[redacted]

15 AUGUST 2001

Colonel A.J. Karle, USMC
Chief of Staff, Marine Corps Base
PSC Box 2004
Camp Lejeune, N.C. 28542-0004

SUBJ: Chronology of Water Contamination at MCB, CLNC

Dear Colonel Karle,

Received your reply of 6 August to my earlier inquiries as to the rationale/validity of the October 1980 entry. Thank you for your response. Additional information on the findings of the initial TTHM monitoring, the identity of unidentified halogenated or chlorinated hydrocarbons other than THM's, the presence of Disinfectant By-Products (DBP's) etal may become available in the near future.

What MCB knew and when they knew it may rise to the surface yet. The passage of THM regulations is cited by a now retired EPA official directly concerned with WQ monitoring as the best work done by EPA for the public health since EPA's inception. I have enclosed several American Water Works Association publications that may be of interest to Director Neal Paul of your Installation Restoration Division. The DBP issue was noted in a letter to HQ/S EMD on 11 September 2000 with no response.

I did request in September 2000 data relating to water quality standards, monitoring, contamination events, certification of MCB WQ monitoring staff and the Vita of the Base Chemist during the 1965-1967 period. This data was not available. I did not request data for periods after 1967 because my family had departed CLNC in late 1967, however, other personnel exposed to VOC contamination after 1967 would be interested if such material is currently available.

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The objectives of Camp Lejeune in the areas of remediation and mitigation are commendable and seem to be progressing as planned. However they are basically measures after the fact of a massive contamination event and do nothing to mitigate the suffering of those Marines and Sailors and their families that have endured adverse health effects from the event.

The objectives of those Marine and Navy personnel who suffered adverse health effects; either to self or dependents, especially children conceived and born at Camp Lejeune, are somewhat different as you may surmise.

As to the value of the Administrative Record File (ARF) carried on the Baker Environmental website, a command responsibility of LANTDIV NAVFACENGCOM, the following observations are forwarded:

(1) That site is an adjunct of the Installation Restoration Program and is selectively and subjectively constructed to meet the needs of that program.

(2) The intent of the ARF is to document all activities leading to a decision or action at a site and generally includes all final reports on investigations and clean-actions, as well as communications with regulators and outside federal/state agencies.

(3) Draft reports, field notes, general guidance documents and working level communications are generally not included unless they are determined to be essential to the decision making process.

(4) Essensiality is determined by the CERCLA lead agency, LANTDIV NAVFACENGCOM, and as a result many documents on the ARF citing references and enclosures within the basic document deemed essential are not themselves considered essential and are not available from the originator or even the addee upon request. If the originator of a document, considered essential in the decision making process and now placed in the ARF, thought it necessary to cite references

ther later deletion as being "non-essential" and left out of the Admin Record represents a diminution of knowledge and lessens the value of the AR to the public.

While I have utilized the other websites noted, in addition to the ARF, none of them provided the responses to the inquiries I have made over the past eighteen months of MCB, LANTDIV, EPA 4, USGS, NARA, NPRC, NCDENR, ATSDR, NEHC, SECNAV, SECDEF, Bumed - to mention a few.

If one desires a cursory look at the contamination event, essentially an epoch, from the USMC viewpoint or data supporting the decision making process of the Installation Restoration Program then the websites cited are the places to look.

I shall keep your encouragement to utilize same in mind.

Respectfully Submitted,

[redacted]

MAJOR, USMC (Retired)

cc: Chairman Levin, Senate Committee on Armed Services w/o encl..
Office of the General Counsel, LANTDIV w/o
HQMC (LFL) w/o enclosures.

Enclosures: (1) AWWA Fact Sheet Chlorine Disinfectants/Disinfectant By-Products (DBPS) (2)

(2) AWWA Fact Sheet: Trihalomethanes

(3) AWWA Release: "California Study suggests Disinfection By-Products may Affect Pregnancies" 10 Feb 1998

(4) AWWA News Relase: "Water Providers Put Toughest Contaminants in the Cross Hairs", 7 Nov. 2000

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ChlorineDisinfectants/Disinfectant By-Products (DBPs)

- Chlorine is a naturally existing element that has been used to disinfect drinking water supplies in America for most of the 20th Century.
- Chlorine disinfection has been extremely effective in protecting drinking water resources from bacterial and viral contamination. It has virtually wiped out instances of water-borne diseases like typhoid fever, cholera and dysentery in America and other developed countries.
- Over 200 million Americans currently drink water that has been disinfected.
- The three primary chemical agents used in chlorine disinfection are: free chlorine, chloramine (chlorine and ammonia bonded together) and chlorine dioxide (chlorine and oxygen bonded together).
- Ozone is also used to disinfect water.
- Disinfectants are very active compounds. When added to a water supply, disinfectants not only kill bacteria and viruses, but also react with other chemicals present in the water. These chemicals generally enter the water supply through natural plant and soil breakdown.
- When disinfectants react with other chemicals, new compounds known as disinfectant by-products or "DBPs", are created. DBPs associated with chlorine disinfection include trihalomethanes (THMs), such as chloroform.
- Because chlorination has been used for almost 100 years to disinfect water supplies, approximately 40 percent of the DBPs from chlorination have been identified and researched. Much less is known about the kind of DBPs produced by other disinfectants because of their relatively recent emergence.
- Use of chloramine or chlorine dioxide in chlorine disinfection produce fewer DBPs than chlorine, but have associated risks. Chloramine is not as strong a disinfectant as chlorine, and disinfection with chlorine dioxide produces its own DBPs.
- Animal research using high concentration of DBPs found increased occurrence of cancer development, although why this occurs has not yet been determined. Research on the relationship between DBPs and cancer and other health risks is ongoing.
- American drinking water has **very low** concentrations of DBPs.
- The U.S. Environmental Protection Agency (USEPA) has **not** been able to link exposure to DBPs at low concentration levels and the health risks associated with high concentration level exposure.
- Since 1984, American drinking water utilities have spent almost $23 million researching the production of DBPs, the risks posed by them and methods to treat them. These research efforts are ongoing. In addition, the 300 largest drinking water utilities have spent more than $150 million to conduct the information gathering required by the Information Collection Rule (ICR). The ICR is the largest study to date pertaining to the occurrence of DBPs and associated treatment practices.
- Since 1979, the U.S. Environmental Protection Agency (USEPA), under the authority of the Safe Drinking Water Act, has regulated the acceptable levels of

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some DBPs. USEPA cites the large population of Americans potentially at-risk from low-level DPB exposure as the impetus for regulation.

- The Safe Drinking Water Act Amendments of 1996 required USEPA to comply with the regulatory timeline it set forth in its initial Disinfectant and Disinfectant-By-Product (DDPB) rule and Interim Enhanced Surface Water Treatment Rule (IESWTR). USEPA proposed both in 1994.
- Because the research on DBPs and their impact on public health continue, and because serious questions about the actual health risks posed by DBPs still remain, the increased.
- Stage 1 of the DDBP rule establishes the following course of action:
  - Establishes a goal of completely removing four particular THMs from American water supplies.
  - Reduced the acceptable level of total THMs by 20 percent.
  - Introduced a new group of DBPs, haloacetic acids (HAA5), for regulation.
  - Requires water suppliers to reduce levels of total organic carbon, which reacts with disinfectants to make DBPs.
  - Requires the levels of disinfectants in water after disinfection to be reduced.
- Stage 2 of the rule has not yet been promulgated, but USEPA and stakeholders began work on the rule in late 1998. Stage 2 must be finalized by 2001.

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Charles W. Berberich, Webmaster
Torey Lightcap, Deputy Webmaster

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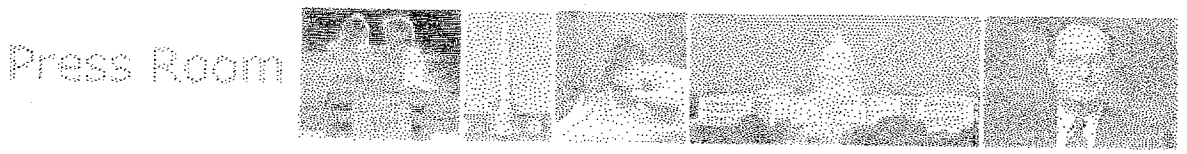

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Trihalomethanes (THMs)

- Chlorine is added to public water supplies throughout America and around the world to disinfect them. The primary agents used in chlorine disinfection are: free chlorine (chlorine alone), chloramine (chlorine and ammonia) and chlorine dioxide (chlorine and oxygen).
- Chlorine disinfection has been extremely effective in limiting the outbreaks of such water-borne diseases as typhoid fever, dystentary and cholera, virtually negating them from water supplies in America.
- Chlorine is a very active element. When added to a water supply it does not only disinfect it, but reacts with other chemicals in the water. These reactions create new compounds known as disinfectant by-products or "DPBs".
- An example of DPB production occurs when organic acids from decaying vegetation find their way into water supplies. When these acids react with a chlorine agent, the reactions produce new compounds, known as trihalomethanes or "THMs".
- THMs are linked to a number of serious health risks. Some are believed to cause cancer. One common THM, chloroform, is believed to retard fetus growth.
- The health risks posed by low concentrations of THMs, such as the levels found in drinking water, are unknown.
- In 1979, the U.S. Environmental Protection Agency (USEPA) imposed regulations reducing the acceptable levels of THMs in American water systems that served more than 10,000 consumers.
- The Safe Drinking Water Act Amendments of 1996 required USEPA to reduce the levels of a number of DPBs, including THMs. USEPA must have regulations to this effect in place by 2002.
- Since the health risks linked to the low-level concentration of some DBPs are unclear and the research on this issue is ongoing, USEPA decided to implement the new rules in two stages. Stage 1 was announced by USEPA in late 1998. Stage 2 has yet to be promulgated, but work on it began in late 1998.
- In Stage 1, USEPA reduces the acceptable level of total THMs in all American water systems. It also sets goals to zero out concentrations of four particular THMs, including chloroform.

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Torey Lightcap, Deputy Webmaster
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February 10, 1998

California Study Suggests Disinfection By-Products May Affect Pregnancies

AWWA Recommends Awareness and Calls for More Research

(Denver, Colo.) -- "Protecting public health is the first priority of North American community water systems," announced Bevin A. Beaudet, president of the American Water Works Association, in response to a California study which suggests a link between drinking water containing a disinfection by-product called trihalomethanes (THMs) and instances of miscarriage. THMs in drinking water are formed when chlorine or other disinfectants -- essential to public health -- react with naturally occurring organic matter in the water.

"Although we have not yet seen the complete study, we take it very seriously. We are particularly troubled about the potential connection between any disinfection method and risk to public health. Since we began disinfecting water at the turn of the century, waterborne diseases such as Typhoid and Cholera have been virtually eliminated. That is why any link between disinfectants we use to treat water and negative effects to public health is especially disturbing and of great concern to water utilities everywhere," said Beaudet.

AWWA member utilities are currently working with the US Environmental Protection Agency (USEPA), collecting detailed occurrence and treatment information that will be used as the foundation for future disinfection by-products standards.

Research on THMs and other disinfection by-products has been under way since the early 1970s. The AWWA Research Foundation alone has spent over $140 million on drinking water research in the last decade, the largest expenditure in drinking water research in the world.

"AWWA strongly supports the study's recommendation for more research," Beaudet added. "For several years, water suppliers have taken steps to reduce THM levels in tap water and

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ensure safe drinking water to the public. Our member utilities will continue to take such steps consistent with the important requirements to maintain adequate disinfection.

"As an association that is dedicated the safety of the nation's drinking water, we believe that the California scientific study merits public notice," said Beaudet. "Further, if pregnant women feel uncomfortable in any way with the findings of the study, we recommend they consult their personal physician for advice."

The American Water Works Association - founded in 1881 and headquartered in Denver, Colorado - is the world's leading authority on drinking water. Our 54,000 members include scientists, engineers, environmentalists, public health experts, educators and water managers throughout the United States, Canada and Mexico.

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AWWA News Release

What's New

FOR IMMEDIATE RELEASE:
November 7, 2000

CONTACT: Doug Marsano
303-347-6138

WATER PROVIDERS PUT TOUGHEST CONTAMINANTS IN THE CROSS HAIRS

New Rule Offers Unprecedented Quality Protections for Community Drinking Water

(Washington, D.C.)- American tap water providers today agreed to implement rigorous new protections against Cryptosporidium and disinfection by-products (DBP's) in drinking water. The new protections are part of a plan developed after almost two years of negotiations with the U.S. Environmental Protection Agency and others.

"For almost a century, American water providers have been committed to providing safe, affordable drinking water to consumers, " said American Water Works Association Executive Director Jack Hoffbuhr. "Today, water providers have confirmed that producing high quality drinking water and protecting public health will continue to be their highest priorities."

"The agreement represents a high water mark for public health protection," added Diane VanDe Hei, Association of Metropolitan Water Association Executive Director. "It will guide water systems in their efforts to protect consumers from Cryptosporidium and other waterborne pathogens and reduce chemical byproducts."

Under the agreement, water providers will increase monitoring for Cryptosporidium and produce a removal plan drawing from a number of options, such as improved source water protection, alternative disinfection methods and more thorough filtration. Water providers will also intensify monitoring efforts to ensure more accurate readings for DBP's and reduce DBP concentration in their water supplies by 20 to 35 percent. AWWA estimates the rule will cost water utilities over $5 billion in capital investments and $300 million annually in operations costs.

The protections take aim at two of the most troublesome contaminants challenging community drinking water quality. Cryptosporidium, a potentially lethal parasite, is encased in a hard outer shell, making it very resistant to traditional chlorine-based drinking water disinfection. DBP's, which animal research suggests may lead to a number of serious health ailments, are formed during the chlorine disinfection process. Chlorine disinfection is the nation's most trusted and widespread means of disinfection, protecting the drinking water supply of 200 million Americans from bacterial and viral contamination. The technique is responsible for the eradication of waterborne diseases including cholera, dysentery and typhoid from the American population. Although researchers have produced conflicting results on the dangers DBP's pose to human health, water providers have nevertheless been searching for sensible ways to reduce DBP levels in tap water given the significant number of Americans relying on chlorinated water supplies.

"This agreement is an excellent example of the willingness of the water industry, in partnership with government and interested stakeholders, to take prudent actions to enhance the protection offered to water customers, even when the scientific research does not provide unequivocal answers or solutions," concluded Peter Cook, Executive Director of the National Association of Water Companies.

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The American Water Works Association and its 57,000 members work to assure a safe, sufficient supply of drinking water for the people of the United States, Canada, and Mexico. The group leads efforts to advance the science, technology, consumer awareness, management, conservation, and government policies related to drinking water. For additional information please contact Doug Marsano at (303) 347-6138, or visit our Web site at www.awwa.org.

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