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MCB CAMP LEJEUNE
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DEPARTMENT OF THE NAVY
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From: Commanding Officer, Navy Environmental Health Center
To: Commander, Atlantic Division, Naval Facilities Engineering Command, Attn: Katherine Landman, 1510 Gilbert Street, Norfolk, VA 23511-2699

Subj: REVIEW OF INSTALLATION RESTORATION PROGRAM DOCUMENTS FOR MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA

Ref: (a) Baker Environmental transmittal ltr of 26 Nov 96

Encl: (1) Medical Review of "Draft Remedial Investigation Report, Site 73 - Amphibious Vehicle Maintenance Facility, 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, Site 73 - Amphibious Vehicle Maintenance Facility, Marine Corps Base, Camp Lejeune, North Carolina" and are forwarding our comments to you as enclosure (1).

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

3. We are available to discuss the enclosed information by telephone with you and, if necessary, with you and your contractor. If you require additional assistance, please call Ms. Katharine Kurtz at (757) 363-5553 or Mr. David McConaughy at (757) 363-5557. The DSN prefix is 864.

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

MEDICAL REVIEW OF DRAFT
REMEDIAL INVESTIGATION REPORT
SITE 73 - AMPHIBIOUS VEHICLE
MAINTENANCE FACILITY
MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA

Ref: (a) Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, October 1988 (EPA/540/G-89/004)

General Comments:

1. The document entitled "Draft Remedial Investigation Report, Site 73 - Amphibious Vehicle Maintenance Facility, Marine Corps Base, Camp Lejeune, North Carolina" dated 26 November 1995 was provided to the Navy Environmental Health Center (NAVENVIRHLTHCEN) for review on 5 December 1996. The report was prepared for the Naval Facilities Engineering Command, Atlantic Division, by Baker Environmental, Inc.

2. The remedial investigation (RI) report is well organized and includes nine areas of concern (AOCs) at Courthouse Bay Liquids Disposal Area (Site 73). However, we are concerned that the potential human health risk posed by the organics detected in both the surficial and the Castle Hayne aquifers have not been completely addressed. Our comments and recommendations are provided below.

Review Comments and Recommendations:

1. Title Page

should be '96

Comment: The report date of 26 November 1995 given on the title page needs verification; it may be a misprint. The second phase of the field work was conducted between 13 and 16 May 1996.

Recommendation: Recheck the report date.

2. Page ES-3, "Executive Summary"
   Pages 3-7, 3-10, Section 3.4, "Hydrology"
   Page 4-14, Section 4.4.2.3, "Uppermost Portion of the Castle Hayne Aquifer"
   Pages 6-2, 6-3, Section 6.2.2, "Identification of Data Suitable for Use in a Quantitative Risk Assessment"
   Page 8-2, Section 8.1.1.2, "Groundwater"

Comments:

a. Page ES-3 indicates that the soil unit at Site 73 is not acting as a confining or semi-confining unit (i.e., the unit is not restricting flow from the surficial to the Castle Hayne aquifer). Furthermore, page ES-4 of the text states that "the absence of the clay on the eastern portion of the site allows the surficial groundwater to combine with the underlying groundwater zones causing change in the direction of groundwater flow." Both the shallow and the deep groundwater begin to recharge Courthouse Bay.

b. Both shallow and deep groundwater at the site reportedly were evaluated as a single exposure source because of this interconnection between the shallow and deep aquifers. However, we feel that individual risk data calculations also are necessary to determine the potential impact from exposure to either shallow or deep groundwater for a more accurate risk estimate. Combining the detection concentrations from both the surficial and the deep aquifers may result in an overall reduced risk.

c. The groundwater investigation was performed in two phases, with Phase I and Phase II groundwater data evaluated separately. The maximum concentration of trichloroethylene (TCE) (320 ug/L) was detected in intermediate monitoring well 73-DW03. The vertical extent of the contamination reportedly lies between 63 feet and 146.5 feet mean sea level (msl).

d. The concentration of vinyl chloride was the main contributor to the potential carcinogenic risk, which exceeded the United States Environmental Protection Agency's (USEPA's) acceptable range for groundwater ingestion for the future residential child and adult. Page 4-14 states that "...the lesser concentrations of TCE that were detected in other samples collected during the first phase [5 VOC detections] were not detected during the second phase [1 VOC detection]." Page 4-12 states that the maximum concentration of vinyl chloride increased in the same monitoring well during the second phase groundwater sampling activity (320 versus 110 ug/L). The detection limits for the GC/MS method used for the Phase II groundwater investigation were higher than the regulatory levels, which may account for the variations in data obtained. The report should discuss in greater detail the rationale for not combining the data from the Phase I groundwater investigation with the Phase II results (with substitution of the higher value of the two where the same chemical is identified in the same location). The risk calculations performed with the combined data could then be compared to the results obtained from the individual data treatment calculations for comparison purposes.

e. Groundwater was evaluated for future residents only because current receptors reportedly are exposed to groundwater drawn from the deep zone. Three active supply wells are located within a one-mile radius of Site 73; whereas, two additional supply wells are located just beyond this distance. These supply wells are believed to be up gradient to the direction of groundwater flow. We disagree with the decision to eliminate the current groundwater exposure pathway for the following reasons, unless stronger supporting data are presented: the lack of a confining layer between the two aquifers; the levels of chlorinated hydrocarbons detected in the Castle Hayne aquifer samples; and the variations in the direction of groundwater flow reported (i.e., "vertical gradient reverses").

Recommendations:

a. Calculate the risk separately for both the surficial and the deep groundwater exposure scenarios, or provide stronger justification for the data handling practices used.

b. Consider the current groundwater exposure scenario, or include additional evidence to support the elimination of this exposure pathway.

c. Consider combining the Phase I and Phase II groundwater data to obtain a more complete picture of the groundwater contamination.

d. Implement plans for long-term groundwater monitoring because of the levels of contaminants present and the nearby location of the supply wells. what supply wells? AS is out of service.

e. Modify the Base Master Plan to include restrictions on the future use of the surficial aquifer at Site 73.

3. Page 1-2, Section 1.3, "Site Description and History"
   Page 1-6, Section 1.4.5, "Preliminary Investigation"
   Page 4-11, Section 4.4.2.1, "Surficial Aquifer"
   Page 6-9, Section 6.2.4.2, "Subsurface Soil"
   Page 7-7, Section 7.3.2.1, "Surface Soil"

Comments:

a. Previous environmental investigations at Site 73 included the detection and removal of several leaking underground storage tanks (USTs) containing petroleum products (gasoline and diesel fuel). Historical information indicates that 400,000 gallons of petroleum oil and lubricants (POLs) possibly were discharged directly onto the ground surface, along with the disposal of 20,000 gallons of waste battery acids.

b. Benzene (18 J micrograms per liter (ug/L)) contamination was detected in the shallow aquifer within the A-47 complex. A benzene/ethylbenzene/toluene/xylene (BTEX) plume was

identified in groundwater in this area. High concentrations of semi-volatile organic compounds (SVOCs) were detected in surface and subsurface soil boring locations. No SVOCs reportedly were retained as surface or subsurface soil chemicals of potential concern (COPCs) for the human health risk assessment (HHRA).

c. A surface seep was identified (vicinity of 73-MW07, AOC #2) that discharges into the road/ditch. Although VOCs were not detected in samples taken, SVOCs to include benzo-a-pyrene and chrysene were detected in surface soil samples. Additional information concerning the chemical analysis of the seep discharge would be helpful to determine correlation with past (and/or current) waste disposal practices.

Recommendations:

a. Present further justification to support the elimination of SVOCs as COPCs in view of historical data.

b. Discuss the analysis of SVOCs and the quantitation limits obtained.

c. Provide additional information concerning the analysis of the seep discharge.

Just because GW discharges to surface doesn't mean it is contaminated

4. Page 2-7, Section 2.2.3, "Analytical Program for Groundwater Samples"
   Page 4-6, Section 4.4, "Analytical Results"
   Page 4-10, Section 4.4.2, "Groundwater Investigation"

Comments:

a. Various methods were used to analyze for VOCs in groundwater (e.g., Methods 601, 602, 625, 524.2, Contract Laboratory Program (CLP) Methods, etc.), depending on the anticipated contaminant volatility (e.g., gasoline, diesel, waste oils), classification, etc. Monitoring well groundwater samples collected from the second phase of field work reportedly were analyzed by CLP methods only (higher detection limits). Reportedly, different results may be obtained for VOCs because of these variations in the methods used in the different phases of the RI. Page 4-10 states that "Hence with EPA Method 601/602 false positive results may occur and quantitation may not be exact, however, lower detection limits are able to be acquired and compounds can be detected at much lower concentrations." sounds like poor wording

b. EPA Method 601/602 requires that a sample be analyzed by a gas chromatograph (GC) (contaminants identified only by their retention times). To be sure a chemical is accurately identified (comparison of retention times with known standards), the method includes analytical conditions for a second confirmatory GC column. We are not sure if the laboratory used a second column to confirm the identity of the chemicals detected in the samples. We feel that false negatives are also possible (e.g., chemical masked by broader eluting chemical) and thus, analytes could be present but their peaks misidentified.

c. Additional information would be helpful concerning the method detection limits, the advantages and disadvantages of the methods, the method suitability for detection of various chemicals, and the level of data quality used for each method, etc.

Recommendations:

a. Present additional information concerning the method detection limits, the advantages and disadvantages of the methods, the method suitability for the detection of various chemicals, and the level of data quality used for each method. Provide the rationale for using the various methods for the different phases of the groundwater investigation.

b. Indicate if a second confirmatory GC column was used for identification purposes.

c. Present additional site-specific information concerning the possibility of false negatives.

5. Page 4-4, Section 4.2.2.2, "Groundwater"

Comment: Page 4-4 of the text states "When the results were compared, the concentrations for the dissolved metals were generally higher than the total metals except for barium and zinc. Samples collected from the upper most portion of the Castle Haynes Aquifer exhibited similar results with the only exception being iron." Usually, the dissolved metals are detected at lower concentrations than the total metals (unfiltered).

Recommendation: Provide a rationale for the differences in dissolved versus total metal concentrations detected. this is often the case when particulates are not a factor - what you are seeing is sample variability as in a duplicate sample.

6. Page 4-7, Section 4.4.1.1, "Surface Soil"
   Page 4-9, Section 4.4.1.2, "Subsurface Soil"
   Page 4-9, Section 4.4.1.3, "Extent of Contamination"
   Page 5-3, Section 5.2.4, "Leaching of Soil Contaminants to Groundwater"

Comments:

a. The compound 2,4-dinitrophenol routinely was detected in both surface and subsurface soil samples at greater than two times the base-wide background concentrations reported. One of the common uses of the compound 2,4-dinitrophenol is as an ingredient in blank ammunition used during training exercises. Because of the on-going military training activities on-site, we feel that an additional discussion of the possibility of continued contamination related to these training maneuvers would be helpful to evaluate site risk.

b. Although waste oils reportedly were disposed of in the past by direct pouring on the ground, a discussion of the metal contaminants commonly associated with waste oil disposal

operations is not provided. The metals detected in numerous surface soil samples above twice the base background levels were zinc, magnesium, chromium, and lead.

c. Page 4-9 of the text states that "At this juncture, it is not known why so many pesticide compounds were detected in a sample collected in this portion of the site and not along the tree line or wooded areas." Because of the number of different pesticides detected and the possibility of pesticide contamination originating from the storage and/or direct disposal of these chemicals on-site, we feel a discussion of the prior and current (e.g., hazardous material storage area location on-site) pesticide handling practices would be beneficial. Additionally, the "Uncertainty Section" does not include a discussion of the possible increased toxicity from exposure to mixtures of pesticides found.

d. The text also states that "...the distribution of contaminants in the surface and subsurface soils followed no discernible pattern; therefore, the contamination suggests that past spills or disposal events have not resulted in long-term impacts to soil. The low levels of VOCs may reflect the lack of significant spills involving solvents. It is also possible that the VOCs have volatilized or migrated to the water table and dispersed." Because of the current concrete surfaces and/or building structure (A-3 replaced by A-47), stained soil areas reported, and past site history presented, the concentrations of chemicals detected in various site-related media (to include chlorinated hydrocarbons in the groundwater), and the numerous instances throughout the report where "laboratory contamination" is cited to explain analytical results, we feel that additional justification is needed to support the conclusions made concerning the source and extent of site-related contamination. This text sounds ok to me as is.

Recommendations:

a. Discuss the detections of 2,4-dinitrophenol in surface soil samples.

b. Provide information concerning the types of metal contaminants commonly found in waste oils.

c. Include information concerning the prior and current pesticide handling practices.

7. Page 4-16, Section 4.4.3.2, "Surface Water Investigation"

Comment: Although carbon disulfide reportedly was detected in 13 samples collected from the eastern and western tributaries and Courthouse Bay, the text attributes its low detection in surface waters to be the result of decaying organic matter. The report does not discuss the toxicity of this compound at the levels found. The possibility of site-related petroleum products/waste oil disposal contributing to this contaminant detection also is not discussed.

Recommendation: Discuss the toxicity of carbon disulfide at the concentrations detected in surface waters and the possibility of site-related petroleum products contributing to the concentrations detected.

8. Page 4-18, Section 4.4.3.3, "Extent of Surface Water and Sediment Contamination"

Comment: Aroclor-1260 reportedly was detected in a sediment sample from Courthouse Bay. However, page 4-18 states that "it is not certain why this compound was detected in any samples collected from the bay, especially since there is no documented history of waste disposal." This statement appears to disregard the possibility mentioned elsewhere in the text of the disposal of waste oils, such as transformer oils, that contained polychlorinated biphenyls (PCBs). The location of transformers also were shown on area maps. The report does not address whether these levels of PCB contamination pose a human health risk of concern.

Recommendation: Clarify whether the disposal of transformer oils may have contributed to the levels of PCBs detected. Indicate if a risk to human health exists from the levels found.

9. Page 4-19, Section 4.6, "Quality Assurance/Quality Control"

Comments:

a. Page 4-19 states that "Organic compounds detected within the blank samples include methylene chloride, acetone, 1,2-dichloroethane, 2-butanone, chloroform, bromodichloromethane, di-n-butylphthalate, bis(2-ethylhexyl) phthalate, dibromochloromethane, toluene, 2-hexanone, and 4-chloroaniline." These detections suggest that these contaminants originated from the laboratory (e.g., possibly contamination from equipment, deionized water, reagents, laboratory surroundings, etc.).

b. Field blanks also contained VOCs. These data suggest that a thorough review of all laboratory and field quality assurance/quality control (QA/QC) procedures is needed to improve the accuracy and reliability of the investigative data obtained.

Recommendation: Review all laboratory and field QA/QC procedures to improve the accuracy and reliability of the investigative data obtained.