Exhibit # 14

Summary of Investigation

Marine Corps Base, Camp Lejeune

U.S. Environmental Protection Agency
Criminal Investigation Division

1. INTRODUCTION

1.1 Officials contributing to this summary.

The following individuals have participated in this investigation and contributed to this summary:

Special Agent
US Environmental Protection Agency
Criminal Investigation Division
Charlotte Resident Office

Senior Criminal Enforcement Specialist
US Environmental Protection Agency
Criminal Investigation Division
Atlanta Area Office

P.H.
Consultant, US Department of Justice
US Environmental Protection Agency, retired
Atlanta, GA

1.2 Format of this summary.

For approximately a year the EPA CID has conducted an investigation based upon numerous allegations that federal law was violated by individuals and entities connected with contaminated drinking water on Marine Corps Base, Camp Lejeune, (Camp Lejeune) beginning in the early 1980s through 2004. Based upon the evidence and information compiled in this investigation, the EPA CID has referred this case for prosecutorial input by the US Department of Justice.

During the course of this case, questions have been consistently posed to the investigation from various sources: members of congress, military and civilian witnesses, EPA management, and

victims. As a result, the format of this summary reflects many of these questions with brief written responses. These questions and responses were determined to be the most relevant to this investigation and potential violations of federal law. This summary has been divided into two sections: an investigation into the actions of US Marine Corps (USMC) military and civilian employees at Camp Lejeune, and an investigation into actions taken by employees of the Agency for Toxic Substances and Disease Registry (ATSDR).

In addition to addressing criminal culpability, investigators also broadened the scope of their investigation to answer several questions particularly relevant to this case, but determined not to be violations of federal law.

Concurrent with this EPA CID investigation, the Commandant of the United States Marine Corps (USMC) issued a charter March 18, 2004, forming the Drinking Water Fact-Finding Panel for Camp Lejeune. This Panel completed an independent review of the facts surrounding the decisions made following the 1980 discovery of volatile organic compounds in drinking water at Camp Lejeune. This Report was provided to the Commandant and the EPA CID in early October 2004. This Report was reviewed during this investigation and copies were provided to the US DOJ to assist in their review of this investigation. Many of the same records, persons and concepts considered and interviewed by the Panel were also examined by the EPA CID. As a result, specific sections of the Panel's report are sometimes referred to in this summary. Further, during the course of this investigation, . spoke briefly with a contract investigator for the Panel on his findings. In this summary, details from a few subject interviews conducted by this investigator are referenced.

Finally, officials reading this summary will need to have an understanding of the details surrounding the contaminated drinking situation at MCB-CL and federal environmental regulations to properly access the information provided in this summary.

Attachments to this summary include:

TTHM Surveillance Report Forms for MCB-CL (4 Forms)

Grainger Laboratories Letter dated August 10, 1982

1.2.1 Investigation into the USMC.

The USMC maintains Marine Corps Base, Camp Lejeune (MCB-CL) in Jacksonville, NC. While this case initially targeted any component within the Marine Corps hierarchy with connection to the contaminated drinking water issue, further evaluation determined only three entities may be subject to criminal liability. The three entities are: the civilian employees within Camp Lejeune's Natural Resources and Environmental Affairs Division (NREAD); the direct military hierarchy to the NREAD, to include the Assistant Chief of Staff (AC/S) Facilities, the Chief of Staff and the Commanding General; and, the civilian employees of the Naval Facilities Engineering Command Atlantic Division (LANTDIV).

The principle allegations investigated in regard to the Navy and USMC were:

A. Violations of the Safe Drinking Water Act (SDWA),

B. Conspiracy to violate the SDWA,

C. Conspiracy to conceal records and prevent persons from talking with a federal agency conducting a congressionally mandated health study,

D. Conspiracy to conceal (FOIA) records from the public,

E. Providing material false statements to a federal law enforcement officer.

1.2.2 Investigation into the ATSDR.

Concurrent with the congressionally mandated health assessment for Camp Lejeune in 1997, the ATSDR began a series of public heath related assessments and studies to explore the potential link between contaminated drinking water and human health. Several investigators have lead the

research with oversight by managers in the Division of Health Studies. During the course of their research, these lead investigators have entered into dialogue with members of the public connected with the contaminated drinking water matters at Camp Lejeune. It was through this dialogue that certain citizens learned of and alleged to investigators potential criminal misconduct within the agency, specifically the destruction of Agency records in violation of record retention policy. Further, these citizens alleged a failure by the ATSDR to properly address the contaminated drinking water matter at Camp Lejeune based upon influence from the Navy. Only employees within the Division of Health Studies with responsibility for Camp Lejeune were investigated for misconduct.

The principle allegations investigated in regard to the ATSDR were:

A. Destruction of a federal agency's records,

B. Conspiracy to improperly administer a congressionally mandated health study.

1.3 Why did the EPA CID open a criminal investigation?

In September of 2009, a series of factors contributed to the information considered prior to opening a criminal investigation. First, private citizens had contacted numerous government agencies (DOJ's Environmental Crimes Section in Washington, DC; US Attorney's Office in Raleigh, NC; the EPA's CID Headquarters in Washington, DC; and, the EPA CID Atlanta Area Office), alleging violations of federal law and requesting an investigation be conducted. Second, members of Congress had been contacted by many of the same private citizens, specifically the Offices of Senator Jim Jeffords (I-VT), Senator Elizabeth Dole (R-NC), Senator John Warner (R-VA), Congressman John Dingle (D-MI). Staffers from various congressional offices inquired with the EPA CID. Finally, print and television news reporters contacted the EPA CID to both inquire into the matter and provide information supporting potential federal violations.

1.3.1 Investigative Discretion.

The EPA Exercise of Investigative Discretion Memo (January 12, 1994) states,

"The criminal case selection process will be guided by two general measures - significant environmental harm and culpable conduct."

The threat of significant harm to the environment and human health was demonstrated by the actual release of industrial solvents into the groundwater by sources on Camp Lejeune and the off-base dry cleaner, ABC Cleaners. This reality has been long established by the EPA and culminated in Camp Lejeune being placed on the National Priorities List (NPL) in 1989. Further, the ATSDR had committed to a public health study investigating the ill health effects children that were exposed *in-utero* may have suffered from mothers that consumed contaminated drinking water.

The illegal conduct alleged by the private citizens concerned the concealment of records connected with the contaminated drinking water on the base by the USMC from the public and the ATSDR via its request(s) for data. Further, documents received by the citizens via Freedom of Information Act (FOIA) requests to the military, indicated Camp Lejeune officials had knowledge the drinking water on the base was contaminated and they failed to prevent it from being consumed.

In regard to employees at ATSDR, it was alleged that an order was made by a manager within the Division of Health Studies to a subordinate employee to destroy Agency case file records related to the Camp Lejeune health study. This allegation was considered to be deliberate misconduct by a public official.

Finally, this case initially exhibited six case factors EPA CID considers significant: serious government or government contractor misconduct, congressional interest or inquiry, serious public health threat, fatality or serious injury, national media issue, headquarters request.

1.4 Why has this investigation been referred to the DOJ?

The Department of Justice has forwarded several allegations from the public to the EPA CID since 2003, for investigation. This report addresses those allegations.

The EPA CID has investigated the allegation that the USMC and components thereof, have conspired to conceal data and prevent persons from exposing the details surrounding the discovery of volatile organic compounds (VOCs) in the drinking water of Camp Lejeune in the early 1980s. Investigators have been unable to substantiate that a conspiracy by military and/or civilian employees of the USMC exists.

The absence of substantive environmental violations has made this criminal investigation difficult. The absence of enforceable regulatory standards for both PCE and TCE between 1980 and 1985, provided no violation of the SDWA in this period of time related to these solvents. In this regard, even a statute of limitation is not relevant. However, the unique 25 year history, the complexity of this case, DOJ expertise and an evaluation of subject statements warrants prosecutorial input.

In regard to federal crimes committed by the ATSDR, prosecutors are asked to consider the circumstances surrounding

2. PRINCIPLE EVIDENCE CONSIDERED

An initial period of investigation and review was required to sort out and fully understand the numerous allegations and intricacies involved with investigating contaminated drinking water on a military base in the 1980s. In regard to Camp Lejeune, investigators eventually focused on the details, records, and persons connected to the TTHM sampling results generated by the US Army

Environmental Hygiene Agency in 1980-1981, and the Grainger Laboratories letter identifying the presence of TCE/PCE in 1982. The initial reaction to and decisions after having received these two sets of data by the military was investigated.

2.1 TTHM Surveillance Report Forms from the US Army Environmental Hygiene Agency

In 1974, Congress passed the Safe Drinking Water Act (SDWA) to address domestic drinking water supplies and the concern over organic chemicals and other pollutants. The SDWA was implemented in three phases, with phase one being the development of National Interim Primary Drinking Water Regulations (NIPDWR). These interim regulations became effective on June 24, 1977, with amendments to follow. TCE and PCE were not among the contaminants included in these interim regulations.

In the 1979 amendments the final regulations for the control of total trihalomethanes (TTHMs), which established an maximum contaminant level (MCL) in drinking water and provided for compliance and monitoring. This regulation required that certain water treatment systems begin mandatory monitoring of TTHMs by November 1982, and compliance with the MCL was required by November 1983. In preparation for TTHM compliance, the USMC began sampling its drinking water system in 1980. It would be this initial sampling by the USMC that led to the identification of volatile organic compounds (VOCs) in drinking water at Camp Lejeune.

In 1980, Camp Lejeune drinking water was extracted from approximately 100 individual groundwater wells, treated in eight treatment plants (Tarawa Terrace, Hadnot Point, Holcomb Boulevard, Courthouse Bay, Rifle Range, Onslow Beach, Montford Point, and New River), and provided to residents through a network of distribution pipes (See Panel's Report, Attachments H, I, K). These eight treatment/distribution systems were designed to operate independently, although several connections were provided in the event of emergency.

In October 1980, Camp Lejeune initiated voluntary TTHM sampling of the Hadnot Point and New River water distribution systems in anticipation of the November 1982 deadline. At this time, the Naval Facilities Engineering Command Atlantic Division (NAVFAC) served in an advisory role to Camp Lejeune and facilitated implementation of the SDWA compliance program at the base. LANTDIV arranged for the analysis of the water samples, which were performed by the US Army Environmental Hygiene Agency (USAEHA) laboratory in Fort McPherson, Georgia, and a private contractor, Jennings Laboratories. LANTDIV scheduled monthly sampling and analysis of the Hadnot Point and New River water distribution systems from October 1980 through December 1981. The objective of sampling the water systems at Camp Lejeune and other Marine Corps facilities was to evaluate TTHM levels prior to scheduled implementation of regulatory requirements.

On October 21, 1980, the Camp Lejeune conducted TTHM sampling of the Hadnot Point and New River water distribution systems. USAEHA laboratory personnel developed TTHM Surveillance Reports to record the TTHM analytical results, which were submitted to LANTDIV. The October 1980, December 1980, January 1981, and February 1981 TTHM Surveillance Reports indicated that water samples collected during these months were highly contaminated with chlorinated hydrocarbons that interfered with TTHM analyses. These results were the first indication that chlorinated hydrocarbons were present in the drinking water systems at Camp Lejeune. (Refer to US Army Environmental Hygiene Agency TTHM Surveillance Report Forms).

Both LANTDIV and Camp Lejeune received copies of these TTHM Surveillance Forms, which included hand written references to organic interferences. Neither staff at LANTDIV nor Camp Lejeune, specifically the Natural Resource and Environmental Affairs Division (NREAD), related these results and organic interferences to a source. Both the Panel and the EPA's investigators looked into the details surrounding these TTHM Surveillance Forms at both LANTDIV and Camp Lejeune. In order to put these details in context, both the Panel and the EPA's investigators also researched the regulatory framework, the standard industry water supply

practices, and the level of expertise at LANTDIV and Camp Lejeune in 1980.

In regard to the staff of the NREAD, this investigation found that: the absence of regulatory standards; inconsistent sampling results attributable to a multi-well system; a lack of understanding of the operating parameters of the water distribution system; a compliance based approach to regulations; a lack of communication with military, federal, or state environmental and health agencies; and, the lack of expertise for toxicology and public health prevented the NREAD from properly addressing the organic interferences. The absence of enforceable regulations for the solvents found to cause the organic interference provided no violation of the SDWA. This investigation found no conspiracy by the staff of the NREAD to intentionally violate the SDWA or conceal any data related to the TTHM Surveillance Forms.

In regard to the staff of the LANTDIV this investigation found that: the absence of regulatory standards; a compliance based approach to regulations; a lack of communication with military, federal, or state environmental and health agencies; and, the level of expertise for toxicology and public health most likely prevented the LANTDIV from properly addressing the organic interferences. The absence of enforceable regulations for the solvents found to cause the organic interference provided no violation of the SDWA. This investigation found the staff of the LANTDIV was not forthcoming when questioned about the TTHM Surveillance Report Forms. It is not clear to what extent the LANTDIV addressed the organic interference issue in 1980-1981, since every LANTDIV employee interviewed denied knowledge of the interference issue.

2.2 Analyses of samples from Grainger Laboratories (August 10, 1982) for Tarawa Terrace and Hadnot Point

In February 1982, LANTDIV directed Camp Lejeune to begin TTHM monitoring using a laboratory certified by North Carolina. Camp Lejeune initiated sampling in April 1982, using Grainger Laboratories, which summarized in reports TTHM tests performed on samples taken at

various points in the base's water supply system. No individual wells were sampled. Chemist at Geraghty Laboratories directed these reports to the in the NREAD.

The base collected monthly samples from eight Camp Lejeune drinking water systems in April, May, June, and July 1982. Geraghty contacted by phone on May 6, 1982 to inform her that interferences from chlorinated hydrocarbons were apparent during the analysis of water samples from the Tarawa Terrace and Hadnot Point water systems.

In July 1982, base personnel collected additional water samples from the Tarawa Terrace and Hadnot Point drinking water systems for analysis by Geraghty to identify the suspected chlorinated hydrocarbons. At this time, Geraghty also analyzed water samples it had retained from May 1982 TTHM sampling event to identify the specific chlorinated hydrocarbons detected in previous analyses. In August 1982, Camp Lejeune received analytical results that quantified TCE and PCE concentrations (Refer to Geraghty Laboratories Letter - August 10, 1982). This letter from Geraghty Labs was addressed to the Commanding General and was meant to get the attention of Camp Lejeune.

Like the organic interference issue, attempted to identify the source of the TCE and PCE concentrations indicated by Geraghty. In regard to the staff of the NREAD, this investigation found that: the absence of regulatory standards; inconsistent sampling results attributable to a multi-well system; a compliance based approach to regulations; a lack of communications with military, federal, or state environmental and health agencies; and, the level of expertise for toxicology and public health prevented the NREAD from properly addressing the TCE/PCE contamination. However, with a clear indication solvents had contaminated drinking water systems on Camp Lejeune, and NREAD failed to properly investigate the contamination and determine the contamination was coming from individual groundwater wells. The absence of enforceable regulations for TCE and PCE provided no violation of the SDWA. This investigation found no

conspiracy by the staff of the NRRAD to intentionally violate the SDWA or conceal any data related to the Grainger Letter or TCE/PCE.

In regard to the staff of the LANTDIV, this investigation found that LANTDIV, as a technical advisory organization to Camp Lejeune, was not diligent in providing technical expertise to the NRRAD. The absence of enforceable regulations for the solvents found to cause the organic interferance provided no violation of the SDWA. As previously mentioned, this investigation found the staff of the LANTDIV was not forthcoming when questioned about the solvents identified in the 1982 Grainger Laboratories letter.

2.3 How the contaminated wells came to be shutdown.

The Navy Assessment and Control Installation Pollutants (NACIP) Program was initiated at Camp Lejeune in January 1982 with an Initial Assessment Study (IAS). During the IAS, 75 potential contaminated sites were identified at Camp Lejeune, and of those, 22 were considered priority sites that required further study. In July 1982, Camp Lejeune initiated the NACIP Confirmation Study. The Confirmation Study included the sampling of any community water supply well in the vicinity of a priority site, such as Hadnot Point. This was significant, as prior samples were drawn at the water treatment plants or in the distribution system, not from individual wells.

In November 1984, Camp Lejeune received results of the NACIP investigation that revealed areas of environmental contamination. Based on a direct association established between contamination in the Hadnot Point system and VOCs (TCE/PCE) detected in the drinking water wells, water system operators began shutting down contaminated wells in Hadnot Point in November.

In January 1985, NRRAD recommended all drinking water wells be tested for VOCs. On February 8, 1985, two wells at Tarawa Terrace were closed in response to contamination detected in

these wells.

The NACIP program had been designed to identify the existence of any pollutants on and in the vicinity of Camp Lejeune. It was NACIP program's sampling that identified the TCE/PCE contamination in the individual drinking wells that lead to their closure by base command. Absent this sampling in 1984-85, it is not clear the contaminated wells would have been eventually identified by the NRRAD or LANTDIV.

3. INVESTIGATION INTO THE USMC

3.1 Why were the underground wells providing drinking water to Tarawa Terrace and Hadnot Point not tested for VOC's, like TCE/PCE, by Camp Lejeune following the publication of SNARLS by the EPA in 1979 and 1980?

A 1982 memorandum shows that in 1982, base personnel had a copy of EPA's SNARL for TCE, SNARL for PCE, and Suggested Action Guidance for PCE. These documents summarized the toxic properties, including cancer causing potential for humans, of each compound and provided safe, non-cancer levels for durations of exposure for as much as lifetime. While the SNARLS were not enforceable regulatory values, they informed the water supply industry, as well as State and local health authorities, of the potential dangers from drinking water containing TCE and/or PCE.

THE SUGGESTED NO ADVERSE RESPONSE LEVELS (SNARLS) FOR PCE AND TCE		
PERIOD	*PCE*	*TCE*
1-Day	2900 ppb	2000 ppb
10-Days	175 ppb	200 ppb
Chronic	20 ppb	75 ppb

At Camp Lejeune, the first (and only prior to late 1984) quantitative levels of TCE/PCE interferences were received by the NREAD in August 1982.

GRAINGER LABORATORIES RESULTS AUGUST 10, 1982		
LOCATION	*PCE*	*TCE*
Tarawa Terrace WTP	76 ppb	-
Tarawa Terrace WTP	82 ppb	-
Tarawa Terrace WTP	80 ppb	-
Tarawa Terrace WTP	104 ppb	-
Hadnot Point WTP	< 1	19 ppb
Hadnot Point WTP	< 1	21 ppb
Hadnot Point WTP	15	
Hadnot Point WTP	1.0	No data

SUMMARY OF GRAINGER LAB SAMPLES MAY 1982 TO SEPTEMBER 1985		
MONTH	*LAB RESULT*	*COMMENTS*
May 1982	No interference noted	Telephone call about VOC's
July 1982	No interference noted	
[redacted]		
September 1982	No interference noted	
October 1982	No interference noted	
December 1982	TCE/PCE interference noted	No quantitative levels
January 1983	No interference noted	
September 1983	TCE/PCE interference noted	No quantitative levels

Because Camp Lejeune was in compliance with TTHM regulations, it appears no additional sampling occurred from September 1983 until mid-1984, when the NACIP program began testing wells. Both and , NREAD, would agree that more targeted water sampling should have occurred.

On June 12, 1984, EPA proposed rules for Volatile Synthetic Organic Chemicals (VOC's) with proposed MCLs. The EPA did not pass enforceable regulations for TCE until 1989, and for PCE until 1991. The absence of enforceable regulations between 1980 and 1985, provides no federal SDWA violation. The contaminated wells were shutdown in late 1984 and early 1985.

The Panel concluded there were confounding factors that appeared to have hindered Camp Lejeune personnel from quickly recognizing the significance of the VOC contamination. Factors

cited were: the absence of regulatory standards, no records of resident complaints about water quality, sampling errors, and inconsistent sampling results attributable to a multiple-well system that diluted or masked evidence of significant contamination from any one source.

Based upon interviews with NRRAD employees, namely [redacted] the "inconsistent sampling" appears to have been foremost in their minds at the time. They were unable to reproduce high readings, but more importantly were never able to appropriately identify any potential sources (point cans, sampling errors, asbestos piping) that caused the interference. For example, on May 27, 1982, the highest TCE reading (1,400 ppb) came from samples drawn from the Hadnot Point distribution system. However, three other samples drawn from the same distribution system (HP) in May averaged 20 ppb. In retrospect, it appears clear the multiple-well rotation system contributed to the inconsistent VOC sampling results or anomalies because the VOC concentration in the samples would fluctuate depending upon the wells that were in operation at the time. Until 1984, NRRAD personnel never sampled individual wells, as opposed to finished drinking water at the water treatment plants. Self-admittedly, this was the most significant lapse in judgement.

During an interview with a former Camp Lejeune Head of Facilities, he suggested that a current parallel to the "organic interference issue" the NRRAD faced in the 1980s, may be likened to MTBE. Methyl Tertiary Butyl Ether or MTBE has been used since 1979 to replace lead as an octane enhancer in vehicles. As more and more drinking water sources exhibit the presence of MTBE, there is great concern over the potential health risks for its consumption. MTBE is on the EPA's Contaminant Candidate List for which EPA considers setting standards. The fact that the regulatory and scientific community gradually set exposure standards or provide specific guidance to the drinking water community is like the growing knowledge base TCE and PCE experienced through the 1970s and 80s. Will we someday look back and ask why we even used MTBE and allowed people to consume any level of it? Today we enjoy the benefit of mass communication through the internet. [redacted] and [redacted] did not have this luxury in the early 1980s.

3.2 When was the first time VOCs were detected in any of the drinking water systems?

The TTHM Surveillance Report Forms received from the US Army Environmental Hygiene Agency in 1980-1981, appear to be the most significant indication of VOCs. Both the NRRAD personnel and records corroborate this. There was one early sample in October 1980 by Jennings Lab that was a single composite of all drinking water systems to identify priority pollutants, which showed various VOCs at the detection level.

3.3 Why was no extensive sampling and analysis ordered when the US Army Hygiene Agency's TTHM's Surveillance Report Forms (1980) stated there was "heavy organic interference" and "you need to analyze for chlorinated organics by gc/ms?"

The NRRAD did investigate the potential source(s) for the organic interference, but never linked it to contaminated wells. With the TTHM results for the most part in compliance and sporadic interferences, the NRRAD appears to have been satisfied with monitoring the situation. The Panel also addressed this in 3.4 Detailed Findings #4-5, page 42.

The LANTDIV personnel generally acknowledge the USAEHA's TTHM Surveillance Report Forms, but not the comments specifying "organic interferences." LANTDIV personnel consistently steered away from admitting any knowledge of "organic interference" from solvents.

3.4 What was the technical expertise (analytical chemistry, toxicology, public health) of Camp Lejeune's Natural Resources and Environmental Affairs Division (NRRAD) from 1980-1985?

The NREAD had education and experience in analytical chemistry, biology and forestry. The NREAD had acquired knowledge and were gaining experience in environmental regulation as it became pertinent. The NREAD maintained no staff employees with training or experience in toxicology or public health.

3.5 What was the technical expertise (analytical chemistry, toxicology, public health) of LANTDIV from 1980-1985?

LANTDIV maintained expertise and training in analytical chemistry, environmental engineering and environmental compliance and regulation. The training and experience at LANTDIV appears to have been better suited to recognize and address VOC contamination and the potential effect(s) on public health than NREAD. Both the NREAD and LANTDIV claimed knowledge and access to public health counterparts, but neither seemed to employ a regular working relationship.

3.5.1 What was LANTDIV's responsibility for directing regulatory compliance and environmental leadership at USMC installations in the 1980s?

LANTDIV personnel consistently stated they only "advised" Camp Lejeune on regulatory issues. According to LANTDIV, they maintained no enforcement authority by design. Both LANTDIV and Camp Lejeune appeared to be regulatory driven, concentrating all efforts on legal compliance with the existing regulations.

While LANTDIV personnel insist they maintained strictly an advisory role, the employees at Camp Lejeune that worked with LANTDIV, such as NREAD employees, looked to LANTDIV for expert analysis and direction. In the early 1980s, any verbal or written suggestions or directives by

LANTDIV were interpreted by Camp Lejeune employees to be in essence orders. This investigation revealed a disconnect between the way in which LANTDIV and Camp Lejeune viewed LANTDIV's responsibility for directing regulatory compliance and environmental leadership. Based upon the educational background of its employees and the apparent oversight responsibility within the Navy structure, the LANTDIV appears to have been designed to direct regulatory compliance and environmental leadership.

3.6 Did Camp Lejeune officials provide residents with drinking water at a level of treatment consistent with general utility practices of 1980-1985?

Science and regulatory history

The first organic substances in drinking water to be regulated under the Safe Drinking Water Act of 1974 were six pesticides and herbicides. The major concern was carcinogenic contaminants found in surface water sources of drinking water supplies. Research on carcinogenic chemicals during this period included volatile organic chemicals (VOCs) initially of concern relative to inhalation exposure in occupational settings. The National Cancer Institute published in 1976 its finding of trichloroethylene (TCE) and tetrachloroethylene (PCE) carcinogenicity in animal models. In 1977, the National Research Council (NRC) of the National Academy of Sciences began the publishing of a series of reports on Drinking Water and Health. In 1980 under the Clean Water Act, the U.S. Environmental Protection Agency (EPA) developed Water Quality Criteria Documents for 64 toxic pollutants. The criteria were developed as guidance for states in developing surface water quality standards. The NRC Reports and the Criteria Documents included information on currently available chronic toxicity data (mostly animal cancer data) for TCE and PCE and other VOCs.

The emerging toxicity data on organic chemicals in water prompted a number of surveys of their occurrence in drinking water supplies. At the federal level, the National Reconnaissance Survey was conducted in 1975 and the National Organics Monitoring Survey in 1978. Many states

conducted more intense surveys of supplies within their borders. Organics including VOCs were detected in many surface and ground water supplies. During this period of the 1970s, the EPA began the process of data gathering and regulating a broad range of organic substances including many VOCs in drinking water. The first VOC regulation in drinking water promulgated in November, 1979 established a maximum contaminant level (MCL) for total trihalomethanes. Most of the contaminant levels of the four chemicals that comprised the total trihalomethanes are created within the water treatment plant by the chlorination process. Regulation of VOCs present in the source waters began in March, 1982 with the Federal Register publication of an Advanced Notice of Proposed Rule Making for eight VOCs in drinking water. Proposed regulatory limits for TCE and PCE were published in 1984 and the final limits were promulgated in 1987 for TCE and in 1991 for PCE. Prior to the publication of the regulatory documents, EPA had released non-regulatory Suggested No Adverse Response Levels (SNARLS) for TCE in 1979 and PCE in 1980. These SNARLS were to serve as guidance on protective levels for non-carcinogenic risks from drinking water exposure extrapolated from inhalation studies in animal models. At some point prior to 1984, the California Department of Health Services set action levels for TCE and PCE in drinking water at the lowest level discussed in EPA's SNARL documents, i.e., 5 ppb and 4 ppb, respectively. Subsequent non-regulatory guidance from EPA's Office of Drinking Water included 1987 Health Advisories for TCE and for PCE. These documents provided information regarding then current information on their toxic properties and safe levels in drinking water.

Drinking water treatment practice

Basic components of municipal water treatment came into use in this country around the turn of the 20th century. River water was the source of drinking water for most large U.S. cities. These source waters often contained bacterial pathogens in high numbers from raw sewage, packing houses and other sources. Waterborne infectious disease was common rising to epidemic level from time to time. Processes to reduce the turbidity of source water were introduced around 1905 and chlorination was introduced soon afterward. Both water treatment processes yielded remarkable reductions in waterborne disease. From this beginning, the approach of current conventional water

treatment practiced by most municipal systems that utilize surface water sources has changed very little. Particulate matter in water may contain embedded microorganisms or surface-attached organisms that can cause disease. The organic particulate matter may also interfere with the disinfecting capability of chlorine. Therefore, efficient and effective removal of particulate matter is a major objective of water treatment. Research in this area has yielded products that improve the clarification process and effective disinfection. However, the five steps of conventional water treatment for surface water remain the same: coagulation → flocculation → sedimentation → clarification (filtration) → disinfection.

Ground water sources of drinking water are not normally subjected to conventional treatment. The natural filtration process of ground water flow typically produces water of low turbidity, well within the turbidity standard. In addition, the typical deep-well source of groundwater has been believed to be generally free of toxic organic substances found in surface water. Disinfection for microbiological protection during distribution is often the only treatment. A lime softening step may be added for "hard" water. Sand filtration may be added when a more particle-free water is desired for esthetic reasons.

With improved analytical methods applied to water samples collected during federal and state surveys in the 1970s, a class of contaminant in "finished" water produced by surface and ground water treatment processes was observed. Synthetic volatile organic substances that are soluble in water had not been effectively removed. The frequency of TCE or PCE positive findings in the state and federal surveys ranged from 14 to 28% with most positive findings occurring in the northeastern states. When these findings were first observed, federal or state standards had not been established for VOCs in drinking water. Water providers were in a quandary as to the appropriate public health response to this newly-observed, generally low-level contamination.

Water treatment industry's response to VOC contamination

The American Water Works Association (AWWA) was founded in 1881 and is the largest organization of water supply professionals in the world. The association conducts training seminars, holds an annual meeting and produces a monthly journal. The journal publishes technical articles on drinking water issues from plant operation to cutting edge research as well as editorials from professional, regulatory and political leaders. It is "must reading" for anyone wishing to stay abreast of drinking water issues. Each issue contains articles in a Research and Technology section. Synthetic volatile organic contaminants were a frequent topic of these articles since conventional treatment practice was not effective in their removal and their presence in water had not been uniformly addressed by the regulatory and public health community. Problem assessment, individual plant experience and research results were frequent topics of journal articles.

Research on VOC removal from drinking water had indicated two approaches may be effective: (1) air stripping which transferred the volatile contaminant from water to air, and (2) adsorbing the volatile contaminants onto a matrix that was slap a filter or could be subsequently filtered from the water. Activated carbon either granular or powdered was reported to be the most practical absorbent. In 1978, the JAWWA published an article by the EPA Office of Drinking Water proposing a two part regulatory approach for VOCs, i.e., an MCL for total trihalomethanes and a granular activated carbon (GAC) treatment requirement to address all other synthetic organics contaminants. The GAC requirement approach was strongly attacked in a February, 1979 article in the JAWWA by the Coalition for Safe Drinking water, a coalition of 90 water utilities in the U. S. They preferred the development of an individual MCL for each contaminant *as health data became available*. Activated carbon had been used for many years by utilities on an as-needed basis to control taste and odor issues, usually an algal bloom problem. The coalition stated that no water system in the world is known to have used GAC treatment for "EPA's design criteria" and that the use of GAC for taste and odor control had little bearing on its efficacy to control organics. Ultimately, the EPA used the MCL approach to the regulation of individual VOCs in water.

Much of the debate over the use of GAC for control of organics in drinking water took

place in the out reach products of AWWA. GAC for organics was a major theme at the 1978 annual meeting of AWWA. At issue were the added cost of this treatment step, effectiveness, quality control and practical operation aspects and adequate sources of activated carbon. Necessity demanded a solution and major problems and issues have been resolved to the end that GAC use for organic removal has become a standardized treatment step in many municipal systems that have a known low-quality water source. Air strippers have also been used but usually for smaller ground water systems where VOC contamination is known and uncontaminated sources are not available. It has also been used as a remedial measure for contaminated aquifers. A significant disadvantage of this approach is the public health and regulatory concerns over ambient air transfer of the contaminants.

The heightened institutional concern for VOC contamination of drinking water derived from surface sources was not immediately applied to ground water. Articles on organic contamination of ground water had appeared in JAWWA from time to time in 1980 and 1981 publications. For example, an April, 1981 article in the Research and Technology section assessed the problem of TCE and methyl chloroform in ground water and stated that "groundwater pollution remains a problem of immense importance and only recently have methods been developed to help decontaminate polluted wells." However, it was not until August 1982, that AWWA dedicated an issue of its journal to organic contamination of ground water. This issue of the Journal included articles on the closing of private and municipal wells in California and Pennsylvania due to TCE contamination. It reported state and federal survey results that found TCE and PCE to be the most frequent organic contaminant in a high percentage of the wells surveyed. Articles discussed a 1981 paper by the White House Council on Environmental Quality titled Contamination of Ground Water by Toxic Organic Chemicals and an article on EPA's 1980 Proposed Ground Water Protection Strategy. Concern was building even though changes needed to address the issue generally awaited a regulatory requirement.

Water treatment practice at Camp Lejeune

The 2004 report of the Drinking Water Fact-Finding Panel for Camp Lejeune shows the water treatment process for drinking water produced at the Hadnot Point and Holcomb Boulevard treatment plants as follows: pre-chlorination → storage → lime softening → filtration → fluoridation → storage → distribution. This process was typical of ground water treatment during this period and more rigorous than many with the inclusion of a filtration step. No specific information was available on the filtration medium but the assumption is made that it was a rapid sand filtration system typical used in the treatment of surface water sources. The industry generally recognized by the early 1980s that this treatment process would not remove synthetic volatile organic contaminants. Surveys had found that such contaminants were present in a limited number of municipal ground water supplies around the country-- generally at part-per-billion levels. The health implication of this contamination was unclear as was an appropriate treatment method to remove the contaminants. The research data to address both issues were limited, uncertain and controversial during the late-1970s-early-1980s time frame. In addition, no state or federal regulatory limits had been established.

If optimally operated, these two Camp Lejeune water treatment systems would be considered appropriate and adequate in the early 1980s for producing a safe "in compliance" drinking water from deep ground water sources. More aggressive systems would have been aware of the published findings of current treatment failure to remove volatile organic contaminants, of survey information on VOC occurrence, and of the increasing interest in their health implications. Such systems may have sampled each of their supply wells for VOC contamination since migration of contaminants from nearby sources to deep wells had been reported for other locations. However, to pursue VOC contamination in the absence of regulatory safe levels could require the addressing of difficult cost and public relations issues. The water industry had presented only three remedial options -- (1) abandon the contaminated wells, (2) air strip the contaminants or (3) add a granular activated carbon treatment step with intense monitoring to determine effectiveness. Camp Lejeune assumed from its compliance record that it was distributing a safe drinking water and did

not pursue actions that may have brought that assumption into question. They were joined in this assumption by many water utilities around the country who awaited new regulations to spur them into action as did the 1979 trihalomethane regulation. However, one interesting fact must be noted. The ultimate decision by Camp Lejeune leadership to close 10 contaminated wells in 1984 and 1985 was made in the absence of MCLs or other regulations for the primary contaminants—TCE and PCE.

Also reference Panel's 3.4 Detailed Findings #1-2, page 40.

3.7 Did Camp Lejeune officials comply with existing water quality regulations between 1974-1985?

Drinking water provided by Camp Lejeune appears to have met all state and federal regulatory requirements in place during the 1980-85 time period. Drinking water regulations had been established for only a few *organic* substances, i.e. six pesticides (1976) and trihalomethanes (1979). Initial drinking water regulations (MCLs) for volatile organic chemicals (VOCs) including trichloroethylene were published in 1987. An MCL for tetrachloroethylene was promulgated in 1991.

Also see Panel's 3.4 Detailed Findings #1-2, page 40.

3.8 Did Camp Lejeune officials contact the State of North Carolina Water Quality Control Section or EPA when VOCs were detected in 1980-1982?

No. While the State maintained no enforceable standards and the EPA had only released SNARLs as guidance, no officials at Camp Lejeune recalled having sought guidance from the regulatory agencies to help interpret the organic interferences and presence of solvents.

3.9 Why did Camp Lejeune officials fail to immediately shutdown wells used for drinking water when they were notified explicitly of contamination due to VOC's by Grainger Laboratories in 1982?

Similar to 3.1. The NRRAD failed to recognize the groundwater wells were the source of contamination. As noted previously, this was arguably the greatest lapse in judgement.

3.9.1 How did Camp Lejeune handle the Grainger Letter (1982) upon receipt?

The best explanation of how a letter mailed to the Commanding General dealing with environmental issues was explained by stated this letter would have been routed through his office to NRRAD and not read until that point. expectation was the NRRAD would have addressed environmental concerns or recommendations backup through the chain of command.

3.10 The USMC Water Survey Chronology of Events (April, 1985) states, "Initial assessment study for Camp Lejeune is published and concludes that while none of the sites posed an immediate threat to human health or the environment, further investigation is warranted.." In light of the Grainger letter (1982), how can this be said?

To understand how this statement could have been made in 1985 it is necessary to look at how the water interference issue was being addressed and how the preliminary assessment was conducted. It appears that the two issues were being addressed by different groups and by different

methods. The organic contamination of the drinking water was being addressed by base staff from NREAD and base utilities. They were looking backward from the finished drinking water to find the source of contamination. Initially their focus was on other possibilities than the supply wells. The Initial Assessment Study, which was lead by LANTDIV, was an effort to find disposal and contaminated sites on the base that could have an adverse effect on human health or the environment. Most of the actual work was done by a contractor. The Initial Assessment Study is primarily a records search combined with visual assessment of the sites. It normally does not involve any sampling but will identify sites to be further investigated. It is unlikely, giving LANTDIV's denial of knowledge of the that the contractor who prepared the Initial Assessment ever saw the letter.

3.11 Was the Naval Facilities Engineering Command Atlantic Division (LANTDIV) aware of the drinking water samples revealing the presence of TCE and PCE prior to the NACIP related analyses generated in 1984?

The LANTDIV personnel generally acknowledge the USAEHA's TTHM Surveillance Report Forms, but not the comments specifying "organic interferences." LANTDIV personnel consistently steered away from admitting any knowledge of "organic interferences" from solvents. As noted in the subject write-up, the expectation(s) of the Navy's Shore Establishment, which incorporates LANTDIV, can most appropriately determine the degree to which LANTDIV failed to provide leadership and communication with installations like Camp Lejeune on environmental issues.

3.11.1 To what extent did LANTDIV address the TTHM report forms?

LANTDIV received the reports and most likely reviewed them for their compliance with TTHM regulations. There appears to be no effort or record of any attempt to address the VOC

commission into.

3.12 To what extent was either the Preventive Medicine Unit on MCB-CL or any component within the Navy's Bureau of Medicine and Surgery advised or involved in addressing the presence of VOC's in drinking water samples?

No formal request was made based upon review of the administrative record or interviews. The few instances NREAD employees discussed the presence of solvents with members of the PMU, it appears to have been with the field side of the Unit. This field side of the PMU was made of health technicians assigned to deployed battalions, brigades, or regiments. The health technicians were concerned with more common health threats such as STDs, bacterial contamination, and good sanitation practices. A second group within the PMU was housed in the naval hospital with a greater degree of expertise and education. This staff appears to have been most qualified to have addressed the public health aspect of VOC contaminated drinking water in the early 1980s. Investigators were unable to develop any evidence this group was contacted concerning the ground water contamination.

3.12.1 Did the PMU receive the Grainger letter?

The specific routing of the Grainger letter was never determined.

3.13 How were the residents of Tarawa Terrace and Hadnot Point drinking water systems notified of the contaminated wells in 1984?

This issue was not considered in this investigation because it was not related to a crime. See Panel's 3.3.3.3 USMC Public Communications Regarding Hadnot Point and Tarawa Terrace Water

Systems (1980-1985).

3.14 Is Base Commander MajGen. Buehl's letter (April 30, 1985) where he characterizes the contaminated water system as "minute (trace) amounts" accurate?

The use of the term "minute (trace)" involves semantics that avoids the issue of what amounts of the substance may be harmful. A "trace" is generally defined as a very small amount of a substance, perhaps too small an amount to be measured. It is true that parts-per-billion (ppb) is a very small amount relatively speaking. However, such low levels of many hazardous substances in water can be measured and may pose a health risk. Many volatile chemicals in water including TCE and PCE can be measured at the 5 to 10 ppb range. Levels of PCE in wells supplying the Tarawa Terrace area had repeatedly shown high double digit ppb levels with a peak level of 1580 ppb prior to the date of MajGen Buehl's letter.

3.15 Has the USMC cooperated with this investigation?

The USMC has cooperated fully with EPA CID's investigation. The USMC HQ and Camp Lejeune have provided complete and timely responses to all requests. An example of the depth of cooperation by the USMC occurred after a meeting at the US Attorney's Office, Raleigh, NC, in April of 2004, with the Navy's Eastern Area Counsel Office and Counsel to the USMC Commandant, where they consented to providing their privileged document file to EPA.

In regard to any of the Naval and Marine Corps components approached in this investigation, the biggest area of concern were the seemingly subsumed statements provided by the personnel at LANTDIV.

3.16 Has there been a conspiracy by USMC Officials to conceal records and prevent persons connected with contaminated drinking water on Camp Lejeune from cooperating?

This investigation has not substantiated an ongoing conspiracy in this case.

In regard to the civilian employees within MCB-CL's Natural Resources and Environmental Affairs Division (NREAD), these employees were for the most part honest and forthcoming. None of these employees claimed or believed there was an underlying conspiracy by the USMC to conceal the information related to the drinking water in the 1980-1985, nor when the ATSDR began investigating the matter in the 1990s.

In regard to the direct military hierarchy to the NREAD, there were never clear and distinct allegations or evidence implicating one or more of these officers. The reality that there were several supervisory positions over the NREAD coupled with the consistent turnover in these positions made the likelihood of a systemic, years long conspiracy unlikely.

In regard to the civilian employees of the Naval Facilities Engineering Command Atlantic Division (LANTDIV), there is concern by investigators that these employees have not been completely forthcoming in their interviews. However, on the issue of concealing records in a conspiracy, there was never indication LANTDIV took steps to conceal their administrative record nor prevent their people from talking with investigators. The greatest concern lay in the fact that investigators found LANTDIV personnel to have been coached. There was never any direct evidence that allowed investigators to pierce through LANTDIV employee claims that they were not aware of the VOC contamination prior to 1984.

3.18 What is the assessment of the Report furnished by the Drinking Water

Fact-Finding Panel for Camp Lejeune?

The eight Report findings accurate reflect the information presented in the text and are consistent with the findings of DOJ's expert witness hired to participate in interviews and to review the Administrative Record and other documents.

4. INVESTIGATION INTO THE ATSDR

4.1 Is the rate of childhood cancers and birth defects from 1968-1985 significantly higher than the national average?

The national average childhood (1-19 yrs old) cancer incidence rate is about 17 per 100,000 with a mortality rate of about 2.5 per 100,000. The rate for a major birth defect is about 3,600 per 100,000. The ATSDR study seeks to determine if the rate of selected cancer and birth defect types are elevated in children and if they are associated with the mother's consumption of Camp Lejeune drinking water contaminated with VOCs. The answer to this question must await the outcome of the full epidemiological study.

4.2 Why was the water modeling data initially used by [redacted] in [redacted] dissertation flawed?

When ATSDR began their health study in 1996, they requested the water modeling data for the Camp Lejeune water distribution systems. Camp Lejeune provided the water modeling data apparently for the 1972 through 1985. ATSDR would later receive health data for a study population residing on Camp Lejeune from 1968 through 1985. When ATSDR went to match the water modeling data to the health data, the ATSDR appeared to have extrapolated the water

modeling for the 1972-1985 time frame, back to 1968. The problem with this having been done was the water modeling for Camp Lejeune was different between 1968 and 1972. This discrepancy was identified by a private citizen in 2003. The current ATSDR health study incorporates the correct water modeling.

Related to this issue was the length of time Camp Lejeune took to get ATSDR the correct water modeling for the 1968-1985 time frame when it was identified in 2003. It appears to have taken close to six months and several communications to Camp Lejeune for the water modeling diagrams to make there way to ATSDR. However, the preparation and format of the piping diagrams would have taken sometime to prepare.

4.3 Did the "Revised" Interim Progress Report, originally completed by (October 2002), exclude appropriate facts/data? Why was this Report not released until July 2003?

A September, 2002 version of the Interim Report of the case survey authored by apparently failed peer review. An apparent unchanged version dated October, 2002 was final draft. This draft was scientifically unacceptable to ATSDR managers and after considerable unsuccessful discussion with the task of redrafting the report was given to another lead investigator at ATSDR. The redrafting and response to peer review was completed in the first half of 2003. Significant changes in the redrafted "progress report" included the deletion of some information, e.g. a literature review section and a comparison with regional reference data, and the updating of case numbers from the ongoing investigation. The text was extensively rewritten, however, the conclusion that a full epidemiological study should proceed did not change expressed an opinion in an October 16, 2003 interview that the progress report had two potentially significant omissions, i.e. (1) there was no reference to the similar Woburn study and (2) the incidence of cardiac problems was not addressed. Upon

investigation, these concerns were not born out and seemed to have withdrawn concerns in a September 13, 2004 interview. The final Progress Report was released in July, 2003.

4.4 Has the USMC or any Navy component minenced the ATSDR?

The USMC has supplied the essential data and information required by ATSDR to undertake their health assessments and studies. Investigators have not identified any instances when data was intentionally withheld or false data was provided.

Quarterly meetings were held between the ATSDR and representatives of the Navy through the course of the study. Based upon interviews with ATSDR, this appeared to never influenced their scientific work. While delays on the receipt of data was evident in this case, a current senior lead investigator for the ATSDR has assessed the Camp Lejeune delays as routine hurdles found in most ATSDR studies.

4.4.1 USMC funding for study.

A modification in the long-standing Memorandum of Understanding (MOU) between The Agency for Toxic Substances and Disease Registry (ATSDR) and the Department of Defense (DOD) extended the project period to December 31, 2004. Among other responsibilities of ATSDR, this MOU provides for the Agency's conducting of public health assessments and other related health activities at DOD installations and facilities. Pursuant to this MOU, a 1993 three-year plan showed the USMC Camp Lejeune Military Reservation as one of 30 DOD sites to receive a public health assessment. The MOU provided for DOD's execution of funding for work performed by ATSDR pursuant to this agreement. The sources of DOD funds provided to ATSDR are to be the Defense Environmental Restoration Account and the Base Closure Accounts. The MOU also allows the transfer of DOD personnel to ATSDR as necessary to carry out provisions of this

agreement. ATSDR has received DOD funds for the health survey and health studies at Camp Lejeune but the total amount and specific aspects have not been made available to HPA investigators. However, a ATSDR researcher stated in an interview that in 2000 the Marine Corps had dedicated $4 million for the health survey. This person also stated that the projected $2-3 million for the current children health study would likely be provided by the Marine Corps and perhaps other government sources.

DOD funding of the health survey was apparently delayed because of outspoken opposition to the study by a mid-level manager in the Navy's Environmental Health Center. This opposition has been characterized as a professional difference of opinion as to the scientific value of the study in obtaining conclusive findings. Coupled with this internal debate was confusion with the Naval hierarchy on who was responsible for the contaminated wells. This appears to have contributed to the perception by the public and ATSDR that the Navy was denying any responsibility to avoid any potential litigation. Subsequently, key personnel in the USMC supported the study and provided funding.

4.4.2 USMC records and data provided to ATSDR.

The epidemiological study to be conducted by ATSDR required the contacting of the military residents of Camp Lejeune during the study period. The personnel records of former Camp Lejeune residents were maintained by the Defense Manpower Data Center. Initially, these records were not made available to ATSDR because they did not meet any exceptions required for release of information under the Privacy Act. Subsequently the DOD Privacy Act regulations in place were amended in a Federal Register notice to allow Department of Health and Human Service personnel access while conducting health studies. Once these legal issues were resolved the records were provided. Every civilian or military employee of the USMC believes the Corps has and will continue to fully support the ATSDR study.

Based upon discussions with USMC officials, the USMC appears to not have truly

recognized the complexity and degree of attention this issue required in 1997. Prior to 1997, the USMC self admittedly failed to adequately address concerns and data requests from the public and ATSDR. This type of issue has to be managed and coordinated well. This was not done early on and appears to have contributed to more confusion, suspicion and concern on behalf of the retired Marines. The USMC officials said this was unfortunate, regrettable and something the Navy and USMC should have done better.

4.5 Has the USMC concealed records from ATSDR?

The issue of concealment appears to have consistently been tied to delays the ATSDR experienced after having requested documents from the USMC. Investigators have not identified any instances when data or records was intentionally withheld or false data was provided.

4.6 Was ordered by supervisor destroy ATSDR records connected with the MCB-CL study?

In December 2002, was preparing to leave the Division of Health Studies and position as the on the Camp Lejeune study. In preparation for this departure and while cleaning out office returned records to the official Camp Lejeune file and organized records to be taken with At this time, maintained concern over what records was retaining and began more closely supervising the records was going to take with

approached regarding what should do with sets of telephone log books had used to record names, numbers, and medical information from the public that had contacted her over the years. While it is not clear gave a direct order to destroy these records, it is clear fully expected and specifically advised not to take any

Camp Lejeune records from the Division of Health Studies. never denied may have told to destroy the records. stated the detailed information collected by in these telephone log books was not necessary nor scientifically relevant to the study said the information from the Camp Lejeune families was important, but it just should not have been collected and documented in the informal way did it. As a result, believed the records were sensitive, since they contained personal medical information, and should not go outside the Division of Heath Studies. could not recall specifically what said to in December 2002, but would have been fine with the records having been either shredded or put in the official file.

Based upon an interview with the Division of Health Studies, it appears these records should have been put in the official Camp Lejeune case file within the Division of Health Studies. However, the asserted the records are scientifically irrelevant to any public health study conducted by the ATSDR. There appears to be enough confusion and extraneous factors investigators can elaborate on that fails to make this issue a clear and substantial violation of federal law. Further, the records were never destroyed.

4.7 Has , assisted the Navy or USMC in concealing data from the public?

Investigators have not identified any instances when data or records was intentionally withheld or false data was provided by the Navy or USMC. There has been no evidence or information indicating assisted the Navy or USMC in concealing data. The allegation that was in some way improperly assisting the military in her official capacity appears to have been thoroughly confused with her position within the Public Health Service. Person(s) claimed had received a promotion from the Navy based upon favorable overtures. The promotions within the Public Health Service are not linked to the Navy and no collaboration between and the Navy was found to exist.

4.8 Why has an adult study not been performed?

The professional judgment within ATSDR varies on the scientific value of an epidemiological study of adult military residents of Camp Lejeune. However, the prevailing view at ATSDR is that a Camp Lejeune adult study would be very expensive and would not produce conclusive results. The scientific merit of epidemiological studies requires a rigorous effort to remove confounders. Such uncertainties hinder the finding of any true statistical difference in effects between the study and control populations. This view holds that the exposure to hazardous substances and other risk factors of current or former resident of Camp could be significant and would be varied and uncontrolled. These unmanageable confounders would preclude a meaningful epidemiological study for evaluating the health effects of VOC contaminants in drinking water. An important aspect of this view is that VOCs do not produce *unique* health effects relative to other day-to-day chemical exposures and risk factors posed by the American life style. Therefore, relating an effect to a given substance or risk factor would be very difficult if not impossible. The more controlled environment and exposure in a mother's womb provides conditions for a study of newborns to more likely show a causal association if it exists.

4.9 Has the ATSDR health study for Camp Lejeune followed an accepted scientific procedure and an appropriate timetable?

It appears that ATSDR is vigorously pursuing the data and procedural requirements for a sound epidemiological study. The weaknesses of many environmental health studies are (1) uncertainty or mis-classification of exposure to the substance(s) in question, (2) an inadequate comparison population and (3) low participation rates. ATSDR is giving major attention to reducing each of these uncertainties. Peer review of each aspect of the study is being conducted. This type of study is time consuming and labor intensive. In consideration of the study

complexity, the effort to obtain a comprehensive record of the affected population, and the delays with privacy act issues discussed above, the study completion date of 2006-07 seems reasonable.

4.10 Has the ATSDR cooperated with this investigation?

The ATSDR has fully and openly cooperated with this investigation. Access to any employees and records have been immediately granted.

5. PERSONS AND ENTITIES INVESTIGATED

5.1 USMC military and civilian employees

As referenced in the 1.2.1, the subjects considered were: (A) the civilian employees within MCB-CL's Natural Resources and Environmental Affairs Division (NERAD); (B) the direct military hierarchy to the NERAD, to include the Assistant Chief of Staff (AC/S) Facilities, the Chief of Staff and the Commanding General; and, (C) the civilian employees of the Naval Facilities Engineering Command Atlantic Division (LANTDIV). The following specifically details the individuals this investigation focused on.

(A) NATURAL RESOURCES AND ENVIRONMENTAL AFFAIRS DEPARTMENT (NERAD)

From [redacted] was employed at MCB-CL and served as the NERAD in the [redacted] time-frame. When questioned on the details of the "organic

interference" indicated on the TTHM sampling results (1980-81) and the presence of TCE/PCB by Geiger Laboratories (1982). provided nondescript and emotional responses. While never denied having seen records indicating the presence of volatile organic compounds (VOC's), specifically TCE and PCE in 1982, blamed staff, said were working on it.

. was never able to specifically detail direct involvement nor his responsibilities as a supervisor on this issue. ' . was quick to blame officials in the Preventative Medicine Unit, the LANTDIV and ' ' senior management for not having participated in addressing this issue or better supporting the NREAD over the years. was the department head closest to the contaminated water issue with a background in science, direct access to the data, responsibility for environmental compliance, and the authority to address the matter with senior base management.

agreed to talk with investigators, but continued to claim extensive stress from this matter effected . .emory. admitted NREAD was responsible for failing to appropriately address the presence of contaminated drinking water. stated superiors held responsible for the failure of NREAD to identify the contaminated wells in 1982. said nor staff were ever disciplined regarding this issue by the USMC. had no knowledge of military or civilian personnel connected with this matter obstructing justice, destroying records, conspiring, or generating false writings or statements.

From to was employed at MCB-CL and served as the Soil, Water and Environment Branch of NREAD in the ' time-frame. was able to explain specifically how and the NREAD had addressed both the "organic interference" indicated on the TTHM sampling results and the presence of TCE/PCB by Geiger Laboratories (1982). provided both historical perspective of general industry practices for the 1980-1985

time frame and background on the few employees assigned to environmental compliance at Camp Lejeune.

, explained that the NREAD at Camp Lejeune had prided itself in being a progressive, technically able Department when compared to other military installations in the 1980s. believed that while the environmental group for Camp Lejeune was essentially and they had the expertise to address the regulatory compliance issues presented at the time. In regard to the TTHM reports indicating "organic interference," stated NREAD had at the time successfully addressed the issue and kept Camp Lejeune within compliance with the regulatory limits. They simply did not interpret the "organic interference" to be indicative of a contaminated drinking water system. However, following the Geraghty Laboratory letter (1982), NREAD simply failed to link the presence of TCE/PCE to individual drinking wells. summarized the contaminated water issue best when he stated that following receipt of the Geraghty letter, "they simply dropped the ball."

like both and insisted both the bases' Preventative Medicine Unit and LANTDIV should have been directly involved in helping interpret and guide the NREAD on how to address the sample results. acknowledged that while there had been meetings with both entities, her supervisor ever documented these meetings nor a formal request for guidance.

has cooperated fully with this investigation and provided his best recollection of actions and decisions in the time-frame. exhibited remorse and great concern on this matter. had no knowledge of military or civilian personnel connected with this matter obstructing justice, destroying records, conspiring, or generating false writings or statements.

From to served as the in the Soil, Water and Environment Branch (included the Water Quality Lab) of the NRRAD. maintains the most direct knowledge and involvement with the evidence of contaminated drinking water in the 1980 to 1985 time-frame. was admitted that in retrospect and supervisors in the NRRAD failed to recognize and properly address the VOC's present in the wells used to supply drinking water.

Between 1981 and 1982, appears to be the only employee that attempted to identify the source of the "interference" related to the TTHM sampling results provided by the US Army Environmental Hygiene Agency, Fort McPherson. Upon receipt of the Grainger Laboratory's letter (August 1982) indicating the presence of TCE and PCE in drinking water samples, again attempted to locate alternative sources. From 1982 to late 1984, admitted, did not identify the source of the solvents as being several individual drinking wells. claimed to have lacked the expertise to readily identify potential public health concerns, but acknowledges could have more aggressively addressed this issue with officials of the Preventative Medicine Unit. stated expected LANTDIV to have provided guidance at the time for both the organic interference (1980-81) and solvents (1982), having received copies of the analysis forms. stated both and Department should have requested a more official inquiry into the water issues by LANTDIV.

has cooperated fully with this investigation and provided best recollection of actions and decisions in the 1980 to 1985 time-frame. exhibited remorse and great concern on this matter. had no knowledge of military or civilian personnel connected with this matter obstructing justice, destroying records, conspiring, or generating false writings or statements.

(5) MARINE CORPS BASE - CAMP LEJEUNE MILITARY HIERARCHY

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Except for the responsibility of their position, the above listed have not been implicated specifically in any document(s) or by any individuals as having been directly or indirectly responsible or significantly involved with the contaminated drinking water at MCB-CL from 1980-1985. None of the have been approached for an interview based upon this reality.

Based upon interviews with military and civilian employees at MCB-CL, was instrumental in addressing and supporting environmental issues concerning the base.

Except for the responsibility of their position, the above listed Colonel's have not been implicated in any document(s) or by any individuals as having been directly or indirectly responsible or significantly involved with the contaminated drinking water at MCB-CL from 1980-1985. None of the Colonel's have been approached for an interview based upon this reality.

Except for the responsibility of their position, the above listed Colonel's have not been

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implicated in any document(s) or by any individuals as having been directly or indirectly responsible or significantly involved with the contaminated drinking water at MCB-CL from 1980-1985. None of the Colonel's have been approached for an interview based upon this reality.

served in the USMC from 1959 to 1988, and was the
from 1983-1985. had been responsible for briefing the
on all relevant issues for the divisions within the Utilities Department. had
received no briefing on a contaminated water situation by his predecessor Col. in 1985.
was aware of contaminated wells being shutdown in late 1984 and early 1985.
stated he relied on the NREAD to advise and recommend courses of action on all environmental
issues, specifically those related to drinking water. said he and would
have done what needed to be done to address contaminated water on the base.

did not recall disciplinary action as having been considered against employees of
the NREAD. did not have a strong understanding on drinking water regulations nor the
technical aspects of NREAD's work. had a very limited recollection on why the wells
were shutdown in 198 did not express responsibility for the contaminated water issue,
although he did appear to be truthful. had no knowledge of military or civilian personnel
connected with this matter obstructing justice, destroying records, conspiring, or generating false
writings or statements.

as an advisor to the AC/S Facilities for environmental issues from
has a background in environmental science and engineering had
responsibility for the NACIP program on the base and was a primary liaison between LANTDIV

and Camp Lejeune self-described his position as a mediator tasked to communicate between Camp Lejeune's military hierarchy and the civilian employees of environmental Division on the base.

appeared to be sharp and well aware of the historic contaminated water issues on the base. admitted knowledge on both the organic interference issues and recognition of solvents by Geologist Laboratories in 1982 claimed the NREAD had been addressing these issues in consultation with the LANTDIV. said both and LANTDIV should have played a more active role in identifying and addressing the TCE/PCE contamination they were notified of in 1982. said LANTDIV should have taken the lead on this solvent issue given the degree of expertise and research required to properly address it. This being said, did not believe LANTDIV was an effective, contemporary component within the Naval structure.

was forthcoming and interested in the drinking water issues. said his interview with the Panel's investigator did not go well based upon the aggressive and inappropriate tone of the inquiry. said he was less forthcoming as a result. position, education, and personality made him a key employee within the 1982-1984 time frame for addressing the contaminated drinking water issues. acknowledged responsibility for not having invested himself more into the issue.

(C) NAVAL FACILITIES ENGINEERING COMMAND ATLANTIC DIVISION (LANTDIV)

has a background in civil engineering and began with LANTDIV in 1972. By 1980, was I (formerly Quality) Branch. was directly

involved with the advising Camp Lejeune on EPA's published final regulations for the control of THMs from 1980 forward. LANTDIV was involved with setting up the contract between Camp Lejeune and the US Army Environmental Hygiene Agency, Fort McPherson.

When presented the THM Surveillance Report Forms for 1980-1981, acknowledged these were more than likely the results from sampling at Camp Lejeune. When asked about the comments stating "organic interference," did not recall ever having addressed this issue with Camp Lejeune. stated there could be several explanations for "organic interference" and it is not a direct indication the drinking water system was contaminated. denied having been advised of the Geraghty Laboratory (1982) samples that indicated the presence of TCE and PCE, but knew Geraghty had been used.

, like , colleagues, spent much time explaining LANTDIV's advisory role in the Navy's structure and its non-enforcement directive. LANTDIV appears to be setup as an internal contractor with the clear understanding they will only advise installations on regulatory policy. LANTDIV did not fall within the chain of command on Camp Lejeune. LANTDIV was not supposed to lead on issues, only advise when asked. It is was not determined if the Naval Hierarchy shares this opinion.

In every interview conducted with LANTDIV employees regarding Camp Lejeune, they denied knowledge of "organic interferences" in 1980-1981, and the presence of TCE/PCE contamination in the drinking water system in 1982. , was no exception. , appeared to be very nervous when questioned and had difficulty articulating and recalling his past actions. In light of the Fact-Findings Panel's concurrent inquiry, there were indications LANTDIV personnel have been coached on how to address this issue.

is still employed at LANTDIV.

...has a background in civil engineering and began with LANTDIV in. By ...was a (formerly Quality) Branch under While ...ible and self-described responsibilities (... put directly over compliance at Camp Lejeune, ... name is not referenced by employees of the NREAD nor the administrative file for the time-period in question.

When presented the TTHM Surveillance Forms for 1980-1981 ... completed the forms. When asked about the comments stating "organic interference," ... ld not recall ever having addressed this issue with Camp Lejeune ... fully aware of the TTHM sampling at Camp Lejeune, but did not to elaborate beyond the fact LANTDIV had merely participated in setting up the contract ... stated having been advised of the Geologic Laboratory (1982) samples that indicated the presence of TCE and PCE.

... had a good recollection of the responsibilities of LANTDIV at Camp Lejeune in the 1980-1985 time-period. He ... and spent much time defining the lines of communication and authority between LANTDIV and USMC installations. The Fact-Finding Panel found,

The Naval Facilities Engineering Command Atlantic Division (LANTDIV), as a technical advisory organization, apparently was not opposed to providing Camp Lejeune with information and expertise to help the base understand the significance of the contamination and subsequent test data in the early 1980s.

A direct line of responsibility is unclear and the LANTDIV employees connected to the drinking water contamination at Camp Lejeune in the early 1980s, appear to use this reality to shed direct culpability. epitomized this by willingness to spend time on the "advisory role" LANTDIV maintained. ... colleagues have made no effort to interpret nor probe the

contaminated drinking water matter at Camp Lejeune. LANTDIV has performed no top-to-bottom review nor generated any summary of its actions.

is still employed at LANTDIV.

has a background in chemistry and chemical engineering, and began with LANTDIV in By was in the Environmental Programs (formerly Quality) Branch, Potable Water and Asbestos. was directly involved with advising Camp Lejeune on EPA's published final regulations for the control of TTHMs from 1980 forward.

When presented the TTHM Surveillance Forms for 1980-1981, recognized the forms. When asked about the comments stating "organic interference," did not recall ever having addressed this issue with Camp Lejeune. stated there could be several explanations for "organic interference" and it should have been further analyzed via gc/ms (gas chromatography / mass spectrometry). stated having been advised of the Geraghty Laboratory (1982) samples that indicated the presence of TCE and PCE.

confused the time-line of events at Camp Lejeune claiming the contaminated wells discovered during the NACIP sampling were shutdown in 1985. Again, stated LANTDIV had no direct knowledge of or order to address "organic interferences" and/or solvents in the drinking water at Camp Lejeune. It was not clear whether simply had difficulty recalling the timing of specific events or if confusion on the issue allowed to deflect responsibility.

Amar is retired.

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was a LANTDIV engineer that assisted Camp Lejeune with TTHM sampling and general drinking water issues in the) time-frame. is still an employee within the Environmental Programs Branch of LANTDIV. was interviewed by the lead investigator for the Fact-Finding Panel, whom stated Wallace exhibited a poor recollection of any "organic interferences" and/or solvents in the drinking water prior to 1984.

Based upon interviews with 's colleagues, appears to minimize the LANTDIV party line that LANTDIV had no direct knowledge of or order to address "organic interferences" and/or solvents in the drinking water prior to 1984.

is still employed at LANTDIV. was not interviewed by EPA.

has a background in physics and engineering, and began with LANTDIV in By was in the Environmental Programs (formerly Quality) Branch, but claimed to have little involvement with drinking water assessments at Camp Lejeune 'participated in setting up contract labs for Camp Lejeune, but not interpretation of the analyses.

, the in the NREAD, said was well aware of the TTHM "interference" issues and had been working with to address them. When asked about the "interference" issue, did not recall it having been an issue, nor the discovery of TCE/PCE in 1982.

Unlike colleagues at LANTDIV, made more of an effort to analyze the records presented to was thorough in responses and attempted to provide additional information to assist in our investigation.

no longer employed at LANTDIV.

5.2 ATSDR employees

. has been an employee of the ATSDR since and is currently the of the Epidemiology and Surveillance Branch of the Division of Health Studies. received . from. and maintains a and from. While the Camp Lejeune studies have had several lead investigators, has been the since the first ATSDR health study was published in August 1998.

There have been several citizens and victims that have questioned the length of time ATSDR has taken to complete its health assessments and studies. However, this investigation determined there was only one area of criminal culpability. In December of 2002, did , - order subordinate to destroy records that would be considered part of the ATSDR's official Camp Lejeune case file?

In was preparing to leave the Division of Health Studies and ' position as the . on the Camp Lejeune study. In preparation for this departure and while cleaning out office, scanned records to the official Camp Lejeune file and organized records to be taken with At this time, maintained concern over what records was retaining and began more closely supervising the records was going to take with

approached regarding what should do with one of telephone log books used to record names, numbers, and medical information from the public

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that had contacted over the years. While it is not clear gave a direct order to destroy these records, it is clear fully cognizant and specifically advised not to take any Camp Lejeune records from the Division of Health Studies.

Based upon an interview with the Division of Health Studies, it appears these records should have been put in the official Camp Lejeune case file within the Division of Health Studies. However, the asserted the records are scientifically irrelevant to any public health study conducted by the ATSDR. There appears to be enough confusion and extraneous factors investigators can elaborate on that fails to make this issue a clear and substantial violation of federal law. Further, the records were never destroyed.