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From: Commanding Officer, Navy Environmental Health Center
To: Commanding General, Marine Corps Base, Camp Lejeune (Environmental Management Department, IR Division), Onslow County, NC 28542

Subj: MEDICAL REVIEW OF ATSDR PUBLIC HEALTH ASSESSMENT FOR MARINE CORPS BASE CAMP LEJEUNE, NORTH CAROLINA (INITIAL RELEASE)

Encl: (1) Medical Review of Public Health Assessment for Marine Corps Base, Camp Lejeune, North Carolina (Initial Release)

1. We have completed a medical review of the Agency for Toxic Substances and Disease Registry (ATSDR) document entitled "Public Health Assessment for Marine Corps Base, Camp Lejeune, North Carolina" (Initial Release). Our comments and recommendations are provided in enclosure (1).

2. The point of contact for this review is Ms. Andrea Lunsford, Head, Health Risk Assessment Department. If you would like to discuss the enclosed information or if you desire any further assistance, please call her at (804) 444-7575 or DSN 564-7575, extension 402.

P. D. BARRY

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MEDICAL REVIEW OF INITIAL RELEASE OF PUBLIC HEALTH ASSESSMENT FOR U.S. MARINE CORPS BASE CAMP LEJEUNE, JACKSONVILLE, ONSLOW COUNTY, NORTH CAROLINA

General Comments:

1. The initial release document entitled "Public Health Assessment for U.S. Marine Corps Camp Lejeune, Jacksonville, Onslow County, North Carolina, CERCLIS No. NC617002580" prepared by the U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), and dated 8 September 1994, was provided to the Navy Environmental Health Center for review on 12 September 1994.

2. The point of contact for review of the public health assessment is Ms. Andrea Lunsford, Head, Health Risk Assessment Department, who may be contacted at (804) 444-7575, or DSN 564-7575, extension 402.

Review Comments and Recommendations:

1. Cover and Title Page

Comment: Both the document cover and the title page refer to "U.S. Marine Corps Camp LeJeune." The correct title of the facility is U.S. Marine Corps **Base** Camp Lejuene. This is correctly stated in the first line of the Summary (page 1) and reflected in the acronym ("MC**B** Camp Lejeune") used throughout the remainder of the text.

Recommendation: Correct the facility name on the cover and title page.

2. Page 2, "Summary," subsection "Volatile Organic Compounds (VOC) Levels"

Comments:

a. This paragraph states that "A study of birth outcomes, in particular of low birth weight, pre-term births, and fetal deaths, **should** further understanding of the health effects of low-dose VOC exposure."

b. It is not obvious that this study will further understanding of the health effects of low-dose VOC exposure. Determining/demonstrating causal relationships is often difficult in epidemiological studies. This may be even more difficult where the cohort is a transient military/military dependent population. Until the study parameters are established and the data evaluated, it may be prudent to indicate that the study **may** further understanding of low-dose VOC exposure.

Enclosure (1)

c. An even more optimistic opinion about the study is indicated on page 45, where the Public Health Action Plan ("Past Public Health Hazards, Volatile Organic Compounds in Drinking Water, Planned Actions") states, in refering to the birth outcome study, that "This information **will** further the understanding of the health effects of low-dose VOC exposure."

Recommendations:

a. Rephrase the statement on page 2 to indicate that an **evaluation** of birth outcome data **may** further understanding of the health effects of low-dose VOC exposure.

b. Rephrase the statement in the Public Health Action Plan (page 45).

3. Section I, "Health Hazards - Past Exposure Situations," subsection A, "Lead Exposure (Tap Water)"

a. Page 12, "Lead Sampling"

Comment: The last paragraph of this section discusses blood lead tests and notes that out of 102 adults tested, three showed slightly elevated blood lead levels. The next sentence states: "However, several questions concerning laboratory procedures suggest blood lead levels may actually be higher than that measured." No further explanation or description of the suspect laboratory procedures is provided. This same statement is made on page 14 in the subsection entitled "Summary and Follow-up."

Recommendation: Include a brief, clear explanation as to which laboratory procedures cause ATSDR to believe that the results are not accurate and may be downwardly biased.

b. Page 14, "Summary and Follow-up"

Comment: The end of the third paragraph states that lead paint was determined to be the exposure source for several children showing elevated blood lead levels during routine testing. It also states that a lead abatement program has been initiated. No other information about the lead abatement program is given.

Recommendation: Include a brief description of the lead abatement program that has been initiated at MCB Camp Lejeune.

4. Section I, "Health Hazards - Past Exposure Situations," subsection B, "Pesticide Exposure (Site 2)"

a. Page 15, "Site 2 - History and Use"

Comments:

(1) The historical overview states that from 1945 to 1958 building 712 was used as a pesticide storage area and as an office for the pesticide workers; it also states that pesticides were mixed on two outside concrete pads, level with the ground surface. The pads and the surrounding soil contain the highest levels of pesticide contamination. The building was used as a day care center from 1966 to 1982 and is presently used as a personnel office. The report does not indicate if building 712 was ever decontaminated.

(2) Table 1, "Health Hazard Situations," outlines the sources of contaminants, the exposure pathway elements, and the receptors for pesticides in the soil at Site 2. The concrete pad and building 712 are not listed as exposure pathway elements. Likewise, on page 19, Table 2, "Probable Health Effects for Pesticide Exposures at Site 2" does not include contact with contaminated surfaces either from the concrete pads or from inside building 712. Due to the length of time that employees and children have spent inside the building or in direct contact with the concete pads we think the question of whether or not the locations are "clean" needs to be addressed.

(3) Subsections 2, 3 and 4, respectively entitled "Office Workers - Recent Exposure," "Children in Day Care - Past Exposure: 1966-1982" and "Adults at Parking Lot - Past Exposure: 1966-1982" discuss the exposure pathways of the corresponding populations. Contact with contaminated surfaces inside the building or on the pads is not included in the estimated exposure dose.

Recommendations:

(1) State whether or not building 712 and the concrete pads have been decontaminated.

(2) Indicate whether any contact surface sampling was previously conducted inside building 712.

(3) If sampling indicated surface contamination inside the building and the building has not been decontaminated, include absorption from contact with contaminated surfaces in estimating personal exposure doses.

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b. Page 17, "Lawn-Care Workers - Recent Exposure"

Comment: ATSDR estimates five lawn care workers could have been exposed to pesticides at this site for three days a week (presumably, eight hours per day) for nine months of the year. This seems an excessive exposure estimate. The size of the site does not appear to warrant lawn care work for 3 days a week.

Recommendation: Consider a more realistic exposure scenario for the lawn care workers.

c. Page 19, "Table 2 - Probable Health Effects for Pesticide Exposure at Site 2":

Comments:

(1) The table does not include ingestion/inhalation rates, exposure duration values, or exposure parameters used to calculate the "Maximum Estimated Exposure Dose (mg/kg/day)" values presented. This information is included in a table in Appendix D-1, "Pesticide Exposure Estimates for Site 2." The appendix is not referenced on Table 2.

(2) There is a discrepancy between the text description of exposure durations (3 days a week for 9 months) and the "Assumptions" shown at the bottom of the table in Appendix D-1, which indicates "4 days per week for 32 weeks" for lawn care workers. Assuming four weeks per month, the text description (page 19) yields a value of 108 days; the table assumption, 128 days of exposure.

Recommendations:

(1) Reference Appendix D-1 as a footnote to Table 2.

(2) Correct the discrepancy between the text and appendix exposure values.

d. Page 20, "Office Workers - Recent Exposure"

Comment: This section describes office worker exposures to pesticide contaminated dust as they park their cars in the parking lot. It does not indicate the exposure period per day which has been assumed.

Recommendation: Include a reasonable exposure time for the office workers. It is not reasonable to expect that they would have lengthy daily exposures.

e. Page 21, "Children at Day Care - Past Exposures: 1966-1982"

Comment: This section describes children's potential exposure to pesticides from contaminated soil in the playground and parking lot of the day care facility. The estimated time per day of potential exposure is not stated.

Recommendation: Include a reasonable estimate of exposure time per day for the children who may have been exposed to contaminated soils in the playground and parking lot.

f. Page 22, "Adults at Parking Lot - Past Exposure: 1966 - 1982"

Comment: See comment 4(d) above for a comment on parking lot exposure periods.

Recommendation: See recommendation 4(d) above.

5. Section I, "Health Hazards - Past Exposure Situations," subsection C, "Volatile Organic Compound Exposure (Tap Water)

a. Page 26, Table 3, "Maximum Contaminant Concentrations Detected..." and page 30, Table 4, "Probable Health Effects for VOC Exposures"

Comments:

a. Table 3 lists the **maximum** detected values for volatile organic chemicals (VOCs) found in drinking water at MCB Camp Lejeune after a spill incident. On page 30, Table 4 provides these same values under a column entitled "Drinking Water Contaminant - Concentration **Range**." A range of values is not provided, only the maximum values.

b. The title of the Table 4 ("**Probable** Health Effects for VOC Exposures" is somewhat misleading, since the risk estimates are based on personnel being exposed to these maximum detected values for a period of one year. (The exposure duration value is not indicated on Table 4, but is provided in Appendix D-2). The text description of the VOC sampling states that residents were exposed for 14 days, by which time the base had switched them to alternative water supplies. Although the resultant risk estimates are low, there should not be inconsistencies between text descriptions, table titles and table data, and appendices data.

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Recommendations:

a. On Table 4, rephrase the column title to indicate "Maximum Contaminant Concentration" vice "Concentration Range"; alternatively, provide the concentration ranges.

b. Rephrase the title of Table 4 to reflect "Potential Health Effects" vice "Probable Health Effects."

c. Reference Appendix D-2 in a footnote to the table.

6. Section II, "Potential Health Hazards - Possible Exposure Situations,"

a. Page 33, subsection C, "Fish Contamination (Site 6, 9, and 82)

Comments:

(1) After discussing the water quality classification of Bear Creek and Wallace Creek, the last sentence of the first paragraph states that "Fishing is a popular sport **in the area**; therefore, we are particularly concerned about possible fish contamination." The next subsection, "Summary and Follow-up" then states that fish tissue samples taken from Wallace Creek showed detectable levels of VOCs, PCBs, and pesticides, but that "Fish collected by electro shock, seines, and lines were all less than 3 inches in length, and believed to be juveniles..." and that "Even though levels detected in fish were low, larger fish of edible size would most likely contain higher levels."

(2) The issue of larger, edible size fish is then discussed. ATSDR states that large, edible size fish would be needed to determine the health threat, "and therefore ATSDR recommends additional fish samples be collected which would be representative, in both species and size, of fish commonly consumed from these creeks."

(3) The text provides no information that indicates fish of edible size are commonly found in these two creeks. Conversely, the information that fish have been collected by electro shock, seines, and lines, and no fish larger than 3 inches have been caught, suggests that the streams may be too small/shallow to support signficiant populations of larger fish. Just because fish of edible size have been caught in the **area** does not mean that such fish can be found in these particular creeks.

(4) The fish sampling locations, relative to larger bodies of water, stream confluences, and known harvesting areas should be determined and stated. Also, information about possible variation in the fish population, relative to seasonal

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variations (e.g., water levels) may be important in determining the likelihood of catching large fish in the streams.

Recommendations:

(1) Determine if there is any evidence that large (edible size) fish inhabit the two streams.

(2) Determine if sampling locations and/or seasonal variations are likely to impact fish populations in the streams.

(3) Retain or revise the recommendation to collect larger fish samples as appropriate.

b. Page 34, Table 5, "Potential Health Hazards - Possible Exposure Situations"

Comment: Under the "Fish in New River" pathway the "Comments" column indicates that this area is "heavily fished and shellfished." Shellfish are not specifically identified as a potential "Point of Exposure" or a separate exposure pathway on the table; nor is shellfish ingestion specifically discussed in the text. It may be that ATSDR considers "shellfish" a subgroup of "fish" but this is not stated.

Recommendation: Indicate the shellfish status as relates to this pathway. If ATSDR considers this a separate entity from "fish" then it should be included as a potential pathway.

Conclusions

7. Page 42, Section V, "General Conclusions"

Comment: The first point of discussion in this section is potential adverse health effects for base personnel at training exercise locations proximal to potentially contaminated sites and for routine work activities occurring at sites where environmental media has not been sampled/analyzed. This is the first time these situations are mentioned in the document. If these potential exposure scenarios are of concern, providing information such as specific locations and specific contaminants of concern would be helpful for MCB Camp Lejeune to further evaluate them.

Recommendation: Since this appears to be an area of concern for ATSDR, we recommend they include additional information in this document.

Public Health Action Plan

8. Section I, "Past Public Health Hazards"

a. Page 44, subsection A, "Lead in Tap Water"

Comment: Under "Recommended Actions" the fifth point recommends that women and children should be advised not to drink from faucets in which lead levels exceed 15 ppb. The next sentence recommends that "adults" should be advised not to drink water from faucets in which lead has been measured to be 50 ppb or more. Women are generally considered to be adults.

Recommendation: Revise this recommendation to indicate that pregnant women or those desiring to become pregnant should not drink water from sources where lead levels are found to exceed 15 ppb.

b. Page 44, subsection B, "Pesticides in Soil at Site 2"

Comments:

(1) The first recommendation lists air monitoring as one of the appropriate measures to prevent office workers and visitors from being exposed to site contaminants. The types and locations of suggested air monitoring are not described or discussed, nor are the standards to which the sampling results should be compared identified.

(2) The second recommended action is "Provide education to current lawn-care and office workers on their exposure to DDT..." Potential overexposure should be distinguished from exposure.

Recommendations:

(1) Clarify the types and locations of the proposed air samples. Also, state which standards the air sampling results will be compared to in order to determine whether or not an employee has been overexposed.

(2) Rework this recommendation to indicate that education should be provided to employees on their **estimated** exposures. An individual exposed to hazardous substances is not necessarily overexposed.