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MCB CAMP LEJUENE
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DRAFT LETTER FROM THE AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY TO THE UNITED STATES HOUSE OF REPRESENTATIVES REGARDING EXPRESSED INTEREST IN NON-IR SITES MCB CAMP LEJEUNE NC

1/1/1995

AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

The Honorable Brad Miller
Committee on Science and Technology
United States House of Representatives
1300 St. Mary's Street, Suite 504
Raleigh, North Carolina 27605

Dear Mr. Miller:

This is in response to your letter dated March 18, 2010, requesting the Agency for Toxic Substances and Disease Registry (ATSDR) records on the drinking water supplied to Lejeune residents. We agree that former Marine Corps families deserve clarity on the drinking water exposures that occurred at Marine Corps Base Camp Lejeune (MCBCL) and to what degree those exposures contributed to the adverse health effects described in your letter. ATSDR is providing your office with all our administrative records on Camp Lejeune including those related to benzene[1]. We recommend that you focus on the initial draft public health assessment dated September 8, 1994 for the best explanation of the issue of benzene in supply well 602.

Your letter expressed concern that we may have excluded evaluation of non-Installation Restoration Program (IRP) sites such as the Hadnot Point Industrial Area. ATSDR evaluated potential exposures to hazardous substances wherever we found them -- from many different programs designated by the U.S. Department of Defense (DoD), U.S. Environmental Protection Agency (EPA), or by states (e.g., installation restoration, drinking water, lead in housing, pesticide application, and surface water discharge). The IRP[2] is the DoD program at military bases that identifies, investigates, and cleans contamination resulting from past operations. MCBCL began their initial assessment of the potentially contaminated areas in 1983. MCBCL

[1] Many records from the file used in writing the PHA were lost in the late 1990s during a move prior to copies being placed in our permanent records center. Most of those were reacquired since the dose reconstruction activities began in 2003.

[2] Department of Defense began environmental restoration activities in 1975 under the Installation Restoration Program. In 1980, Congress passed the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), also known as Superfund. This law requires responsible parties to clean up releases of hazardous substances in the environment. https://www.denix.osd.mil/portal/page/portal/DERP

listed 22 of those sites and grouped them into operable units for further Marine Corps investigation. ATSDR's Public Health Assessment (PHA) identified 10 situations where people could be in contact with contaminants and discussed those exposures in the body of the document. Additionally, in Appendix B, we included our evaluation of all the MCBCL-identified potentially contaminated sites including those not retained in their IRP. Two of the 10 ATSDR exposure situations (lead and VOCs in drinking water) were not part of the MCBCL's IRP sites. ATSDR evaluated all potential exposure situations we identified and present health effects information on those with supporting data.

ATSDR's primary objective in undertaking public health assessments is to ensure that current and future exposures are prevented[3]. At Camp Lejeune, we discovered real risk for current and future drinking water contamination and possible exposure as late as 1994. First and foremost, we sought to prevent those exposures. The implementation of our recommendations significantly impacted the prevention of current and future exposures. The highlights of our prevention work are discussed in Enclosure A.

We also knew that people expected us to make the best deductions we could about past exposures and we did so even though we knew that the environmental data available to evaluate retrospective exposures was (and is) incomplete. Although an in-depth discussion of benzene exposure was not included in our 1997 PHA for Marine Corps Base Camp Lejeune, our evaluation of drinking water exposure did encompass a review of the available documents on all

[3] Barry Johnson ATSDR Administrator Letter to LTC. Warrant Hull, ATSDR health assessment p 2, August 27, 1987.

contaminants detected in the groundwater including benzene. Past exposure to tetrachloroethylene (PCE) and trichloroethylene (TCE) prompted us to initiate studies on possible health effects and in-depth water system modeling. Our benzene evaluation concluded that because we could not verify exposure to benzene in drinking water, we would not be able to generalize on health effects. We provide here the benzene drinking water exposure evaluation that led to us not discussing benzene health effects in ATSDR's PHA for Marine Corps Base Camp Lejeune.

Past Exposures to Benzene in Drinking Water

The information we used for our 1994 draft version of our PHA is provided below, followed by the specific text addressing benzene contamination in our September 8, 1994 document.

- **Benzene detected in a supply well mixed with 19 other wells:** Benzene was detected in supply well 602 in a sample collected in July 1984. Two sources reported two different benzene concentrations. We chose the higher concentration of 760 parts per billion (ppb). The water systems had more wells than were necessary to supply water on any one day. Water from supply well 602 was mixed with water from 19 other wells (⅔ of the 39 wells were in use at any one time) before treatment and distribution for public use.

- **Tap water samples showed no benzene contamination in 1982, 1983, and 1984:** Treated tap water samples taken in 1982, 1983, and 1984 to detect trihalomethanes (THMs) (e.g., chloroform, bromoform, etc), by-products of chlorination, further analysis showed levels of trichloroethylene (TCE) and tetrachloroethylene (PCE). The

additionally testing used to identify TCE and PCE would likely have identified benzene had it been present based on analysis methods used at the time. Therefore, we concluded that benzene was not in the water people were drinking. Supply wells containing contamination were taken off line in November 1984. No benzene was detected in the December 1984 sampling of finished tap drinking water.

- **Contaminated wells immediately shut down:** ATSDR was informed of the unwritten practice that once contamination was detected at a supply well, that well was immediately shut down. In a conversation June 15, 1993 with Elizabeth Betz, MCBCL Laboratory, " Ms. Betz confirmed that it was common practice (unwritten) at MCBCL to shut down a well when contamination is detected in the well, regardless of the level detected. The well was then retested to confirm the contamination. The water department must get permission from the Commanding General to put the well back on line."

Therefore, we had some information that benzene was not detected in the drinking water in July 1982, 1983, and again in December 1984. Even today, it is common practice for water providers to blend contaminated wells with other wells to provide water that has only trace levels of contaminants. So it was not unusual for us to learn of benzene contamination in one of the 20 wells, yet see no trace levels in the tap water that people were drinking. Since we had no evidence that people were drinking benzene-containing water, we did could not evaluate possible health effects.

We did acknowledge that prior to sampling, people could have been exposed to benzene in drinking water; however, we were not able to scientifically evaluate health implications without data since evaluation of health effects is exposure dose specific.

All the information ATSDR acquired, analyzed, and evaluated for the 1997 PHA lead to the conclusion that in the past, the drinking water presented a public health hazard and that further study was needed to determine if adverse health effects may have resulted from that exposure. Declaring the exposure a public health hazard is the most severe hazard ranking that ATSDR can assign to a past exposure and it spurred ongoing public health research, including extensive water modeling, exposure reconstruction, and epidemiological studies. The following paragraph is from the *September 8, 1994 Initial Release Public Health Assessment for Marine Corps Base Camp Lejeune* from the section entitled:

"Environmental Contamination/Pathway Analyses / Public Health Implications"

Health Hazards – Past Exposure Situations, subsection

C. Volatile Organic Compound Exposure (Tap Water) Page 26

"Hadnot Point Water Distribution System...

Additionally, benzene was detected in supply well # 602 at 760 ppb. Upon discovering the contamination, MCB Camp Lejeune immediately shut down the supply well # 602. Tap water sampling did not show any detectable levels of

benzene; therefore, we assume that no one was exposed to benzene after 1982. Although people could have been exposed to benzene before it was detected at the well, there are no documented reports of benzene levels in tap water. Therefore, in this public health assessment we are not evaluating the likelihood of benzene exposure. In the Hadnot Point system, any given well would have been in use about two-thirds of the time because water demand did not require all wells to be in use at the same time."

Although benzene in supply well 602 is discussed in the body of the initial PHA and not the other PHA versions, all three PHAs discuss benzene in supply well 602 in Appendix B. Statements changed between the 1995 public comment release and the final release of the PHA when additional information was provided to ATSDR by MCBCL regarding their efforts to address our concern for current and future risks of people drinking contaminated water.

We now know that supply well 602 was not shut down in July 1984, but instead shut down in November 1984 when the Marine Corps received the sampling report from their contractor. Therefore, there was at least four months of possible exposure to benzene that involved well 602 being mixed with other wells to varying degrees. Although ATSDR's current water modeling efforts will provide several potential tap water concentrations that we can then use to estimate possible health risks, actual exposure information for benzene is still incomplete.

Thank you again for your letter and for your efforts on behalf of the public's health. I hope this information is helpful. If you have additional questions about this matter, please contact Ms.

Barbara Rogers, CDC/ATSDR's Washington, D.C. office, at (202) 245-0600 or

BRogers@cdc.gov. A copy of this response is being sent to your Washington, D.C. office.

Sincerely,

Thomas R. Frieden, M.D., M.P.H.
Director, CDC, and
Administrator, ATSDR

Enclosure

cc:
Barbara Rogers, CDC/W

Enclosure A

Current and Future Exposures to Benzene in Drinking Water

Even though ATSDR had no data documenting past exposure to benzene, ATSDR was concerned about the current and future use of groundwater as a drinking water source and discusses those concerns further in that same document.

September 8, 1994 Initial Release
Public Health Assessment for U.S. Marine Corps Camp Lejeune
Environmental Contamination/Pathway Analyses / Public Health Implications

I. Potential Health Hazards – Possible Exposure Situations
   A. Groundwater Contamination (Base wide)
   Page 31

"Although 10 wells have been closed because of groundwater contamination with VOCs and fuels, approximately 80 additional wells are still in operation on-base. These wells provide an average of 8.3 million gallons of water daily to MCB Camp Lejeune. Approximately 20 other wells are not in use due to low water pumping volume. Almost all of these wells tap a tertiary sand aquifer that is permeable to contamination.

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.

Summary and Follow-up

We estimate that future exposure exposures to contaminated water could reach levels high enough to cause health concern, as happened in the past. The contamination from the underground fuel tanks and other sources has not been sufficiently defined. We strongly recommend that further sampling be done to define the geometry of the contaminant plumes and the direction and velocity of plume movement and to identify the sources of contamination. We recommend that individual wells be sampled no less than semi-annually to prevent contamination of water distribution systems and to protect people from exposure to contaminated drinking water. Additionally, we recommend that the base continue to monitor water from the distribution systems quarterly. If monitoring indicates contamination, individual wells should be sampled to determine which ones are contaminated so they can be closed or their water treated.

If groundwater monitoring indicates that contaminated groundwater is moving toward on- or off-base drinking water supplies, measures should be taken to prevent people from coming in contact with it. The closest off base drinking water wells are over one-half mile from the base boundary. Typically, groundwater flows toward the New River.

However, a pumping well could cause groundwater flow to change direction and allow contaminants to be drawn up into the pumping well."

Information key to the PHA understanding of exposure to contaminants was a conversation that took place June 15, 1993 with Elizabeth Betz, MCBCL Laboratory, as documented in the attached AROA:

> "Ms. Betz confirmed that it was common practice (unwritten) at MCBCL to shut down a well when contamination is detected in the well, regardless of the level detected. The well was then retested to confirm the contamination. The water department must get permission from the Commanding General to put the well back on line."

Page 60 Summary of Site Evaluations Appendix B-2 and January 6, 1995 Public Comment PHA Appendix B Page B-2-2
(Reference: Environmental Science and Engineering, Inc. Site Summary Report Final, Marine Corps Base, Camp Lejeune, September 1990)

Site Number 22 – Industrial Area Tank Farm – Groundwater Contamination – Evaluations:

"This site was included in the original 22 priority sites. A separate investigation of Hadnot Point Industrial Area was conducted. Therefore, this site is not included in the Operable Unit Installation Restoration Program. Groundwater contamination (benzene, etc.) was detected in the base drinking water supply well 602. That well has not been used since 1984. Groundwater contamination at this site contributes to ATSDR's overall concern for potential human health hazards from exposure to contaminated drinking water."

August 4 1997 Final PHA Release Appendix B Page B-2-4
Site Number 22 – Industrial Area Tank Farm – Groundwater Contamination – Evaluations:

"This site was included in the original 22 priority sites. A separate investigation of Hadnot Point Industrial Area was conducted. Therefore, this site is not included in the Operable Unit Installation Restoration Program. Groundwater contamination (benzene, etc.) was detected in the base drinking water supply well 602. That well has not been used since 1984. Groundwater contamination at this site is being monitored and traced under several base programs."

Because of MCBCL sampling efforts and the establishment of additional monitoring programs of the groundwater and drinking water supply wells, ATSDR's evaluation of current and future health risks from base wide groundwater changed from Potential Health Hazard – Possible Exposure Situations to No Apparent Public Health Hazard.

A. Groundwater Contamination (Base wide)

Previously, ATSDR had concerns that base drinking water wells might be at risk for contamination. MCB Camp Lejeune is taking action to identify, assimilate, track, and predict groundwater contamination migration through several programs. These programs are intended to protect the drinking water supply and to ensure that people do not drink contaminated groundwater. In some areas, contaminant plumes have been identified and groundwater is being treated to reduce groundwater contamination. Investigations are ongoing to identify and treat groundwater contamination through the Underground Storage Tank and Remedial Investigation studies. To prevent people from drinking contaminated water, ATSDR recommended that MCB Camp Lejeune initiate a semi-annual wellhead monitoring program (ATSDR Public Health Assessment Public Comment Release for MCB Camp Lejeune, January 6, 1995). As a result of our recommendations, an "annual program to monitor the active supply wells" was implemented by the base in 1996. Under this program, (Sampling Analysis of Groundwater Wells at the Marine Corps Base, Camp Lejeune) drinking water supply wells are sampled at the wellhead. The annual sampling of groundwater wells was initiated by the base to protect the drinking water supply and the people who drink that water. This program is not required by law and is not under the jurisdiction of any off-base agency. Since this program was initiated, six drinking water supply wells have been closed because either contamination was detected at levels above drinking water standards or well locations are in close proximity to contaminated wells.

bcc:
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ATSDR:DHAC:10SRAB006: 4/01/2010
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