

### CHRONOLOGY OF EVENTS:

- 24 Oct 77 Southern Testing and Research Laboratories, Inc. reported the results of analyses from water distribution systems throughout Camp Lejeune. All eight water supply systems aboard the Base were tested (Courthouse Bay, Rifle Range, Onslow Beach, Hadnot Point, Holcomb Blvd., Tarawa Terrace, Montford Point, and New River) for herbicides and some chlorinated hydrocarbons (not specifically TCE or PCE). The detection limit was established at 1 ppb for the herbicide and chlorinated hydrocarbon analysis. There were no detections of TCE or PCE.
- Apr 79 Study of TT and Montford Point Water Treatment Plants recommended demolishing plants due to age, expanding Holcomb Blvd. water treatment plant and running water line to TT and Camp Johnson. Base submits MILCON project to demolish TT and Montford Point water treatment plants.
- 26 Nov 79 Suggested No Adverse Reaction Level (SNARL) published in Federal Register for TCE.
- 29 Nov 79 In compliance with requirements of the Safe Drinking Water Act, the EPA published final regulations in 40 CFR Part 141, Federal Register, Vol. 44 for the control of trihalomethanes as an amendment to the National Primary Drinking Water Standards. For water treatment systems serving between 10,000 and 75,000 people, mandatory monitoring was required to begin by 29 November 1980 and compliance with the new standard was to be achieved by 29 November 1983. Smaller systems serving fewer than 10,000 people were not required to monitor and comply with the new standards. At Camp Lejeune, only the Hadnot Point and MCAS New River water plants served more than 10,000 people. They were required to be tested quarterly.
- 10 Feb 80 SNARL published in Federal Register for PCE.
- 1980-81 Sampling for Trihalomethanes ("THM") done on 21 Oct 80; 18 Dec 80; 29 Jan 81; 26 Feb 81; 9 Mar 81; 14 Apr 81; 11 Jun 81. The samples from 21 Oct 80; 18 Dec 80; 29 Jan 81; 26 Feb 81; 9 Mar 81 reflect chlorinated hydrocarbons (solvents) in the sampled water at high levels, which interfered with THM sampling in Hadnot Point. The samples taken on 14 Apr 81 and 11 Jun 81 do not reflect any further interference from solvent contamination. It is unknown if these results were received by the Camp Lejeune Natural Resources and Environmental Affairs Division ("NREAD") prior to 1982. These results were not submitted to North Carolina regulatory agencies as the U.S. Army Environmental Hygiene Agency ("USAEHA") at Fort McPherson was not state certified.

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- 24 Jun 80 The Defense Environmental Quality Program Policy Memorandum (DEQPPM) 80-6 required Department of Defense components to identify their abandoned hazardous waste disposal sites and establish a prioritized program to conduct record searches at their installations. In response to the DEQPPM 80-6, the Department of the Navy developed the Naval Assessment and Control of Institutional Pollutants (NACIP) Program in January of 1981. The purpose of this program was to identify, investigate, assess, characterize, and clean up or control releases of hazardous substances; and to reduce the risk to human health and the environment from past waste disposal operations and hazardous material spills at Navy/Marine Corps activities in a cost-effective manner. The NACIP Program is now known as the Navy/Marine Corps Installation Restoration (IR) Program.
- 1982-83 MILCON project approved to expand the Holcomb Blvd. water treatment plant and demolish the TT water treatment plant.
- 14 Jan 82 Naval Energy and Environmental Support Activity ("NEESA") letter announces kickoff of the Naval Assessment and Control of Installation Pollutants Program ("NACIP"), Initial Assessment Study ("IAS") at Camp Lejeune. The intent of this study is to identify environmental concerns, including water contamination.
- 5 Feb 82 LANTDIV letter forwards trihalomethane guidance for testing and compliance. This letter restates the criteria mentioned in entry dated 29 Nov 79.
- 12 Feb 82 LANTDIV memo indicates MCAS New River is marginally above trihalomethane limits based on 1980 study. All other systems appear within standards.
- 12 Feb 82 Ms. Elizabeth Betz, Supervisory Chemist, NREAD, in a memorandum for the record, states that only Hadnot Point and MCAS New River water systems require monitoring for THMs.
- 23 Feb 82 NEESA notified Camp Lejeune that the NACIP IAS team was to visit Camp Lejeune in March 1982.
- 25 Feb 82 NAVFAC letter requests Bureau of Medicine to establish policy for trihalomethane compliance for systems serving less than 10,000 people. Little effect at Camp Lejeune since Commanding General, Camp Lejeune, had previously instructed that all Base water systems were to be sampled for THMs regardless of population served.

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- Apr 82           Trihalomethane testing occurred at the Tarawa Terrace, Holcomb Blvd and Hadnot Point water treatment plants.
- 27 Apr 82       Grainger Laboratories began sampling all eight water systems for trihalomethanes. Hadnot Point and MCAS New River were required to be tested, while testing of the other water systems was voluntary. Five samples were taken from the TT system and all tested normal for trihalomethanes. Five samples were also taken from the Hadnot Point systems and were all found exceeding the established criteria for trihalomethanes. There is no indication of PCE or TCE contamination. Prior to this date, sampling analysis was conducted by USAEHA, in its laboratory at Fort McPherson, Georgia. The Fort McPherson laboratory was not certified, and, therefore, the analyses were not reportable to the State of North Carolina, and could not be used to determine compliance. However, all subsequent samples for THM were analyzed by a new laboratory, Grainger Laboratories, that was certified for state reporting.
- 6 May 82        In a telephone conversation between Mike Hargett of Grainger Labs and Elizabeth Betz, Mr. Hargett informed Ms Betz that cleaning solvents in the water, specifically TCE and PCE, hindered analysis of samples being analyzed for trihalomethanes from two water treatment systems, Tarawa Terrace and Hadnot Point.
- 25 May 82       In a subsequent memorandum to file dated 25 May 1982, Elizabeth Betz expanded on her 6 May 82 conversation with Mike Hargett, of Grainger Labs. According to the memorandum, Mr. Hargett had called to say that during the analysis of the April 1982 samples they had encountered some interference. He said that peaks for Perclene (Trademark for a dry-cleaning composition consisting of PCE and surfactant additives) and TCE were found in samples from the TT and Hadnot Point water systems. He stated that no mention would be made of the extra peaks except for the "less than value" on the report for Bromodichloromethane (a THM being analyzed for). Ms Betz stated that she notified her boss, Mr. Danny Sharpe, Supervisory Ecologist, of Grainger's findings, and that the findings were then sent up the chain of command to Mr. Billy Elston, Deputy Base Maintenance Officer, and over to the Utilities Director, Mr. Fred Cone. She further stated that on 14 May 1982, there was a meeting to brief Col. Millice (AC/S Facilities), and LtCol Fitzgerald (Deputy AC/S Facilities), regarding the April THM analysis by Grainger Labs. During the briefing it appeared to her that they were unaware of the VOC findings, but she did not inform them at that time.

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- 25 May 82 In another Memorandum to File, Elizabeth Betz again referenced the 14 May 82 meeting. According to this memorandum, she went to LtCol Fitzgerald's (Deputy AC/S Facilities) office to brief him on the trihalomethane analysis for April from Grainger Labs. He took her into Col Millice's (AC/S Facilities) office to brief him at the same time. Col Millice requested a summary be prepared and submitted with the future trihalomethane analysis. No mention was made of extra peaks that Grainger found in the TT and Hadnot Point systems samples.
- 27 May 82 Hadnot Point water system was sampled. Results reflected PCE = 15 ppb and TCE = 1400 ppb. [Note: These results were identified when the sample was reanalyzed after the July 82 samples exhibited high interferences which were thought to be chlorinated hydrocarbons].
- 28 May 82 TT water system was tested. Results indicated PCE = 80 ppb. [Note: These results were identified when the sample was reanalyzed after the July 82 samples exhibited high interferences which were thought to be chlorinated hydrocarbons].
- 1 Jun 82 Grainger Laboratories called and informed that the May samples were unreliable because of poor duplication. Grainger requested to recollect and run another analysis.
- 1 Jun 82 Memorandum from Ms. Elizabeth Betz to Mr. Danny Sharpe concerning reports to be sent to the State, with a copy to LANTDIV, as North Carolina had primary responsibility for enforcement of the Safe Drinking Water Act. The memorandum states: "My files do not show an organic analysis for the water plants. This sampling and analysis could have been overlooked since the Safe Drinking Water Act left the initial sampling and frequency as a State option for ground water. My copy of the State Regs does not call for organic analysis unless otherwise stated by the Secretary."
- 4 Jun 82 Ms Betz received a letter from Grainger Laboratories requesting re-sampling for the May samples. Significantly, this letter also noted solvent peaks, but comparison of duplicate samples indicated poor repeatability.
- 24 Jun 82 THM testing occurred at the TT water treatment plant.
- 25 Jun 82 Trihalomethane testing occurred at the Hadnot Point and Holcomb Blvd. water treatment plants.
- 28 Jun 82 In a letter from the Base Maintenance Officer to the AC/S Facilities on the subject of trihalomethane analysis of the Base drinking water supplies, the

Base Maintenance Officer stated that all base systems were in compliance with the 0.10 milligrams per liter limit for THMs promulgated under the Safe Drinking Water Act.

- 13 Jul 82 Grainger Laboratories trihalomethane results indicate all systems are within trihalomethane compliance. No mention of TCE or PCE.
- 27 Jul 82 In a memorandum to Mr. Danny Sharpe, Ms. Elizabeth Betz states that due to the extra samples required to be taken in the TT and Hadnot Point systems, despite their low averages for THM, she recommended that samplings for THM continue on a monthly basis at TT and Hadnot Point.
- 27 Jul 82 Mr. Julian Wooten, Director, NREAD sends a letter to the Base Maintenance Officer regarding compliance with the Safe Drinking Water Act and related North Carolina regulations. The letter proposes reducing the frequency of sampling water supply systems throughout the Base, including Hadnot Point and Tarawa Terrace. While regulations required monitoring water supply systems that served greater than 10,000 people, Camp Lejeune had voluntarily been conducting monthly THM monitoring at each of its eight water treatment systems. Mr. Wooten recommended that only the MCAS New River and the Rifle Range continue on monthly monitoring, while the other systems be reduced to quarterly monitoring.
- 27 Jul 82 Water distribution system in TT was tested. Influent (raw water) PCE = 76 ppb and effluent (treated water) PCE = 82 ppb.
- 27 Jul 82 Water distribution system in TT was tested again at Bldg. TT-2453. Results reflected PCE = 104 ppb. The contaminant source was not identified.
- 27 Jul 82 Hadnot Point distribution system was tested again. Influent: PCE = <1 ppb, TCE = 19 ppb. Effluent: PCE = <1 ppb, TCE = 21 ppb. The system was also sampled at Bldg. FC-530: PCE = 100 ppb, TCE = no data (approximated between 19-21 ppb).
- 29 Jul 82 In a Memorandum to File, Ms. Elizabeth Betz memorialized a discussion that occurred with Ms. Linda Sewall, Water Supply, NC Department of Human Resources concerning trihalomethane monitoring and reporting requirements. Ms. Sewall informed Ms. Betz that there were no THM monitoring requirements for plants serving less than 10,000 people. However, the Base would be required to report to the state if the Base voluntarily tested those wells and showed levels in excess of the limits. For the Hadnot Point and New River systems (which exceeded the 10,000

threshold), reporting THM monitoring to the state on a quarterly basis was to begin in November of 1982.

- 30 Jul 82 In a Memorandum to the Record, Elizabeth Betz noted that THM sampling was conducted on 28 July 82 at TT and Hadnot Point. The memo also notes that two extra samples were taken from TT and HP to be tested for TCE, PCE and other solvents.
- 30 Jul 82 Additional samples are taken at TT and HP because of the interfering peaks encountered due to the presence of TCE and PCE.
- 10 Aug 82 Letter from Grainger Laboratories to Commanding General, Camp Lejeune discussed the previously referenced interferences in the trihalomethane sampling at TT and Hadnot Point. It stated that previously all samples from the TT and Hadnot Point water systems presented difficulties in performing the monthly trihalomethane analyses. Interferences which were thought to be chlorinated hydrocarbons (VOCs) hindered the quantification of certain trihalomethanes. According to Grainger Laboratories, these VOCs appeared to be at high levels and hence were more important from a health standpoint than the total trihalomethane content. The contaminant in the TT well field was suspected to be PCE and was confirmed by two analytical techniques. Samples from the Hadnot Point system were also analyzed by the same analytical techniques and identified both TCE and PCE. Upon quantification of the July contaminants, the samples obtained in May were reanalyzed and resulted in the levels of VOCs reflected for the 27 May 82 and 28 May 82 entries. PCE was identified in the TT system and its concentration seemed relatively stable over the period in which it was identified (May - July 82). Both TCE and PCE in the Hadnot Point system had been variable over this same period and were at significantly lower levels than when first encountered.
- 18 Aug 82 Trihalomethane sampling conducted monthly from April through July did not show any problems in the Hadnot Point, TT, Montford Point, Holcomb Blvd., Courthouse Bay, or Onslow Beach systems. Therefore, these systems were reduced to quarterly sampling. The New River and Rifle Range systems continued to be sampled monthly.
- 19 Aug 82 Letter from Ms. Betz, to Mr. Danny Sharpe, discussed the significance of the PCE and TCE contaminants discovered in the TT and Hadnot Point water systems. She informed Mr. Sharpe that neither TCE nor PCE were regulated contaminants under the Safe Drinking Water Act. However, she explained that EPA had a "SNARLs" program that provided some guidance on TCE and PCE. A SNARL was a "suggested no adverse

response level," and was not a legally enforceable standard. She further stated that PCE and TCE, in high doses, had been reported to produce liver and kidney damage and central nervous system disturbances in humans. She advised that EPA's snarls for PCE were 2300 ppb for 1-day exposure, 175 ppb for 10-day exposure, and 20 ppb for longer-term where drinking water was the only source of exposure.

Ms. Betz further advised Mr. Sharpe that On 9 April 1980, EPA had produced a Suggested Action Guidance on PCE where PCE contamination had possibly occurred because of an asbestos coated pipe. EPA's recommendations were (1) immediate corrective action (within 24 hours) if the PCE level exceeds 2,300 ppb (same as one-day snarl), (2) corrective action within 10 days if the PCE level exceeds 130 ppb (same as 10-day snarl), and (3) for extended periods the PCE level should not be greater than 40 ppb. EPA's snarls for TCE were determined to be 2000 ppb for 1-day exposure, 200 ppb for 10-day exposure, and 75 ppb for a chronic snarl. There was no Suggested Action Guidance on TCE. The memo advised that the level of PCE for the TT system samples averaged 90 ppb, which exceeded the PCE SNARL's long-term recommended level of 40 ppb. The levels did not vary significantly between the raw and treated samples. Ms. Betz believed that the PCE contamination was possibly due to the use of coated A/C pipe, as in the EPA Suggested Action Guidance, in the raw water lines at TT. PCE in the Hadnot Point system samples appeared to be at trace levels, and under recommended levels stated in the SNARL. The levels of TCE at Hadnot Point were presently averaging 20 ppb, which was below all three recommended maximum exposure levels. Ms. Betz admitted she could not account for the 1400 ppb level of TCE on 27 May 1982, or why it was now averaging only 20 ppb.

Aug 82-Jul 84 Camp Lejeune officials were not certain whether VOCs were coming from pipes, treatment plants, or from groundwater wells. Additionally, there was concern over the accuracy of the trace VOC findings given the technology at that time, and the fact that most pollutants were measured in parts per million vice parts per billion at that time. Camp Lejeune officials remained in contact with Mr. Fred Hill and Mr. Mike Bell, State of North Carolina Water Quality Control, regarding the findings of VOCs at Hadnot Point and Tarawa Terrace. State officials seemed unconcerned about the trace VOC findings, as VOCs were unregulated substances. Camp Lejeune was told to focus on bringing THM levels into compliance.

31 Aug 82 Memorandum to File, Ms. Elizabeth Betz states that LANTDIV letter of 12 August 1982 analysis shows the eight system composite sample indicated either non-detect, little detected below detection limits, or at detectable limits for all parameters of trihalomethanes and inorganics

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except Cadmium and Selenium, which were below the maximum contaminant level required by the Safe Drinking Water Act.

- 7 Sep 82 Trihalomethane samples for July and August indicated compliance with trihalomethane regulations. No indication of VOC interference.
- 30 Sep 82 Contract awarded to replace water laterals in TT. (\$1,205,057.)
- 9 Nov 82 Inorganic analysis of water treatment plants indicates none of the maximum contaminant levels were exceeded.
- 9 Dec 82 Letter from Grainger Laboratories regarding November trihalomethane sampling of the eight water treatment systems indicates VOC contamination in the TT and Hadnot Point systems. All five samples - taken from the TT system show PCE. All five samples taken from the Hadnot Point system exhibit the presence of both PCE and TCE. As these samples were being analyzed for trihalomethane, the levels of PCE and TCE were not reported. However, there was PCE and TCE interference. This information was reported to the state.
- 21 Dec 82 November trihalomethane testing experienced interferences from high levels of solvents. Bruce Babson of Grainger Laboratories stated that the levels of solvents had dropped for awhile; however, in the last samples, the levels of solvents were relatively high again.
- 4 Jan 83 Mr. Julian Wooten, Director, NREAD forwarded Ms. Betz' letter regarding the newest VOC interferences to the AC/S Facilities with a recommendation that the Facilities Environmental Engineer, Mr. Robert Alexander, "look into this situation."
- 5 Jan 83 The letter was forwarded to Mr. Robert Alexander, Environmental Engineer, Facilities, with a note from Lt Colonel Fitzgerald, the Deputy AC/S Facilities: The note stated: "Please look into subject matter."
- Jan 83-Jul 84 Mr. Bob Alexander, Facilities Environmental Engineer, after consultation with other base officials, concluded that since the source of the VOCs was unknown, and there was no regulatory guidance to indicate any immediate action should be taken, the best plan was to have the experts from NACIP investigate the issue when they conducted sampling in the near future. If the VOCs were coming from the water wells, NACIP would determine which ones, if any, posed a health risk. Additionally, MILCON funds had already been appropriated to demolish the TT plant and replace it with water lines from an expanded Holcomb Blvd Plant, so any PCE originating in the TT water treatment plant would also be remedied. Had

the Hadnot Point and Tarawa Terrace plants been taken off line in 1983, Camp Lejeune would not have had sufficient capacity at existing plants to supply water to these areas.

- 25 Feb 83 Mr. Julian Wooten, Director, NREAD in a memo to AC/S Facilities recommended discontinuing THM monitoring at all water treatment systems except MCAS, New River and Hadnot Point. Also recommended initiating consultation with State regulatory personnel relative to alternatives for achieving compliance with trihalomethane standards. No mention was made of VOCs.
- Apr 83 IAS for Marine Corps Base, Camp Lejeune, North Carolina is published by NEESA. This NACIP study stated that: "No industrial or municipal wastes were found to be migrating onto base property." At the time the IAS was released, Camp Lejeune did not know that contamination was extending onto Base from ABC Cleaners.
- 25 May 83 A letter was sent from EPA to DoD stating: "Federal Drinking Water Standards for TCE are currently under development by EPA." The letter discussed some proposed standards, and noted that they were likely to be in 5-50 ppb range for chronic exposures, but added "as a note of caution...these recommended levels are of an interim nature and should not be applied to all TCE sites without addressing individual specific site conditions." This letter was not, however, received by, or communicated to, Camp Lejeune until 1985.
- 16 Sep 83 THM results of quarterly sampling reflected contamination of TCE and PCE in TT and Hadnot Point. This information would have been forwarded to the state as THM sampling data.
- 13 Nov 83 Site visit by LANTDIV and Environmental Science and Engineering, Inc. in furtherance of the Confirmation Study under the NACIP program.
- 12 Dec 83 Letter from Col M.G. Lilley, AC/S Facilities, to Mr. Charles E. Rundgren, Water Supply Branch, Division of Health Services, Raleigh, North Carolina stated that Camp Lejeune was discontinuing voluntary monitoring of all water systems for trihalomethanes other than Hadnot Point and MCAS New River. MCAS New River would continue testing on a quarterly basis, as required by law, and it was requested that the Hadnot Point system be reduced from quarterly testing to annual testing.
- 1983-84 NACIP Confirmation Study of potential hazardous waste sites aboard Camp Lejeune is on-going.

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- 1984 Well TT-23 was constructed approximately 1800' from ABC Cleaners
- 12 Jun 84 Between 1979 and 1982, EPA, in a proposed rulemaking, suggested recommended levels of VOCs in drinking water at which adverse health effects would not be anticipated. These levels were published on this date in the Federal Register. However, no maximum levels for TCE and PCE were set until 1987, and these regulations did not become effective until 1989.
- Jul 84 Base wells were sampled for TCE as part of the Base NACIP Confirmation Study Program, largely in areas where chemicals were suspected to have leaked. Wells in use at Hadnot Point and TT were found to contain various VOCs. This information was not passed on to Camp Lejeune officials until November 1984 because NACIP did not release information until sampling readings had been verified.
- 30 Nov 84 Hadnot Point water treatment plant well 602 was tested and found to contain: TCE = 1,600 ppb, Trans 1,2-DCE = 630 ppb, Benzene = 121 ppb, and 1,1,2,2-TCA = 24 ppb. Well 602 was shut down on 30 Nov 84.
- 4 Dec 84 Hadnot Point wells 601, 603, 608, 634, 637, and 642 were tested. Results indicate: well 601: TCE = 207 ppb, trans 1,2-DCE = 88 ppb; well 603: TCE = 4.6 ppb. Wells 634, 637, and 642 reflected no contamination. The raw and treated water was tested at the water treatment plant. Results indicate the influent had: TCE = 46 ppb, trans 1,2-DCE = 15 ppb, chloroform = 10 ppb, and bromodichloromethane = 6 ppb. The effluent had: TCE = 196 ppb, trans 1,2-DCE = 83 ppb, chloroform = 16 ppb, and bromodichloromethane = 10 ppb. No 1,1,2,2-PCA was detected in either the raw or treated water.
- 6 Dec 84 Telephone Conversation Record of phone call from Mr. Robert Alexander, Facilities Department, with Mr. Jim Bailey, Chief, LANTDIV Environmental Office concerning the monitoring of Hadnot Point water supply system. Mr. Alexander states that he returned Mr. Bailey's call concerning the laboratory analysis of Hadnot Point well 602 and additional wells. The analysis was completed in response to a request by Mr. Paul Rakowski, LANTDIV manager of the NACIP confirmation study. Benzene was confirmed in well 602, from which pumping has been stopped. TCE was also found in wells 602, 601, 603, 608, and in the finished water at Bldg. 20, the Hadnot Point water plant. It was agreed between Mr. Bailey and Mr. Alexander that confirmation testing should be initiated as soon as possible at these and other wells in the system. Samples of finished and raw water at Bldg. 20 should also be analyzed

until further notice. Resampling of wells 601, 603, and 608 should also be completed to confirm detection of these compounds. Mr. Bailey stated that a message was forthcoming which described a plan of action to address the problem. The plan would include additional sampling of the system and wells to pinpoint the areas contaminated. After briefing Col. Lilley and LtCol. Fitzgerald, Mr. Alexander advised Mr. Fred Cone, Assistant Base Maintenance Officer to shut down wells 601 and 608.

- 6 Dec 84 Hadnot Point wells 601 and 608 were shut down.
- 10 Dec 84 Hadnot Point wells 601, 602, 603, 608, 634, 637, and 642 were tested. Results indicated: well 601: PCE = 4.4 ppb, TCE = 230 ppb, trans 1,2-DCE = 99 ppb, methylene chloride = 10 ppb; well 602: TCE = 540 ppb, trans 1,2-DEC = 380 ppb, Benzene = 720 ppb; well 603: TCE = non-detect, methylene chloride = 7 ppb; well 608: TCE = 13 ppb, trans 1,2-DCE = 2.4 ppb, methylene chloride = 14 ppb, and benzene = 4 ppb. Wells 634, 637, and 642 reflected methylene chloride contamination at 130 ppb, 275 ppb, and 38 ppb respectively. The treated water was then tested at the water treatment plant. Results indicated the effluent had: TCE = 2.3 ppb, trans 1,2-DCE = 2.3 ppb, and chloroform = 30 ppb. NOTE: detections of methylene chloride are believed to have been the result of a laboratory contaminant during testing.
- 13 Dec 84 Hadnot Point well 602 was sampled again. Results exhibited: TCE = 340 ppb, trans 1,2-DCE = 230 ppb, benzene = 230 ppb, and toluene = 12 ppb.
- 13-19 Dec 84 The raw water at the Hadnot Point plant was tested daily.
- 14 Dec 84 Hadnot Point wells 634 and 637 were shut down.
- Jan 85 Contract awarded to demolish TT water treatment plant and expand the Holcomb Blvd. plant.
- Jan 85 Monitoring for VOCs commenced at all Hadnot Point and Tarawa Terrace wells. Decision is made by Base officials to test all drinking water wells on Base for VOCs.
- 16 Jan 85 Wells TT-26 and TT-23 were sampled. Results indicated: TT-26: PCE = 1,580 ppb, TCE = 57 ppb, DCE = 92 ppb and vinyl chloride = 27 ppb. TT-23: PCE = 132 ppb, DCE = 11 ppb, no TCE or vinyl chloride was detected.
- 27 Jan 85 A generator fuel line at the Holcomb Boulevard water distribution plant leaked fuel into the water system. The system was immediately shut down

and flushed out. Emergency back up water was pumped from the VOC contaminated Hadnot Point system into the Holcomb Blvd. water distribution system.

- 31 Jan 85 Tap water samples taken from Berkeley Manor Elementary School (which was temporarily receiving water from the Hadnot Point Plant) contained TCE at 1,148 ppb and 1,2-DCE at 407 ppb. These findings were consistent with samples taken from the Hadnot Point plant on the same day, indicating the contamination originated from the emergency water supplied by the Hadnot Point system. Water from the clean Holcomb Blvd. system was restored approximately 9 days later.
- Feb-Mar 85 Base officials begin making plans to expand capacity of Holcomb Boulevard Plant through well construction so that TT Plant can be taken off line.
- Feb 85 Message from Camp Lejeune to LANTDIV regarding NACIP study indicated characterization of VOC problems in Hadnot Point, Holcomb Blvd., and TT systems on-going.
- 4 Feb 85 Well 651 in Hadnot Point was found to have PCE and TCE contamination at extremely high levels, PCE = 400 ppb, TCE = 18,900 ppb, and DCE = 8070 ppb. Well 651 was adjacent to Lot 203 (IR Site #6) and should have been sampled during Nov-Dec NACIP sampling, but was not. All VOC contaminated wells in the Hadnot Point system are now offline.
- 4 Feb 85 Holcomb Blvd and Hadnot Point plants and water distribution systems are flushed and Holcomb Blvd is put back on line.
- 5 Feb 85 Tap water in TT was tested again. Results reflected PCE = 215 ppb, TCE = 8.1 ppb, and DCE = 12 ppb.
- 8 Feb 85 TT wells TT-23 and TT-26 were closed and disconnected from the water distribution system. All contaminated wells in TT are now offline.
- 12 Feb 85 Finished water from the TT distribution system was tested again, and determined to contain no VOCs.
- 19 Feb 85 Water from the TT distribution system was tested again, and was determined to contain no VOCs. Each of the nine TT wells was tested. No contaminants were detected in TT-25, TT-30, TT-31, TT-52, TT-53, TT-54, or TT-67. TT-26 showed: PCE = 1580 ppb, TCE = 57 ppb, DCE = 92 ppb, and vinyl chloride = 27 ppb. TT-23 (new well) reflected: PCE

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- = 41 ppb, TCE = non-detect, DCE = 13 ppb, no vinyl chloride was found.
- 21 Feb 85 Report of North Carolina Department of Human Resources analysis of TT-26 and TT New Well (TT-23) (both of which were offline). TT-26: PCE = 3.91 ppb, TCE = 55.17 ppb, trans 1,2-DCE = trace. TT-23: PCE = 26.17 ppb, TCE = 53.53 ppb, trans 1,2-DCE = trace.
- 1 Mar 85 An Action Brief was generated by the AC/S, Facilities concerning alternatives for providing water to the TT area. The recommended alternative involved constructing an 8" water line from the Holcomb Blvd. water treatment plant to TT. The line could be tied to the railroad trestle to cross Northeast Creek. Estimated cost: \$75,000.
- 11 Mar 85 Julian Wooten sent a letter to AC/S, Facilities concerning his conversation with Paul Hubbell of HQMC regarding published standards for certain types of volatile organic chemicals found in drinking water wells. Mr. Hubbell had made numerous contacts to locate information, to include: American Water Works Association; all DoD services, except the U.S. Air Force; Criteria and Standards Division, Office of Drinking Water, and State Programs Division, all with the EPA Office of Water. Mr. Hubbell communicated that there was a surprising lack of information regarding VOC limits. The Army provided Mr. Hubbell the previously referenced letter from EPA suggesting short term exposure limits of 200 ppb and long term limits of 5-50 ppb for TCE.
- 27 Mar 85 Letter from LANTDIV to Environmental Science and Engineering, Inc. (the NACIP contractor) regarding the Confirmation Study; Evaluation of Data from First Round of Verification Sample Collection and Analysis. This letter provided comments from Camp Lejeune on the "Draft" interim report.
- Apr 85 LANTDIV letter to EPA outlined status and progress of NACIP study.
- Apr 85 In April 85, after sampling TT Wells, North Carolina Department of Environmental Management began to investigate ABC Cleaners as the source of the VOCs in the TT wells.
- Apr 85 -87 The Base continued weekly monitoring of the Hadnot Point and TT water systems for VOCs. Well TT-25 began monthly testing as the State felt it would probably be the next well to become contaminated.
- 22-29 Apr 85 TT-23 was reopened, and used to maintain water production and avoid system shutdown. On every monitoring occasion, VOC analyses of TT

finished water by the LANTDIV contract laboratory indicated concentrations less than the detection limit of 10 ppb.

- 29 Apr 85 Construction began on the auxiliary raw water line to TT to supplement the existing water available in TT. Completion date was expected to be 1 June 85.
- 30 Apr 85 In a "Notice to Residents of Tarawa Terrace" from the Commanding General, MGen. L.H. Buehl imposed voluntary water use restrictions on TT family housing residents because the available water supply could not meet the demand. Supply had been reduced by closure of two contaminated wells. Demand had increased due to unseasonably warm weather. Residents were informed that two of the wells that supply TT had minute (trace) amounts of several organic chemicals. Residents were also informed that there were no definitive State or Federal regulations regarding a safe level of these compounds, but, as a precaution, the CG ordered the closure of the wells for all but emergency situations when fire protection or domestic supply would be threatened.
- 15 May 85 North Carolina Department of Natural Resources and Community Development issued a "Notice of Violation" (NOV) to Camp Lejeune for contaminated wells. This NOV cited ten contaminated supply water wells aboard Camp Lejeune. The contaminated wells included: HP-601, HP-602, HP-603, HP-608, HP-634, HP-637, HP-642, HP-651, TT-26 and "new TT" (TT-23). The organic contaminants include: PCE, TCE, 1,2-trans-dichloroethylene, methylene chloride, vinyl chloride, 1,1-dichloroethane, benzene, toluene, and dichlorobenzene. All the impacted wells were exposed to the Tertiary Sand Aquifer somewhere between 50 and 200 feet below land surface. This NOV required the Marine Corps to submit to the State a plan of action (with a schedule of compliance) that would: 1) identify the source(s) of contamination; 2) define the geometry of the plumes; 3) define the quality attributes of the plume(s); 4) project the future impacts of the source(s); and 5) propose remedial actions to restore the polluted groundwaters to GA standards. The Marine Corps response to this NOV was to expedite the implementation of the NACIP program.
- 1 Jun 85 Gas Chromatograph in the Camp Lejeune NREAD lab became operational. This allowed local testing of drinking water for contaminants.
- 10 Jun 85 Construction of an emergency auxiliary waterline from Holcomb Blvd. water treatment plant to TT completed easing the water shortage. Water restrictions in TT were lifted. In the late 1980's, an expansion contract permanently tied the TT water system to the Holcomb Blvd Plant

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- 1 Jul 85 Construction began to expand the Holcomb Blvd. water treatment plant from 2 MGD to 5 MGD.
- 1- 8 Jul 85 VOC testing conducted at TT and HP Plants; no VOCs detected in treated water.
- 19 Jul 85 Response letter from Camp Lejeune, Col. R.A. Tiebout, AC/S, Facilities to the N.C. Department of Natural Resources and Community Development regarding the NOV of Groundwater Classification and Standards. The plan of action to address groundwater contamination was to implement the NACIP program at Camp Lejeune. The plan of action included the verification step, characterization step, and feasibility study efforts. This plan recommended a characterization effort for the contaminated wells, including two wells of the TT system. This effort included an investigation for potential VOC sources within a one-mile radius of each contaminated well. The study assessed potential sources outside the Camp Lejeune property boundary.
- 6 Nov 85 Laboratory analyses of TT wells TT-26, TT-23 (New Well), and TT-25, indicated a continuing problem in TT-26 and TT-23 of PCE and TCE contamination. TT-25 exhibited trace amounts of PCE (.43 ppb) which were below the level which can usually be detected by most laboratory analyses (2 ppb). No VOCs were detected in the finished water from the TT water treatment plant.
- 24 Jan 86 North Carolina Department of Natural Resources and Community Development notified Mr. Milton Melts, President of ABC One-Hour Cleaners, Incorporated, that he was in violation of North Carolina General Statutes: G.S. 143-215.1(a)(5) and G.S. 143-215.1(a)(6), for disposing of dry cleaning solvents in the septic tank system, and for the disposal resulting in the violation of standards for underground waters respectively.
- 22 Jul 86 LANTDIV letter to EPA advised of additional NACIP efforts at Camp Lejeune. Included in this letter is an appendix to the NACIP contract with a Scope of Work for Round Two Sampling and Characterization & Feasibility. Particularly identified was the intent to conduct an extensive physical survey and document review to identify potential sources of contamination at potable wells on MCB, Camp Lejeune. The objectives of the characterization step were to: 1) Locate the source of VOC contamination detected in deep water supply wells; 2) Determine concentration of detected parameters in source area(s); 3) Determine aquifer characteristics (transmissivity, hydraulic conductivity, permeability, storage coefficients and degree of confinement for both deep and shallow aquifers); and 4) Determine rate and direction of groundwater

and contaminant flow for the deep potable water supply aquifer influenced by supply wells serving the Hadnot Point water treatment plant, and for the shallow aquifer in the Hadnot Point Industrial Area.

- 27 Feb 87 Construction complete on Holcomb Blvd. water treatment plant expansion.
- 1 Mar 87 TT water treatment plant and wells are closed. All TT finished water being provided by Holcomb Blvd. water treatment plant.
- 27 May 87 Site Inspection Report completed by NC Solid and Hazardous Waste Management Branch of ABC One Hour Cleaners. From the study, NRCD was able to conclude that ABC One Hour Cleaners was the source of PCE contamination to groundwater.
- 8 July 1987 EPA publishes final rule establishing maximum contaminant levels for TCE, and monitoring requirements for PCE. Monitoring requirements for TCE and PCE are effective on January 1, 1988.
- 22 Sep 88 Letter from the N.C. Department of Natural Resources and Community Development to Col. T.J. Dalzell, AC/S, Facilities regarding: "Review and Comment, Characterization, Confirmation and Feasibility Reports, Hadnot Point Industrial Area, Camp Lejeune, North Carolina, Onslow County." This letter provided the first notice of state numerical standards for VOC groundwater constituents including PCE, TCE, trans 1,2-DCE, and vinyl chloride as they would appear in the revised North Carolina Groundwater Classifications and Standards (15 NCAC 2L).

2 JUN 02

UPON DOJ RECOMMENDATION  
THIS VERSION WAS NEVER  
RELEASED TO SENATOR WARNER.  
MORE CONCISE VERSION OF CHRONOLOGY  
WAS ULTIMATELY APPROVED BY HQMC  
AND FORWARDED WITH REMAINDER OF  
LEJEUNE RESPONSE TO SENATOR WARNER  
VFA OAC. THAT VERSION CAN CURRENTLY BE  
FOUND ON THE LEJEUNE WEBSITE.



CLW