ES-2, "Site Survey"
   Page ES-5, "Groundwater Investigation"

Comment: The text states that "Only one round of groundwater sampling was conducted at Site 80. Groundwater sampling of the newly installed and existing monitoring wells was conducted during November 19, 1994 through December 3, 1994." The next paragraph indicates that groundwater from the additional monitoring well at Site 80 was collected on July 14, 1995. These statements appear inconsistent.

Recommendation: Further define use of "newly installed" and "existing" monitoring well terminology and resolve apparent discrepancies noted.

2. Page ES-3, "Surface Soil Investigation"
   Page 2-2, Section 2.2.1, "Surface Soil Investigation"

Comment: The report indicates that surface soil samples were collected from ground surface to one foot below ground surface (bgs). Reference (a) defines surface soil samples as samples taken from depths of zero to six inches. However, reference (b) describes surface soil samples as soil samples taken from depths of zero to three inches to develop Public Health Assessments (PHAs).

Recommendation: To facilitate correlation between PHAs and Health Risk Assessments (HRAs) and to minimize costs associated with redundant sample collection and analysis, we recommend the adoption of zero to three inches as the norm for surface soil sample collection for future site soil sampling investigations and/or monitoring efforts that may be undertaken. The adoption of this sampling protocol will be consistent with current U. S. Environmental Protection Agency (USEPA) guidance, since reference (a) directs that surface soil samples should be collected from the shallowest depth practical to accurately reflect potential surface soil exposure pathways.

3. Page ES-5, "Groundwater Investigation"
   Pages 2-6, 2-7, Section 2.3, "Groundwater Investigation"
   Pages 4-4, 4-5, Section 4.2.2.2, "Groundwater"

Comments:

a. Groundwater from monitoring wells at Site 80 reportedly was sampled using U. S. EPA Region IV's low-flow purging and sampling technique. However, existing monitoring wells 80-MW01 and 80-MW02 were sampled with bailers.

b. Total metals were not detected in the intermediate monitoring well (80-MW031W); however, six dissolved metals were detected.

c. The low flow purging and sampling technique was not used during a previous evaluation of metals in groundwater at Camp Lejeune (Baker 1994) that helped to establish base background levels.

Recommendations:

a. The report should explain how the different groundwater sampling methods impacted the test results, particularly as it relates to the customarily lower levels of inorganics detected for total metals by the low-flow purging technique. The possible significance of the higher dissolved metals results for the intermediate well also should be addressed.

b. If chemicals were eliminated from further investigation based on comparison of site-related results with background sample results obtained using different groundwater sampling methods, the effect on the data reported should be evaluated. The overall impact of a potential intrinsic high bias in the base background levels on the risk calculations performed for the groundwater pathway should be addressed.

4. Pages ES-6 - ES-8, "Physical Characteristics of the Study Area"
   Page 3-5, Section 3.4.2, "Site-Specific"
   Page 4-3, Section 4.2.2.2, "Groundwater"

Comments:

a. The text describes a drainage ditch located southeast of the Site 80 wash area. In addition, several large soil mounds in the northeast portion of the site are mentioned.

b. Groundwater elevation contour maps for the surficial aquifer indicate a groundwater mound centered in the Lawn Area with linear flow in all directions. However, the primary groundwater flow direction for the site reportedly is northwest/north, towards Northeast Creek. We were unable to locate Northeast Creek on an area map; however, the text indicates it is one-half mile north of Site 80.

Recommendation: The text should describe the effect of the drainage ditch, soil mounds, and groundwater mound on possible alteration of the natural water flow direction at Site 80.

5. Page 1-3, "Site Description and History"
   Table 1-3, "Previous Investigation Detected Contaminants in Surface Water"

Comments:

a. The text describes the potential disposal of waste oils from the machine shop on-site and the previous detection of Total Petroleum Hydrocarbons (TPHs) in surface water samples taken from the drainage ditch. The text does not discuss the significance of the quantity of TPH detected.

b. Little information is provided concerning the nature of the wastes disposed of on or around the mound areas on-site. Supply records may be available that would provide information concerning the types of chemicals purchased for use in the maintenance operations conducted at the garage, paint locker, and machine shop. In addition, conversations with employees of the maintenance garage who reportedly were instructed not to use soil from this area as fill material may provide additional source identification information.

Recommendations:

a. Discuss the significance of the concentration of TPH detected in the surface water in regard to potential source areas on-site.

b. Indicate if staining of the ground and/or lack of vegetation were noted during site inspections.

c. Drum disposal records should also be reviewed for classification and quantification of wastes reportedly removed from the site by base personnel.

d. Knowledgeable base maintenance personnel should be interviewed to try to ascertain more historical information concerning chemicals used in routine operations.

6. Page 2-5, Section 2.2.2, "Subsurface Soil Investigation"
   Figure 2-2, "Soil Sampling Locations"

Comment: The text indicates that subsurface soil samples were not collected from eight soil borings due to the remnants of a septic system absorption field. The potential effect of this field on the fate and transport of site-related contaminants is not addressed. Also, the lack of subsurface soil sampling data for the area affected by the septic system absorption field on the completeness of the site subsurface soil contaminant characterization is not evident. The text does not provide the location of the field; however, soil boring locations depicted in Figure 2-2 suggest that the Detected Pesticide Area (DPA) contains the remnant septic system absorption field.

Recommendation: Include a discussion in the report of the potential effect of the remnant septic system absorption field on the fate and transport properties of the site-related contaminants. If no effect is anticipated, then the report should state this. Indicate the specific site location of the field and address the completeness of the subsurface soil characterization without inclusion of sampling data from this area.

7. Page 2-5, Section 2.2.2, "Subsurface Soil Investigation"
   Appendix B.2, "Internal Tracking Forms"

Comment: The text indicates that samples were shipped overnight via Federal Express for analysis. A review of the laboratory data provided in Appendix B.2 shows lengthy delays in laboratory receipt of samples, with sample turn-around times of up to 53 days reported. The useability of data that exceeds sample holding times is not addressed.

Recommendation: Explain the lengthy delays in the laboratory's receipt of samples for analysis and indicate what improvements can be made to speed up this process in the future. Follow the guidance provided in reference (c) to ensure the sampling and analytical efforts meet the minimum requirements needed to validate the data obtained.

8. Pages 2-6, 2-7, Section 2.3, "Groundwater Investigation"
   Figure 2-3, "Monitoring Well Sampling Locations"
   Page 4-3, Section 4.2.2.2, "Groundwater"

Comment: Newly installed monitoring well 80-MW04 is located on the northwestern edge of the Maintenance Area. Shallow monitoring well 80-MW08 is located northwest

(downgradient) of the Pesticide Area. Background monitoring well (80-MW07) reportedly is in a downgradient direction from the main area of the site. According to reference (a), the locations of background samples must be areas that could not have received contamination from the site. Therefore, we feel that the background monitoring well may be inappropriate to represent background due to its location in relation to site-related contamination.

Recommendation: Based on a review of the hydrogeologic data available, consideration should be given to selection of an alternate background sampling location in an area that is not influenced by site-related contamination. Otherwise, stronger justification should be presented to show that background monitoring well 80-MW07 is not located in an area potentially influenced by site-related contamination.

9. Pages 3-3 - 3-7, Section 3.4, "Hydrology"
   Page 3-10, Section 3.8, "Water Supply"

Comments:

a. The two supply wells (HP-701 and ON-T2-87) reportedly are in an apparent upgradient direction from Site 80. The shallow aquifer that underlies the site reportedly is not used for potable purposes.

b. Additional information is needed to determine whether there is a potential for the supply wells to be impacted by site-related contamination due to the discontinuous nature of the Castle Hayne confining unit; the fact that the surficial aquifer supplies the primary recharge to the Castle Hayne aquifer; and, other site-related hydrogeologic information presented.

Recommendation: Consider all the site-related hydrogeologic information available to determine whether the two supply wells have the potential to be impacted by contaminants.

10. Page 3-9, Section 3.6, "Land Use Demographics"

Comment: The text indicates that low-density family housing and recreational areas are located north of Hadnot Point. The Bachelor Officer's Housing Area is situated in the center of the Paradise point shoreline. A site map depicting the distance of the housing and recreational areas from the various contaminated areas for Site 80 would be useful.

Recommendation: Consider providing a site map that shows the locations and distances of the base housing and recreational areas from the contaminated portions.

11. Table 4-2, "Summary of Site Background and Base Background Inorganic Levels in Subsurface Soil"

Comment: The comparison of maximum site background and base background inorganic levels in subsurface soil provided in Table 4-2 shows the exact same maximum values for 14 of the inorganics to include arsenic, beryllium, and manganese. This suggests that the area chosen to represent site background contains the highest levels of these inorganics detected in base background samples. It appears that site background samples may be influenced by site-related contamination and/or anthropogenic sources and thus, may be inadequate to represent base background.

Recommendation: Validate the high-end range values provided in Table 4-2 because it seems highly unlikely that the maximum site background values for fourteen inorganics are the highest (identical) base background values. If these are valid numbers, readdress the issue of site background sampling locations, to rule out the possibility of using an area influenced by site-related contamination, and to ascertain if these data are suitable for inclusion in a base background study to determine representative levels of background inorganics on base.

12. Figure 4-1, "Positive Detections of Organics in Surface Soils at Site 80"

Comment: It would be beneficial to show detection levels on site maps of those chemicals that exceeded Region III Risk-Based Screening Concentrations, or applicable regulatory standards, to depict the areas of highest and/or most prevalent contamination to further evaluate human health risks. Figures that list all detected site contaminants per geographic area, although thorough, are usually crowded with information and therefore, not as meaningful to review.

Recommendation: Consider providing figures that depict those site areas where specific contaminants exceeded either Region III Risk-Based Screening Concentrations, or applicable regulatory standard and provide those values for each contaminant with corresponding sampling locations on the site maps.

13. Figure 4-6, "Positive Detections of Inorganics in Subsurface Soils Above Base Background Levels at Site 80"

Comment: The units are not provided in the Legend.

Recommendation: Include the units in the Legend for the contaminant detection levels given.

14. Page 6-8, "Conceptual Site Model of Potential Exposure"
Figure 6-1, "Conceptual Site Model"

Comments:

a. Because of the proximity of base family housing, the report should address whether children currently could be exposed to site-related contaminants, either for a residential exposure scenario or for a recreational user scenario.

b. When calculating risks for construction workers, only subsurface soil data was used. These risk calculations should include both surface and subsurface soil data, because construction workers also could be exposed to the top six inches of soil during construction.

c. Discuss whether the food ingestion pathway for exposure from biota from Northeast Creek is applicable.

Recommendation: Reevaluate the conceptual site model in terms of current populations at risk within a one-mile radius of the site and evaluate any activities that would involve contact with site-related contaminants. Include the surface soil exposure pathway for the future construction worker.