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BRIEF PAPER REGARDING ABC CLEANERS TARAWA TERRACE SUPPLY WELLS AND
ATSDR PUBLIC HEALTH ASSESSMENT ISSUSE MCB CAMP LEJEUNE NC
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ABC Cleaners / Tarawa Terrace Supply Wells / ATSDR Public Health Assessment Issues

There are several issues involved with the former water distribution system in the Tarawa Terrace housing area aboard Marine Corps Base, Camp Lejeune as itemized below.

1. Groundwater contamination, originating from an off-Base source, ABC One-Hour Cleaners, migrated into the supply water wells at Tarawa Terrace. This water was treated with chlorine, fluoride, and softeners at the water treatment plant prior to distribution to the families living in the housing area for drinking and bathing. The length of contaminated water usage before discovery is unknown, although it is suspected that one well could have provided contaminated water for as long as 30 years. Discovery occurred in 1982; however, no drinking water standards existed for the chemicals found at that time. Testing in 1984 and again in 1985 revealed increasing amounts of contamination within wells in Tarawa Terrace, as well as in the tap water in housing. The wells were closed and water for housing was provided from another source as of 8 February 1985.
2. The Agency for Toxic Substances and Disease Registry (ATSDR) published a Public Health Assessment on Camp Lejeune in September 1994. The results of this study indicated several health hazards, including past exposure to volatile organic compounds (VOCs) in the drinking water system at Tarawa Terrace. Subsequently, ATSDR conducted a study to determine adverse pregnancy outcomes related to VOC exposure. They have now proposed an additional study to examine the incidence of childhood leukemia at Camp Lejeune related to VOC exposure. The childhood leukemia study has the potential to arouse public alarm and encourage individuals to make unsubstantiated claims seeking reciprocity against the government.
3. ABC Cleaners is involved in negotiations with the United States Environmental Protection Agency regarding remediation of tetrachloroethylene groundwater contamination that has migrated onto Camp Lejeune. An attorney for ABC Cleaners has suggested that the Marine Corps Base might also be a "potentially responsible party" to the tetrachloroethylene groundwater contamination at Tarawa Terrace.

This paper presents the background for each of these issues.

Background on ABC One-Hour Cleaners

1. The ABC One-Hour Cleaners was constructed in 1954 and has since been in continual operation. Typical of the dry cleaning industry, ABC Cleaners utilizes tetrachloroethylene (PCE) as a dry cleaning solvent. The solvent was stored in a 250-gallon above-ground storage tank located along the west side of the building. Used PCE was reclaimed through a filtration-distillation process contained within the main building. Following completion of the distillation process, the still bottoms, consisting of powder residues, were placed in the dirt driveway west of the building as a "pothole" filler. It is estimated that approximately one ton of still bottoms was placed on the driveway over a 30-year operating period. Since 1985, ABC Cleaners has used a contracting service to recover and recycle its dry cleaning fluid. A septic

tank soil absorption system, built for the original building on this site in the 1940s, is located in the rear of the ABC Cleaners building complex. A floor drain within the dry-cleaning facility is tied directly to the septic tank.

2. In 1986, the Wilmington Regional Office of the North Carolina Department of Natural Resources and Community Development (NCDNRCD), now called the North Carolina Department of Environment and Natural Resources, notified Mr. Milton Melts, president of ABC One-Hour Cleaners, Incorporated, that he was in violation of North Carolina General Statutes. His violations were "for changing the nature of waste discharged through a disposal system by disposing of dry cleaning solvents in the septic tank system," and "for discharging dry cleaning solvents in the septic tank nitrification field resulting in the violation of standards for underground waters."

3. The ABC Cleaners site underwent preliminary environmental investigations in April and September 1986. Results of these two preliminary investigations confirmed the presence of PCE and its derivatives in soils immediately surrounding the septic tank and adjacent to an existing floor drain. A proposal by ABC Cleaners for a remedial action plan to partially remove and/or treat contaminated soils was rejected by the NCDNRCD as it failed to address problems associated with the groundwater contaminant plume emanating from beneath the ABC Cleaners facility.

4. ABC Cleaners was proposed for inclusion on the Superfund National Priorities List in June 1988, and placed on the final list in March 1989. Since ABC Cleaners was unable to conduct a Remedial Investigation and Feasibility Study (RI/FS), the Environmental Protection Agency (EPA) hired a contractor to conduct this environmental investigation. Field work, completed in November 1992, delineated a plume of contaminated groundwater in the surficial and the Castle Hayne aquifers extending from its origin at the ABC Cleaners Site in a Southeasterly direction onto Marine Corps Base (MCB), Camp Lejeune.

5. A Record of Decision (ROD) for the groundwater contamination, identified as Operable Unit #1, was signed on 26 January 1993. This ROD stipulates extraction of the contaminated groundwater, treatment via air stripping, discharge of the treated effluent into Northeast Creek, and the implementation of institutional controls placed on well construction and water use in the general area of the Site. On 6 September 1994, the EPA signed a ROD for Operable Unit #2, soil contamination at the ABC Cleaners Site, selecting soil vapor extraction as the remediation alternative.

6. In January 1998, the EPA began construction of the groundwater remediation system for ABC Cleaners utilizing an area in the northern portion of Tarawa Terrace I aboard MCB, Camp Lejeune.

7. In an unofficial correspondence between the Eastern Area Counsel Office and the Environmental Management Department, it was revealed that an attorney for ABC Cleaners has suggested that the Marine Corps Base might also be a "potentially responsible party" to the tetrachloroethylene groundwater contamination at Tarawa Terrace. The claim that Camp

Lejeune may have contributed to the PCE groundwater contamination is unfounded and false. There is no evidence of Base usage or disposal of PCE, or its degradation components, that could be related in any way to the groundwater contamination plume originating from ABC Cleaners.

Background on the Tarawa Terrace Supply Wells

1. Construction of the Tarawa Terrace (TT) housing area commenced in 1952. In 1958, TT-26, the first of eight water supply wells was constructed in Tarawa Terrace. The year 1961 saw the construction of an additional three wells, TT-52, TT-53, and TT-54. Wells TT-27, TT-31, TT-25, and TT-23 were constructed in 1972, 1973, 1980, and 1984 respectively.
2. On 27 May 1982 tap water in TT was tested. The results reflected PCE at 80 parts per billion (ppb). The tap water was tested again twice on 27 July and once on 28 July 1982 with PCE results of 76 ppb, 82 ppb, and 104 ppb respectively. The contaminant source was not identified. Camp Lejeune officials contacted the NCDNRCD for advice. No further action was taken as there were no water quality standards for detected volatile organic compounds (VOCs) at that time. Levels in drinking water of PCE and its derivatives trichloroethylene (TCE) and 1,2-dichloroethylene (1,2-DCE) were not regulated until the Safe Drinking Water Act was amended in 1991.
3. Well TT-23 was never put into production as TCE contamination was discovered immediately following construction. The Tarawa Terrace wells were sampled for TCE as part of the Base Naval Assessment and Control of Installation Pollutants Program (the forerunner of today's Installation Restoration Program) in July 1984. Results indicated: TT-23 = 37 ppb, TT-25 = trace amounts, and TT-26 = 3.9 ppb. No TCE was detected in the other five wells.
4. Tap water in Tarawa Terrace was tested again on 5 February 1985. The analysis indicated PCE = 80 ppb, TCE = 8.1 ppb, and DCE = 12 ppb. All Tarawa Terrace wells were disconnected from the water distribution system on 8 February 1985 and wells TT-23 and TT-26 were closed. Four days later, on 12 February 1985, and again on 19 February 1985 water from the TT distribution system was tested and determined to contain no VOCs. Unable to meet the increasing water demand without those wells, the Tarawa Terrace water distribution system was closed.
5. The Wilmington Regional Office of NCDNRCD conducted a groundwater pollution study between April and September 1985, to define the source of PCE in wells within the Tarawa Terrace well field. The study concluded the most likely source for the PCE contamination was ABC Cleaners.

Background on ATSDR Public Health Assessment Issues

1. The Agency for Toxic Substances and Disease Registry (ATSDR), is an agency of the United States Public Health Service. It was established by Congress in 1980 under the Comprehensive

Environmental Response, Compensation, and Liability Act (CERCLA), also known as the Superfund law. Since 1986, the ATSDR has been required by law to conduct a public health assessment at each of the sites on the EPA National Priorities List (NPL). The objective of these evaluations is to determine if people are being exposed to hazardous substances and, if so, whether that exposure is harmful and should be stopped or reduced.

2. In 1983, Marine Corps Base, Camp Lejeune conducted an Initial Assessment Study to identify potentially contaminated areas aboard the Base. Seventy-six waste disposal sites were initially identified as potentially contaminated, based on record reviews and Base personnel interviews. Twenty-two of those sites were recommended for further investigation. Based on information obtained during this initial evaluation, as well as subsequent investigations, Camp Lejeune was placed on the EPA NPL on 4 October 1989. ATSDR evaluated the environmental information on the 22 sites and identified eight sites with the potential for human exposure. ATSDR also concluded that three situations aboard Camp Lejeune posed public health hazards. The lowest of the three identified hazards in order of health priority was past exposure to VOCs in three drinking water systems on Base: Tarawa Terrace, Hadnot Point, and Holcomb Boulevard.

3. VOC levels in the Base drinking water systems were of health concern until 1985 when use of contaminated wells stopped. NCDNRCD concluded that well contamination in Tarawa Terrace was caused by groundwater pollution from improper disposal of dry-cleaning solvent by ABC Cleaners.

4. ATSDR published the "Initial Release" of their Public Health Assessment for United States Marine Corps, Camp Lejeune on 8 September 1994. This was followed by the "Public Comment" version of this document on 20 February 1995, and the final version on 4 August 1997. In this document ATSDR recommended a study be done by themselves to determine if mothers who lived in houses supplied with drinking water contaminated with TCE, PCE, and 1,2-DCE had an increase in the number of cases of: 1) full-term babies who had low birth weight, 2) pre-term births, and 3) fetal deaths.

5. In January 1997, ATSDR published the Interim Report of their Volatile Organic Compounds in Drinking Water and Adverse Pregnancy Outcomes study. Based on the analysis of birth weight and gestational age data for residents of Base family housing at Camp Lejeune, the following interim conclusions were made:

A. No association was observed between mean birth weight (MBW) or small for gestational age (SGA) and exposure to PCE in the range of 80 to 200 ppb among the offspring of mothers younger than 35 who had no medical history of fetal death. Most of the PCE-exposed infants studied were included in this group.

B. Decreased MBW and increased SGA were associated with exposure to PCE among the offspring of mothers 35 years of age or older. Smaller decreases in MBW and increases in SGA were associated with exposure to PCE among the offspring of mothers

with histories of fetal deaths. While these findings have some biological plausibility, they were not anticipated and require further evaluation.

C. No association was observed between MBW or SGA and exposure to 1 ppm TCE for 7 to 12 days. However, it was not possible to evaluate whether short-term TCE exposure might be associated with MBW or SGA at particularly critical times during pregnancy.

D. Strong associations were observed between long-term exposure to TCE in the range of 1 ppm and decreased MBW and increased SGA in male infants. No associations were observed for female infants for these study outcomes. These results should be interpreted cautiously because the sample size was very small, which increases the likelihood that the association was a chance occurrence. In addition, an effect on males and not on females was not anticipated. Nonetheless, study of birth weight in the offspring of a larger population of pregnant women exposed to TCE is recommended.

6. ATSDR has proposed a \$1.9M follow-on health study to investigate the potential relationship between exposure to VOCs in drinking water and incidence of childhood leukemia at Camp Lejeune. In August 1997, the Navy Environmental Health Center (NHEC) and the Armed Forces Epidemiological Board reviewed ATSDR's proposal and found insufficient evidence to warrant a full-scale epidemiological study.

7. Although there is concern about the technical merit of ATSDR's proposal, it is the position of Headquarters Marine Corps (LFL) that the EPA, as the financially responsible party, is in a better position to provide feedback on how to improve the usefulness of this study.

8. Approximately 90,000 individuals were identified by Camp Lejeune's Base Housing office as having resided aboard Camp Lejeune between 1968 and 1986. ATSDR has requested the Social Security Numbers and last known addresses or current tours of duty for these individuals. Phase I, the acquisition of 12,000 to 13,000 addresses through the Defense Logistics Agency (DLA maintains the systems which contain the records), based on the matching of Social Security Numbers, is expected to be funded through the Office of Management and Budget during the second quarter of fiscal year 1999. A health evaluation questionnaire will be forwarded to the identified individuals to complete and return. An 80% track response rate is necessary to validate the findings of the study.

9. Since the contamination in the drinking water originated from ABC Cleaners, an off-Base dry-cleaning facility that is being remediated by the EPA using the Superfund, it is the position of HQMC (LFL) that this follow-on study should be funded by the EPA.

10. It is anticipated that a meeting to generate a public relations plan will be scheduled with ATSDR, NHEC, HQMC, and MCB, Camp Lejeune in mid November.