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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: Linda Saksvig, 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 23 Jun 95

Encl: (1) Medical Review of Draft Remedial Investigation Report (Draft Final) for Operable Unit No. 14 (Site 69), Marine Corps Base, Camp Lejeune, North Carolina
(2) Medical/Health Comments Survey

1. As you requested in reference (a), we completed a medical review of the "Draft Remedial Investigation Report (Draft Final) for Operable Unit No. 14 (Site 69), 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. Wendy Bridges or Mr. David McConaughy, Health Risk Assessment Department. If you would like to discuss this medical review or if you desire further technical assistance, please call them at (804) 444-7575 or DSN 564-7575, extensions 428 and 434, respectively.

A. F. JONES
By direction

MEDICAL REVIEW OF INSTALLATION RESTORATION DOCUMENT

Ref: (a) Risk Assessment Guidance for Superfund, Volume 1, Part A: Human Health Evaluation Manual, December 1989 (EPA 540/1-89/002)
(b) Agency for Toxic Substance Disease Registry, Public Health Assessment Guidance Manual, 1994

General Comment: The draft document entitled "Remedial Investigation Report (Draft Final) for Operable Unit No. 14 (Site 69), Marine Corps Base, Camp Lejeune, North Carolina," dated June 1995, was provided to the Navy Environmental Health Center (NAVENVIRLHLTHCEN) for review on 29 June 1995. The report was prepared for Atlantic Division, Naval Facilities Engineering Command by Baker Environmental, Inc.

Review Comments and Recommendations:

1. Page ES-6, "Human Health Risk Assessment"
   Page ES-7, "Human Health Risk Assessment"
   Page ES-8, "Conclusion"

Comment: On page ES-6, the text states that "groundwater was not considered as an exposure medium since the Base is serviced by a public (Base) water supply system." However, on page ES-7, the text says that groundwater is identified as an exposure media for the future residential scenario. In the *Conclusion*, on page ES-8, it is stated that groundwater has been impacted with volatile organic compounds (VOC) by former disposal operations at this site.

Recommendation: The current groundwater pathway scenario seems to be eliminated based on the fact that the shallow groundwater currently is not used as a potable source. However, a review of the data provides evidence of the potential migration of chemicals from the shallow to the deep aquifer and this may have an impact on the supply wells. Groundwater should be considered an exposure medium for both current and future scenarios.

2. Page ES-9, "Conclusion"

Comment: In the *Conclusion*, on page ES-9, the text states there are no adverse human health risks from groundwater because groundwater in this area is not used for potable supply. The report does not discuss whether groundwater in close proximity to the site is used for gardening purposes, washing cars or other activities where human exposure potentially could occur.

Recommendation: Provide detailed information on any nearby shallow groundwater use which may have a potential to cause exposure to contaminants through the groundwater pathway.

3. Page 2-6, Section 2.2.3.3, "Soil Investigation"

Comments:

a. The text states that surface soil samples were collected at ground surface to one foot below ground surface (bgs). The collection of soil surface samples at 0 to 12 inches is inconsistent with Environmental Protection Agency (EPA) guidance such as reference (a), and reference (b) which defines surface soil samples from depths of 0 to 6 and 0 to 3 inches, respectively.

b. The text states that "a total of 29 hand auger borings were advanced to assess the background and surface soil of the former disposal area at Site 69." There is no further discussion of the location or number of background samples collected. It is important to know the type and location of the background samples taken for this site, so that site-related contamination can be distinguished from naturally occurring or other non-site related levels of chemicals.

Recommendations:

a. To facilitate correlation between public health assessments and health risk assessments and to minimize costs associated with redundant sample collection and analysis, we recommend the adoption of "0 to 3 inches" as the norm for surface soil sample collection for any future site soil sampling investigation and/or monitoring efforts that may be undertaken. The adoption of this sampling protocol will not be in controversy with current EPA guidance, since reference (a) does direct that surface soil samples should be collected at the "shallowest depth practical" to accurately reflect potential surface soil exposure pathways.

b. Provide additional information on background samples and locations. Discuss adequacy of background sample site selection on the basis of uniform site characteristics; (e.g., geological, hydrological, analytical results).

4. Pages 2-11 and 2-12, Section 2.2.3.4, "Groundwater Investigation"

Comments:

a. The text states the wells are constructed of polyvinyl chloride (PVC). The Environmental Protection Agency (EPA) discourages the use of PVC as a well construction material and recommends the use of stainless steel. Organic contaminants can leach from the PVC into the groundwater and it is possible for organic contaminants in groundwater to adsorb to the PVC material, both of which can result in nonrepresentative samples.

b. The text states, "Following the initial sampling at Site 69 in January and June 1994 all subsequent sampling events utilized a "low-flow" purging technique." "Low-flow" purging

techniques were incorporated to reduce the effects of particulates in groundwater samples on total metal concentrations. Lower metal concentrations are often detected when the low-flow purge technique is employed. Because the data used to calculate the risk to human health from metal exposure was exclusively from analyses where samples were pulled by the low-flow sampling technique, the risk could be biased low for metal contamination. Furthermore, comparing the low-flow samples (lower concentration) to the **non** low-flow collected background samples (higher concentration) may eliminate some metals as COPC when in fact they should be included in the HHRA.

c. There is no discussion of the location or number of background groundwater samples collected and if they were taken using a "low-flow" purging technique. It is important to know the type and location of the background samples taken for this site, so that site-related contamination can be distinguished from naturally occurring or other non-site related levels of chemicals.

Recommendations:

a. If PVC is used, specific analytical data should be provided indicating that neither the leaching nor the sorption of organic compounds from PVC material will interfere with the data quality of groundwater samples.

b. We feel that additional evaluation of the low-flow purge technique verses the higher flow rate method for sampling groundwater is needed before the results of the background results can be compared to the results of the "subsequent samples".

c. Consideration should be given to retaking the background samples using the "low-flow" purging technique.

5. Page 3-6, Section 3.5.2, "Site 69"

Comment: The report indicates that in the future, Site 69 will be used for military training but it does not describe the future types of activities and whether a potential exists for any digging or soil disturbance during training. The text does not discuss the current use of Site 69 or the percentage of time or number of personnel which may use the site currently or in the future.

Recommendation: Provide more details concerning the military training activities on-site to better evaluate the potential exposure to site-related contaminants. Provide the current use of Site 69 and the percentage of time and number of potentially exposed populations that may be exposed to Site 69 currently or in the future.

6. Page 3-7, Section 3.7, "Water Supply"

Comment: Although we realize Site 69 is a remote site, the possibility of any other wells being used off base, in close proximity to Site 69 should be discussed.

Recommendation: Discuss the possibility of any off base potable/non potable well water being used near Site 69.

7. Page 3-8, Section 3.7, "Water Supply"

Comment: The Federal Maximum Contaminant Level (MCL) for iron is given as 300 ug/l throughout the report. Iron does not have a Federal Maximum Contaminant Level.

Recommendation: Make this correction in the final report.

8. Page 4-4, Section 4.2.2.2, "Groundwater"
Table 4-3 through Table 4-31

Comment: The text states that "groundwater samples were analyzed for total and dissolved (i.e., "filtered") inorganic parameters." We strongly concur with the collection of both filtered and unfiltered ground-water samples. In the data tables there is no differentiation between filtered and unfiltered sample results. Our only concern, with respect to the ground-water sampling protocols presented is that the text does not specifically state which type of sample will be used for assessing human health risks. Reference (a) states that "unfiltered ground-water data should be used to estimate exposure concentrations."

Recommendations:

a. Clarify whether the sample results in the tables are filtered or unfiltered.

b. State specifically how the ground-water sampling results, filtered or unfiltered, will be used in the risk assessment.

9. Page 4-8, Section 4.4.2, "Groundwater Investigations"

Comment: Groundwater investigations are summarized under "Round One," "Round Two" and "Limited Sampling Rounds." Throughout the text and figures, the report does not specify which results were collected from which sampling round. It would be helpful when reviewing this report if all of the sampling results were listed as "round specific".

Recommendation: The specific sampling round in which the groundwater sampling data was collected should be included in the RI report.

10. Page 4-10, Section 4.4.2.1, "Round One"

Comment: The report states that in the Castle Hayne Aquifer, vinyl chloride was detected at 8.37J grams per liter (g/L), TCE was detected at 29.4J g/L and 1,2-DCE (total) was detected at 788 g/L. In Figure 4-10, where vinyl chloride, TCE and 1,2-DCE are listed, it states that all concentrations are reported in micrograms per liter (ug/L).

Recommendation: Correct the units, as appropriate.

11. Page 4-12, Section 4.4.3.1, "*On-Site* Investigation"
Figure 4-12, "Positive Detections of Volatiles in Surface Water"

Comment: Section 4.4.3.1 states that ethyl benzene was detected in sample 69-OS-SW-1 at a concentration of 1J ug/L and xylene (total) were detected in samples 69-DA-SW04 at a concentration of 10 ug/L. In Figure 4-12, ethyl benzene and xylene (total) are both listed as detected in sample 69-DA-SW/SD01.

Recommendation: The text in Section 4.4.3.1 and the information in Figure 4-12 about ethyl benzene and toluene conflict and should be revised.

12. Page 4-13, Section 4.4.4.1, "*On-Site* Investigation"
Figure 4-13, "Positive Detections of Volatiles in Sediment"

Comment: Section 4.4.4.1 states that 1,2-dichloroethene was detected at a concentration of 9J micrograms per kilogram (ug/kg) and 4-methyl-2-pentanone was detected at a concentration ranging from 9J ug/kg to 17J ug/kg. In Figure 4-13, 1,2-dichloroethene is listed as detected at a concentration of 9.0 ug/L and 4-methyl-2-pentanone was detected at a concentration ranging from 9J ug/kg to 17 ug/kg.

Recommendation: The text in Section 4.4.4.1 and the information in Figure 4-13 about 1,2-dichloroethene and 4-methyl-2-pentanone conflict and should be revised.

13. Page 4-14, Section 4.4.4.1, "*On-Site* Investigation"
Figure 4-14, "Positive Detections of Pesticides/PCBs in Sediment"

Comment: Section 4.4.4.1 states that 4,4-DDE was detected in sample 69-OS-SD02 at a concentration of 13.3J ug/kg. In Figure 4-14, 4,4-DDE is listed as detected in sample 69-DA-SW/SD02, making it difficult to determine the location of the positive sample detects.

Recommendation: Revise the sample numbers in Section 4.4.4.1 and/or the information in Figure 4-14 so that they coincide with each other.

14. Page 4-18, Section 4.5.1.1, "Surface Soil"

Comment: Bis(2-ethylhexyl)phthalate and di-n-butyl phthalate were detected in the surface soil of Site 69 ten times above the maximum concentration detected in the QA/QC blanks. The text states that "no information is available that specifically points to disposal of contaminants related to phthalates having been disposed of at this site." Per the Integrated Risk Information System (IRIS), bis(2-ethylhexyl)phthalate can be produced by the burning of plastic products, which could have occurred at this site. Bis(2-ethylhexyl)phthalate can be used in munitions and lubricating oils and di-n-butyl phthalate can be used in explosives and resin solvents which could have been disposed of at Site 69. These phthalates should not be eliminated as a laboratory/or field procedure contaminant when there is the possibility they are a site related contaminant.

Recommendation: Evaluate bis(2-ethylhexyl)phthalate and di-n-butyl phthalate as possible site-related contaminants.

15. Table 4-3, "Summary of Base-Wide Upstream Background Levels of Inorganics in Surface Water"
Table 4-4, "Summary of Base-Wide Upstream Background Levels of Inorganics in Sediment"
Table 4-6 through Table 4-23, "Positive Detection Summary"

Comment: These tables indicate "ND" for the detection of several contaminants. "ND" is defined in the footnotes as "Not detected." Per reference (a), "non-detected chemicals will be designated in each sample with a U qualifier preceded by the sample quantitation limit (SQL) or the contract-required quantitation limit (CRQL). If there is reason to believe that the chemical is present in a sample at a concentration below the SQL, use one-half of the SQL as a proxy concentration"

Recommendation: Present the actual sample detection limit (SDL) values for each contaminant and compare with regulatory limits.

16. Page 6-1, Section 6.0, "Baseline Risk Assessment"

Comment: In the baseline risk assessment of this report there is not adequate characterization of the potentially exposed populations on, or near the site with respect to location relative to the site, activity patterns, and the presence of sensitive subpopulations. There is no discussion of current land use or recreational use surrounding the site. There is also no specific mention of future land use for this site.

Recommendation: Include applicable site specific information concerning the neighboring populations, sensitive subpopulations, recreational activities (fishing, swimming), potable water use, hydrogeologic data, possible transport mechanisms that would cause nearby populations

and/or future residents to be exposed. This information is needed to develop a health risk assessment that will demonstrate those populations potentially at a higher risk.

17. Page 6-1, Section 6.2, "Contaminants of Potential Concern"

Comment: The text states that "findings from additional sampling conducted in June 1994, August 1994, February 1995 and March 1995 were not included in this assessment." However, in Figures 4-7 and 4-10, data is presented from February 1995 and March 1995. If sample results in included in Figures 4-7 and 4-10, it should be included in this report.

Recommendation: Discuss the reason for excluding sampling conducted in June 1994, August 1994, February 1995 and March 1995.

18. Page 6-7, Section 6.2.2, "Selection of Contaminants of Potential Concern"

Comment: This section describes in detail Chemicals of Potential Concern (COPC) for Site 69. Reference (a) states that a complete table of all COPCs for each environmental medium should be included in the RI report. Additionally, a table with the rationale used to eliminate or include a chemical (e.g., comparison with background, frequency of detection, etc.) should be included in the human health risk assessment for the site.

Recommendations:

a. Include a table in the text of all COPCs.

b. Provide the rationale for selection of COPCs.

19. Page 6-17, Section 6.3.4.3, "Inhalation of Fugitive Particulates"
Page 6-29, Section 6.7, "Conclusions of the BRA for Site 69"
Table 6-15, "Matrix of Potential Human Exposure"
Table 6-18, "Exposure Assessment Summary Inhalation of Fugitive Particulates"

Comment: Future residents and civilian base personnel are identified as having exposure to fugitive particles. Construction workers may stir up fugitive particulates in their work at the site. Construction workers should be included as having a potential for inhalation of particulates.

Recommendation: The text should discuss the potential inhalation exposure of constructions workers to particulates.