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MARINE CORPS BASE
PSC BOX 20004
CAMP LEJEUNE, NORTH CAROLINA 28542-0004

IN REPLY REFER TO:

6287
BEMD

03 FEB 1995

Agency for Toxic Substances
and Disease Registry
Division of Health Assessment
and Consultation
Chief, Program Evaluation, Records,
and Information Services Branch
Mail Stop E-56
1600 Clifton Road, N.E.
Atlanta, Georgia 30333

Gentlemen:

A draft Public Health Assessment for Marine Corps Base, Camp Lejeune was completed by the Agency for Toxic Substances and Disease Registry (ATSDR). One of the potential health hazards identified by the Public Health Assessment was potential groundwater contamination. Because of the potential groundwater contamination, annual monitoring of the individual wells was recommended by ATSDR. The enclosure is a proposed scope of work to complete the annual monitoring for all active supply wells. The enclosure is provided for your review and comment. Please provide comments before February 22, 1995.

Sincerely,

ROBERT L. WARREN
Assistant Chief of Staff
Environmental Management
By direction of
the Commanding General

Encl:

(1) Scope of Work - Well Sampling for VOCs

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SCOPE OF WORK
WELL SAMPLING FOR VOCs

I. BACKGROUND

A. Established in May 1941, Camp Lejeune provides specialized training to prepare troops for amphibious and land combat operations. Today Camp Lejeune occupies 234 square miles (151,412 acres), with 14 miles of beach on the Atlantic Ocean, more than 400 miles of roads, 50 miles of railroads, 7 wastewater treatment plants, 5 water treatment plants, 5000 buildings, and facilities supporting 110,000 Marines, Sailors, and their families. The Base houses the 2nd Marine Division , the nucleus of the Marine Corps' east coast force-in-readiness.

B. Camp Lejeune has installed more than 110 groundwater production wells that are connected by over 13 miles of water mains. As of November 11, 1991, 99 of these wells were considered active. Of the active wells approximately 70 are still in operation. These wells provide an average of 8.3 million gallons of water daily to the Marine Corps Base (MCB) water collection system supplying raw water to 5 active water treatment centers. The average age of MCB wells is approximately 25 years although more than 30 percent are greater than 50 years in age. The single well element averaging 160 feet in depth typically consists of (1) an 8 to 10 inch well averaging approximately 100 feet of penetration into the Castle Hayne Aquifer containing approximately 40 feet of screen; (2) a pumping unit, normally a 6 inch vertical line shaft pump; (3) a totalizer to measure flow rates; (4) a single mechanical gate valve; (5) an automatic flapper or butterfly check valve; and (6) a waste water discharge pipe.

C. The total water production from all MCB water treatment systems has not varied significantly over the past 10 years, with an average daily usage calculated on an annual basis of 7.5 million gallons per day. The pumping rates vary considerably for MCB wells, ranging from 500 to more than 480 gpm, and average approximately 170 gpm. Individual records of water production from each well are not kept. Daily hours of operation for each well are maintained at each water plant site.

D. In the past, the Tarawa Terrace, Hadnot Point, and the Holcomb Boulevard water distribution systems on Base were contaminated with high levels of volatile organic compounds (VOCs). The sources of contamination were leaks from off-base and on-base underground storage tanks (USTs), some of which were installed in the 1940s. The contaminated wells were closed in 1985. In 1982, MCB, Camp Lejeune performed a Base wide routine sampling of treated drinking water for trihalomethanes (THMs), a procedure to test for chlorine disinfection by-products. In May, the laboratory noted difficulty in measuring THMs in two of the eight water systems in operation at that time because of interference by unidentified compounds. The analysis was then expanded to include trichloroethylene (TCE) and tetrachloroethylene (PCE) which were thought to be the interfering compounds.

1. Hadnot Point Water Distribution System

At Hadnot Point, drinking water samples contained TCE at 1,400 ppb in May 1982 but dropped to 20 ppb in July 1982. The drop in these levels can be explained by the fact that different supply wells are used on different days. The wells pump water to the distribution system where the water is blended and treated. Chlorine, fluoride, and some other

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added to the water before it is pumped to water towers prior to distribution. The possible sources of contamination at the Hadnot Point distribution system are leaking USTs containing TCE; fuels and spills during vehicle maintenance operations; and disposal of drums at associated storage lots.

Additionally, benzene was detected at 760 ppb. Upon discovering the contamination, MCB, Camp Lejeune immediately shut down the supply well that was contaminated. Tap water sampling did not show any detectable levels of benzene.

In July 1984, as part of the Navy Assessment and Control of Installation Pollutants (NACIP) Program, MCB, Camp Lejeune conducted water quality sampling in wells on Base. They found that eight wells in use at Hadnot Point and one well in use at Tarawa Terrace were contaminated. All nine wells were abandoned and have not been used in the drinking water system since 1985.

2. Tarawa Terrace Water Distribution System

Sampling in the Tarawa Terrace water system in May 1982 detected PCCE at 80 ppb which remained consistent during the July sampling. No TCE was detected. At the time of the 1982 sampling, no source for the contamination at either Hadnot Point or Tarawa Terrace system had been identified. Additionally, there were no drinking water standards for these chemicals in 1982; TCE, PCE, and 1,2-DCE levels in drinking water were not regulated until the Safe Drinking Water Act was amended in 1991.

Contamination of the Tarawa Terrace distribution system was caused by an off-Base dry cleaning operation, ABC Cleaners, whose septic system released the cleaning fluid, PCE, into the ground. The septic system was installed in 1954 and used until 1985. In 1958, a well supplying the Tarawa Terrace system was drilled approximately 900 feet from the dry cleaners. Over time, contamination migrated into two different wells. In 1985, both of these contaminated wells were shut down.

3. Holcomb Boulevard Water Distribution System

On January 27, 1985, a generator fuel line at Holcomb Boulevard water distribution plant burst, leaking fuel into the system. This situation was identified after the Base received complaints of gasoline smell in on-Base residential tap water. MCB performed sampling of the system and found that gasoline had entered the Holcomb Boulevard distribution system. The system was immediately shut down and flushed out. Samples were taken and contaminants were found at several points in the Holcomb Boulevard system after it was flushed out, all of the samples ranged around 1,150 ppb.

E. Although contaminant plumes have been identified in some areas, groundwater contamination boundaries have not been completely defined in other areas. Additionally, groundwater treatment is ongoing. Because the contamination from the USTs and other sources has not been sufficiently defined, MCB, Camp Lejeune has decided to conduct sampling CLW

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individual wells annually to prevent contamination of water distribution systems and to protect people from exposure to contaminated drinking water.

II. CONTRACT OBJECTIVES:

A. Annual testing of all active supply wells must be completed. This contract will complete the sampling of the following wells:

| WELLS | WELLS | WELLS | WELLS | WELLS | WELLS | WELLS | WELLS |
|-----------------------------|----------|----------|---------|---------|---------|---------|---------|
| AS-106 | AS-131 | AS-190 | AS-191 | AS-203 | AS-4140 | AS-4150 | AS-5001 |
| AS-5009 | BA-164 | BA-190 | BB-44 | BB-47 | BB-218 | BB-220 | BB-221 |
| HP-603 | HP-606 | HP-607 | HP-609 | HP-613 | HP-616 | HP-620 | HP-622 |
| HP-623 | HP-628 | HP-629 | HP-632 | HP-633 | HP-635 | HP-637 | HP-640 |
| HP-642 | HP-643 | HP-644 | HP-646 | HP-647 | HP-648 | HP-650 | HP-652 |
| HP-661 | HP-662 | HP-663 | HP-698 | HP-699 | HP-700 | HP-701 | HP-703 |
| HP-704 | HP-705 | HP-706 | HP-707 | HP-708 | HP-709 | HP-710 | HP-711 |
| HP-5186 | LCH-4007 | LCH-4009 | TC-502 | TC-600 | TC-604 | TC-700 | TC-1000 |
| TC-1001 | TC-1251 | TC-1253 | TC-1254 | TC-1255 | TC-1256 | | |
| 1 Well at Greater Sandy Run | | | | | | | |

1. All sampling shall be completed under an approved sampling protocol that is compatible with the required analysis.
2. The following information shall be collected at each wellhead site during sample collection:
 - a. Well identification number
 - b. Number of samples collected
 - c. Date and time of sample collection
 - d. Description of sample handling and collection procedures
 - e. Weather conditions during collection of samples
 - f. Water level in reference to sea level
3. Chain of Custody forms shall be provided along with copies of the original laboratory results.
4. The contractor shall provide all necessary equipment, sample containers, and personnel to collect the samples.
5. All sampling shall be scheduled and coordinated with the Base Utilities Branch.

B. Analyze all raw water samples taken from the drinking water wells for the following parameters and any other volatile organic compounds regulated by the Safe Drinking Water Act:

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p-Isopropyltoluene
Chloromethane
Dichlorodifluoromethane
Bromomethane
Chloromethane
Fluorotrichloromethane
Hexachlorobutadiene
Naphthalene
1,2,4-Trichlorobenzene
cis-1,2-Dichloroethylene
Dibromomethane
1,1-Dichloropropene
1,3-Dichloropropane
1,3-Dichloropropene
1,2,3-Trichloropropane
2,2-Dichloropropane
1,2,4-Trimethylbenzene
1,2,3-Trichlorobenzene
n-Butylbenzene
1,3,5-Trimethylbenzene
tert-Butylbenzene
sec-Butylbenzene
Bromochloromethane
Chloroform
Bromoform
Bromodichloromethane
Chlorodibromomethane
Xylenes (Total)
Dichloromethane
o-Chlorotoluene
p-Chlorotoluene
m-Dichlorobenzene
o-Dichlorobenzene
p-Dichlorobenzene
Vinyl Chloride
1,1-Dichloroethylene
1,1-Dichloroethane
trans-1,2-Dichloroethylene
1,2-Dichloroethane
1,1,1-Trichloroethane
Carbon Tetrachloride
1,2-Decchloropropane
Trichloroethylene
1,1,2-Trichloroethane

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1,1,1,2-Tetrachloroethane
Tetrachloroethylene
1,1,2,2-Tetrachloroethane
Chlorobenzene
Benzene
Toluene
Ethylbenzene
Bromobenzene
Isopropylbenzene
Styrene
n-Propylbenzene

C. The analysis shall be performed by a lab that is certified in the State of North Carolina for Safe Drinking Water Act analysis and for all the parameters listed above.

III. REPORTS

A. The contractor must provide tabulated results of the analyses and compare them with the accepted groundwater standard levels. Any result that does not comply with the standards will be annotated.

B. The contractor will provide monitoring results and all the aforementioned well information items in a database. The database shall be in Lotus Approach for Windows release 2.1 format on 3 1/2 1.44M floppy disks. Currently MCB, Camp Lejeune uses DOS 5.0; therefore, all information on floppy disks must be in a format accessible with DOS 5.0.

IV. MILESTONES AND MEETINGS

A. The contractor must comply with the schedule of milestones, meetings, and submittal dates given in the following table. All meetings will be at Camp Lejeune.

| DATE | MILESTONES |
|-------------------------------|--|
| 10 days after contract award | Base kickoff meeting, site visits, work plan |
| 30 days after contract award | Start sampling |
| 90 days after contract award | Complete sampling |
| 105 days after contract award | Final Draft Meeting |
| 120 days after contract award | Camera-ready copies of the Final Report |

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V. SUBMITTALS

- A. The contractor shall develop a final draft document and a final document. Ten copies of the final draft document shall be provided by the contractor and five copies of the final document shall be provided.
- B. The contractor will provide the final report on 3 1/2 inch 1.44M floppy disks in Lotus AmiPro release 3.0. The database shall be user friendly and approved by the government before implementation.

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